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RESOURCE CONSERVATION AND RECOVERY ACT FACILITIES INVESTIGATION (RFI) REPORT FOR SOLID WASTE MANAGEMENT UNIT 16 AND SOLID WASTE MANAGEMENT UNIT 17 VOLUMES I THROUGH III CNC CHARLESTON SC
09/01/2008
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October 2, 2008

Mr. David Jones
Environmental Program Manager
Naval Weapons Station Charleston
2316 Red Bank Road
Goose Creek, SC 29445-8601

Facility: Naval Weapons Station Charleston
EPA ID NO. SC8 170 022 620

RE: Approval
Response to Comments and Revision Pages
RCRA Facility Investigation (RFI) Report
SWMU 16-Old Southside Landfill
SWMU 17-Old Southside Missile and Waste Oil Disposal Area
Dated September 18, 2008

Dear Mr. Jones:

The South Carolina Department of Health and Environmental Control (the Department) received the above referenced Response to Comments (RTCs) and Revision Pages on September 18, 2008. This submittal is necessary in order to address the Department's comments to the RCRA Facility Investigation Report (RFI) for SWMUs 16 and 17. (Tetrault to Jones, dated September 20, 2006). SWMU 16 is located in the southern portion of the Naval Weapons Station (NWS) and was used for the disposal of solid and liquid wastes generated at the NWS between 1941 and 1978. SWMU 17 is also located in the southern portion of the NWS immediately east of SWMU 16. SWMU 17 was used primarily for the surface disposal of solid waste between 1950 and 1978, but oils and missile components were also disposed of at the site.

SWMUs 16 and 17 have been undergoing a RFI in accordance with the applicable sections of the NWS' Hazardous Waste Management Permit (Permit). The Department has reviewed the above referenced RFI Report with respect to the applicable sections of the NWS' Permit, R.61-79 of the South Carolina Hazardous Waste Management Regulations (SCHWMR), and the approved RFI Work Plan (Scaturo to Jones, dated 11/16/2004).

Based on this review, the Department has determined the RTCs and revision pages have adequately addressed its comments. The NWS should next submit the Corrective Measures Work Plan for SWMUs 16 and 17. Please note that the Department's decision is based on available information provided by the NWS. Any information found to be contradictory to this decision may require additional action.

If you have any questions regarding this issue, please contact me at (803) 896-6675 or petruslb@dhec.sc.gov.

Sincerely,

Laurel B. Petrus, Environmental Engineer Associate
Corrective Action Engineering Section
Division of Waste Management
Bureau of Land and Waste Management

Attachments

cc: Michael W. Danielsen, DWM
Christine Sanford-Coker, Region 7 EQC
Arthur Collins, USEPA Region 4
Dan Owens, NAVFAC SE
B. K. Moring, NAVFAC SE
Linda Klink, Tetra Tech NUS, Inc

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-94-D-0888

Rev. 1
09/08

RFI Report
for
SWMU 16 - Old Southside Landfill and
SWMU 17 - Old Southside Missile and Waste Oil Disposal Area

VOLUME I OF III - TEXT, TABLES, AND FIGURES

Naval Weapons Station Charleston
Charleston, South Carolina

Contract Task Order 0137

September 2008

USEPA ID No. SC8 170 022 620

NAVFAC
Naval Facilities Engineering Command
NAVFAC SOUTHEAST

NAS Jacksonville
Jacksonville, Florida 32212-0030

TETRA TECH NUS, Inc.

Rev. 1
09/08

RFI REPORT
SWMU 16- OLD SOUTHSIDE LANDFILL AND
SWMU 17- OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA

NAVAL WEAPONS STATION CHARLESTON
CHARLESTON, SOUTH CAROLINA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Naval Facilities Engineering Command
Southeast
NAS Jacksonville
Jacksonville,Florida 32212-0030

Submitted by:
Tetra Tech NUS, Inc.
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220

CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0137

SEPTEMBER 2008

PREPARED UNDER THE SUPERVISION OF:

LINDA KLINK, P.E.
TASK ORDER MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

APPROVED FOR SUBMITTAL BY:

DEBRA M. HUMBERT
PROGRAM MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

CERTIFICATION PAGE

REGISTERED SOUTH CAROLINA PROFESSIONAL GEOLOGIST CERTIFICATION

By affixing my seal to this report, I certify that the geologic data and interpretations stated in the *RFI Report for SWMU 16 - Old Southside Landfill and SWMU 17 - Old Southside Missile and Waste Oil Disposal Area, Naval Weapons Station Charleston, South Carolina* are true and accurate to the best of my knowledge. I further certify that I am registered to practice geology in the State of South Carolina and that it is within my professional expertise to verify the correctness of this information.

Keith W. Henn, P.G.
Registration Number 2242

September 17, 2008
Date

FOREWORD

To meet its mission objectives, the United States Navy (Navy) performs a variety of operations, some requiring the use, handling, storage, or disposal of hazardous materials. Through accidental spills and leaks and conventional methods of past disposal, hazardous materials may have entered the environment in ways unacceptable by today's standards. With growing knowledge of the long-term effects of hazardous materials on the environment, the United States Department of Defense (DoD) initiated various programs to investigate and remediate conditions related to suspected past releases of hazardous materials at DOD facilities.

One of these programs is the Installation Restoration (IR) Program. This program complies with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA); the Resource Conservation and Recovery Act (RCRA); and the Hazardous and Solid Waste Amendments of 1984 (HSWA). These acts establish the means to assess and clean up hazardous waste sites for both private-sector and federal facilities.

The program adopted to address present hazardous material management is the RCRA and HSWA corrective action program. RCRA ensures that solid and hazardous wastes are managed in an environmentally sound manner. The corrective action program is designed to identify and clean up releases of hazardous substances at RCRA-permitted facilities.

The RCRA-HSWA program is conducted in four stages as follows:

- RCRA Facility Assessment (RFA)
- RCRA Facility Investigation (RFI)
- Corrective Measures Study (CMS)
- Corrective Measures Implementation (CMI)

The Naval Facilities Engineering Command Southeast (NAVFAC SE) manages and the United States Environmental Protection Agency (USEPA) and the South Carolina Department of Health and Environmental Control (SCDHEC) oversee the Navy environmental program at Naval Weapons Station (NWS) Charleston. All aspects of the program are conducted in compliance with State and federal regulations, as ensured by the participation of these regulatory agencies.

Questions regarding the RCRA-HSWA program at NWS Charleston should be addressed to Mr. Dan Owens, Engineer-in-Charge, Code OPTCEVR, at (904) 542-6367.

TABLE OF CONTENTS

SECTION **PAGE NO.**

CERTIFICATION PAGE ..... **iii**

FOREWORD ..... **v**

ACRONYM LIST ..... **xiv**

1.0 INTRODUCTION **1-1**
1.1 PURPOSE OF REPORT 1-1
1.2 SCOPE OF REPORT 1-1
1.3 HISTORICAL INFORMATION 1-2
1.3.1 Facility Background 1-2
1.3.2 Regulatory Setting 1-3
1.3.3 SWMU 16 - Background and History 1-4
1.3.4 SWMU 16 - Previous Investigations 1-5
1.3.5 SWMU 17 – Background and History 1-5
1.3.6 SWMU 17 – Previous Investigations 1-6
1.4 REPORT ORGANIZATION 1-6

2.0 ENVIRONMENTAL SETTING **2-1**
2.1 CLIMATE 2-1
2.2 TOPOGRAPHY 2-1
2.3 SURFACE WATER DRAINAGE 2-2
2.4 GEOLOGY 2-2
2.5 HYDROGEOLOGY 2-3
2.5.1 Hydrogeology of the Surficial Aquifer 2-4
2.5.2 Hydrogeology and Water Quality of Deep Aquifer Systems 2-4

3.0 INVESTIGATION SUMMARY **3-1**
3.1 FIELD INVESTIGATIONS PRIOR TO THE RFI 3-2
3.1.1 SWMU 16 – Old Southside Landfill 3-2
3.1.2 SWMU 17 – Old Missile Ordnance and Waste Oil Disposal Area 3-3
3.2 RFI FIELD INVESTIGATION 3-4
3.2.1 Deviations from the Work Plan 3-4
3.2.2 Unexploded Ordnance Avoidance 3-5
3.2.3 Permanent and Temporary Well and Piezometer Installation and Groundwater Sampling 3-5
3.2.4 MIP Installation and Interpretation 3-8
3.2.5 Surface Water Sampling 3-9
3.2.6 Sediment Sampling 3-10
3.2.7 Surface/Subsurface Soil Sampling 3-10
3.2.8 Quality Assurance/Quality Control Samples 3-11
3.2.9 Staff Gauge Installation 3-12
3.2.10 Groundwater Level Measurements 3-12
3.2.11 Field Mapping and Surveying 3-12
3.2.12 Geophysical Survey 3-13
3.2.13 Investigation-Derived Waste 3-13
3.2.14 Sample Analysis 3-14
3.2.15 Slug Tests 3-14

TABLE OF CONTENTS (Continued)

SECTION **PAGE NO.**

3.2.16 Tidal Study 3-14
3.2.17 Monitoring Well Abandonment 3-15
3.2.18 Site Restoration 3-15
3.3 SITE-SPECIFIC GEOLOGY 3-15
3.3.1 Descriptions of Cross Sections 3-17
3.4 SITE-SPECIFIC HYDROGEOLOGY 3-21
3.4.1 Groundwater Occurrence 3-21
3.4.2 Groundwater Flow Direction 3-21
3.4.3 Groundwater Flow Characteristics 3-23

4.0 NATURE AND EXTENT OF CONTAMINATION 4-1
4.1 SOIL 4-2
4.1.1 SWMU 16 Surface Soil 4-2
4.1.2 SWMU 16 Subsurface Soil 4-3
4.1.3 SWMU 17 Surface Soil 4-5
4.1.4 SWMU 17 Subsurface Soil 4-7
4.2 GROUNDWATER 4-9
4.2.1 SWMU 16 Groundwater 4-9
4.2.2 SWMU 17 Groundwater 4-10
4.3 SURFACE WATER 4-13
4.3.1 SWMU 16 Surface Water 4-13
4.3.2 SWMU 17 Surface Water 4-14
4.4 SEDIMENT 4-14
4.4.1 SWMU 16 Sediment 4-14
4.4.2 SWMU 17 Sediment 4-15
4.5 SUMMARY 4-16
4.5.1 SWMUs 16 and 17 Surface and Subsurface Soil 4-16
4.5.2 SWMUs 16 and 17 Groundwater 4-17
4.5.3 SWMUs 16 and 17 Surface Water and Sediment 4-17

5.0 CHEMICAL FATE AND TRANSPORT ANALYSIS 5-1
5.1 CHEMICAL AND PHYSICAL PROPERTIES 5-1
5.2 CHEMICAL PERSISTENCE 5-1
5.2.1 Ketones 5-2
5.2.2 Monocyclic Aromatics 5-2
5.2.3 Halogenated Aliphatics 5-3
5.2.4 Phthalate Esters 5-4
5.2.5 Polynuclear Aromatic Hydrocarbons 5-4
5.2.6 Pesticides 5-5
5.2.7 Polychlorinated Biphenyls 5-5
5.2.8 Explosives 5-6
5.2.9 Metals 5-7
5.3 CHEMICAL MIGRATION 5-7
5.3.1 Volatile Organics 5-7
5.3.2 Polynuclear Aromatic Hydrocarbons 5-8
5.3.3 Pesticides 5-8
5.3.4 Explosives 5-8
5.3.5 Inorganics 5-8

TABLE OF CONTENTS (Continued)

SECTION **PAGE NO.**

6.0 HUMAN HEALTH RISK ASSESSMENT 6-1
6.1 DATA EVALUATION 6-2
6.1.1 Data Usability 6-2
6.1.2 Selection of Chemicals of Potential Concern 6-3
6.2 EXPOSURE ASSESSMENT 6-18
6.2.1 Conceptual Site Model 6-18
6.2.2 Central Tendency Exposure versus Reasonable Maximum Exposure 6-25
6.2.3 Exposure Point Concentrations 6-26
6.2.4 Chemical Intake Estimation 6-27
6.2.5 Exposure to Lead 6-38
6.3 TOXICITY ASSESSMENT 6-39
6.3.1 Toxicity Criteria 6-40
6.3.2 Toxicity Criteria for Dermal Exposure 6-40
6.3.3 Toxicity Criteria for Carcinogenic Effects of PAHs 6-41
6.3.4 Toxicity Criteria for Chromium 6-41
6.4 RISK CHARACTERIZATION 6-41
6.4.1 Quantitative Analysis 6-41
6.4.2 Comparison of Quantitative Risk Estimates to Benchmarks 6-42
6.4.3 Results of the Risk Characterization 6-43
6.5 UNCERTAINTY ANALYSIS 6-51
6.5.1 Uncertainty in Selection of COPCs 6-53
6.5.2 Uncertainty in the Exposure Assessment 6-58
6.5.3 Uncertainty in the Toxicological Evaluation 6-62
6.5.4 Uncertainty in the Risk Characterization 6-65
6.6 SUMMARIES 6-66

7.0 ECOLOGICAL RISK ASSESSMENT 7-1
7.1 SCREENING-LEVEL PROBLEM FORMULATION 7-1
7.1.1 Environmental Setting 7-2
7.1.2 Contaminants, Ecotoxicity, and Fate and Transport 7-5
7.1.3 Complete Exposure Pathways 7-7
7.1.4 Preliminary Assessment and Measurement Endpoints 7-8
7.2 SCREENING-LEVEL ECOLOGICAL EFFECTS EVALUATION 7-11
7.3 SCREENING-LEVEL EXPOSURE ESTIMATE AND RISK CALCULATION 7-11
7.3.1 SWMU 16 COPCs 7-13
7.3.2 SWMU 17 COPCs 7-13
7.4 STEP 3A - REFINEMENT OF COPCS 7-14
7.4.1 General Approach 7-14
7.4.2 Risks to Terrestrial Wildlife 7-15
7.4.3 Step 3a Discussion - SWMU 16 7-19
7.4.4 Step 3a Discussion - SWMU 17 7-40
7.6 UNCERTAINTY 7-58
7.6.1 Uncertainty in the Problem Formulation 7-58
7.6.2 Uncertainty in the Ecological Effects Characterization 7-59
7.6.3 Uncertainty in the Exposure Assessment 7-60
7.6.4 Uncertainty in the Risk Characterization 7-60
7.7 SUMMARY AND CONCLUSIONS 7-61
7.7.1 SWMU 16 7-61
7.7.2 SWMU 17 7-62

TABLE OF CONTENTS (Continued)

SECTION **PAGE NO.**

8.0 CONCLUSIONS AND RECOMMENDATIONS 8-1
8.1 CONCLUSIONS 8-1
8.1.1 SWMU 16 Conclusions 8-1
8.1.2 SWMU 17 Conclusions 8-2
8.2 RECOMMENDATIONS 8-4
8.2.1 SWMU 16 Recommendations 8-4
8.2.2 SWMU 17 Recommendations 8-4

REFERENCES R-1

APPENDICES

A FIELD FORMS
A-1 DRILLING PERMIT AUTHORIZATIONS
A-2 BORING LOGS and MIP LOGS
A-3 MONITORING WELL CONSTRUCTION DIAGRAMS
A-4 MONITORING WELL DEVELOPMENT RECORDS
A-5 LOW-FLOW PURGE SHEETS
A-6 GROUNDWATER SAMPLE LOG SHEETS
A-7 SURFACE WATER SAMPLE LOG SHEETS
A-8 SEDIMENT SAMPLE LOG SHEETS
A-9 SOIL SAMPLE LOG SHEETS
A-10 QA/QC AND IDW SAMPLE LOG SHEETS
A-11 WATER-LEVEL MEASUREMENTS
A-12 SURVEY COORDINATES
A-13 IDW DISPOSAL DOCUMENTATION
A-14 SITE RESTORATION CERTIFICATIONS

B MIP REPORTS BY COLUMBIA TECHNOLOGIES
B-1 2003 MIP REPORT
B-2 2005 MIP REPORT

C REFERENCES
C-1 GEOPHYSICAL SURVEY RESULTS
C-2 FIELD MAPPING OF DEBRIS
C-3 HISTORICAL AERIAL PHOTOGRAPHS
C-4 TIDE PREDICTION TABLES
C-5 SOLUTIONS-IES PILOT SCALE TREATABILITY STUDY REPORTS

D HYDROGEOLOGICAL DATA AND CALCULATIONS
D-1 SLUG TEST RESULTS AND CALCULATIONS
D-2 TIDAL STUDY DATA
D-3 HYDRAULIC GRADIENT AND SEEPAGE VELOCITY CALCULATIONS

TABLE OF CONTENTS (Continued)

APPENDICES (Continued)

E ANALYTICAL RESULTS
- **E-1 SURFACE SOIL ANALYTICAL RESULTS**
- **E-2 SUBSURFACE SOIL ANALYTICAL RESULTS**
- **E-3 GROUNDWATER ANALYTICAL RESULTS (TtNUS)**
- **E-4 GROUNDWATER ANALYTICAL RESULTS (SOLUTIONS-IES)**
- **E-5 SURFACE WATER ANALYTICAL RESULTS**
- **E-6 SEDIMENT ANALYTICAL RESULTS**
- **E-7 QA/QC ANALYTICAL RESULTS**
- **E-8 IDW ANALYTICAL RESULTS**
- **E-9 CHAIN-OF-CUSTODY FORMS**

F SUPPORTING DOCUMENTATION FOR THE HUMAN HEALTH RISK ASSESSMENT

G SUPPORTING DOCUMENTATION FOR THE ECOLOGICAL RISK ASSESSMENT

TABLES

NUMBER

2-1 Climatic Conditions for NWS Charleston
3-1 SWMU 16 and 17 Sampling and Analyses Program
3-2 IDW and QA/QC Sampling and Analysis Program
3-3 Monitoring Well Construction Summary
3-4 Temporary Well and MIP Construction Summary
3-5 Summary of Groundwater Quality Parameters Collected During Purging
3-6 Summary of Surface Water Quality Parameters
3-7 Water-Level Measurements October 10, 2001 (High and Low Tide)
3-8 Water-Level Measurements December 3, 2001 (Low Tide) and December 4, 2001 (High Tide)
3-9 Water-Level Measurements March 1, 2005 (High Tide) and February 22, 2005 (Low Tide)
3-10 Summary of Hydraulic Conductivity Testing
4-1 Facility Background Concentration Summary - Hydric Soil, Nonhydric Soil, and Groundwater
4-2 Surface Soil Summary Statistics – SWMU 16
4-3 Subsurface Soil Summary Statistics – SWMU 16
4-4 Surface Soil Summary Statistics – SWMU 17
4-5 Subsurface Soil Summary Statistics – SWMU 17
4-6 Groundwater Summary Statistics – SWMU 16
4-7 Monitoring Well 2001 and 2005 Data Comparison – SWMU 16
4-8 Groundwater Summary Statistics – SWMU 17
4-9 Monitoring Well 2001 and 2005 Data Comparison – SWMU 17
4-10 Comparison VOC Data from Co-located Temporary and Permanent Monitoring Wells – SWMU 17

TABLES (Continued)

NUMBER

4-11 Comparison of Tree Coring Results with Groundwater and Soil Samples – SWMU 17
4-12 Comparison of Color-Tec Screening Results with Groundwater Samples – SWMU 17
4-13 Surface Water Summary Statistics – SWMU 16
4-14 Surface Water Summary Statistics – SWMU 17
4-15 Sediment Summary Statistics – SWMU 16
4-16 Sediment Summary Statistics – SWMU 17
5-1 Fate and Transport Physical and Chemical Characteristics for Organics
5-2 Fate and Transport Physical and Chemical Constants for Inorganics
6-1 Occurrence, Distribution, and Selection of COPCs – Surface Soil, SWMU 16
6-2 Occurrence, Distribution, and Selection of COPCs – Subsurface Soil, SWMU 16
6-3 Occurrence, Distribution, and Selection of COPCs – Groundwater, SWMU 16
6-4 Occurrence, Distribution, and Selection of COPCs – Surface Water, SWMU 16
6-5 Occurrence, Distribution, and Selection of COPCs – Sediment, SWMU 16
6-6 Occurrence, Distribution, and Selection of COPCs – Surface Soil, SWMU 17
6-7 Occurrence, Distribution, and Selection of COPCs – Subsurface Soil, SWMU 17
6-8 Occurrence, Distribution, and Selection of COPCs – Groundwater, SWMU 17
6-9 Occurrence, Distribution, and Selection of COPCs – Surface Water, SWMU 17
6-10 Occurrence, Distribution, and Selection of COPCs – Sediment, SWMU 17
6-11 Exposure Point Concentrations for COPCs – SWMU 16
6-12 Exposure Point Concentrations for COPCs – SWMU 17
6-13 Receptors and Exposure Routes for Quantitative Evaluation – SWMUs 16 and 17
6-14 Summary of Exposure Input Parameters – RME, SWMUs 16 and 17
6-15 Summary of Exposure Input Parameters – CTE, SWMUs 16 and 17
6-16 Non-Cancer Toxicity Data – Oral/Dermal, SWMUs 16 and 17
6-17 Non-Cancer Toxicity Data – Inhalation, SWMUs 16 and 17
6-18 Cancer Toxicity Data – Oral/Dermal, SWMUs 16 and 17
6-19 Cancer Toxicity Data – Inhalation, SWMUs 16 and 17
6-20 Summary of Cancer Risks and Hazard Indices – RME, SWMU 16
6-21 Summary of Cancer Risks and Hazard Indices – RME, SWMU 17
6-22 Summary of Cancer Risks and Hazard Indices – CTE, SWMU 16
6-23 Summary of Cancer Risks and Hazard Indices – CTE, SWMU 17
7-1 Ecological COPC Selection – Surface Soil, SWMU 16
7-2 Ecological COPC Selection – Sediment, SWMU 16
7-3 Ecological COPC Selection – Surface Water, SWMU 16
7-4 Ecological COPC Selection – Surface Soil, SWMU 17
7-5 Ecological COPC Selection – Sediment, SWMU 17
7-6 Ecological COPC Selection – Surface Water, SWMU 17
7-7 Exposure Parameters for the Terrestrial Wildlife Model, SWMUs 16 and 17
7-8 Maximum Hazard Quotients – Terrestrial Wildlife Food-chain Models, SWMU 16
7-9 Average Hazard Quotients – Terrestrial Wildlife Food-chain Models, SWMU 16
7-10 Maximum Hazard Quotients – Terrestrial Wildlife Food-chain Models, SWMU 17
7-11 Average Hazard Quotients – Terrestrial Wildlife Food-chain Models, SWMU 17
8-1 Summary of Receptor-Specific Human Health and Ecological Risks and Recommendations – SWMU 16
8-2 Summary of Receptor-Specific Human Health and Ecological Risks and Recommendations – SWMU 17

FIGURES

NUMBER

1-1 Naval Weapons Station Charleston Location Map
1-2 Site Location Map – SWMU 16 and 17
1-3 Site Plan and Topography
2-1 Prevailing Wind Direction Naval Weapons Station Charleston
2-2 Physiographic Provinces of South Carolina
2-3 Generalized Geologic Cross-Section Transecting From Columbia to Charleston, South Carolina
3-1 Groundwater and Surface Water Sample Location Map – SWMU 16 and 17
3-2 Soil and Sediment Sample Location Map – SWMU 16
3-3 Soil and Sediment Sample Location Map – SWMU 17
3-4 Cross Section Locations
3-5 Geologic Cross Section A-A'
3-6 Geologic Cross Section B-B' and C-C'
3-7 Geologic Cross Section D-D' and E-E'
3-8 Geologic Cross Section F-F' and G-G'
3-9 Geologic Cross Section H-H'
3-10 Potentiometric Surface Map Low Tide October 2001
3-11 Potentiometric Surface Map High Tide October 2001
3-12 Potentiometric Surface Map Low Tide December 2001
3-13 Potentiometric Surface Map High Tide December 2001
3-14 Potentiometric Surface Map Low Tide February 2005
3-15 Potentiometric Surface Map High Tide March 2005
3-16 Summary of Tidal Study
3-17 Abandoned Wells – SWMU 16
4-1 Areas of SWMU 16/17 Disturbance/Activity Based on Historic Aerial Photos
4-2 Soil and Sediment Exceedances Tag Map – SWMU 16
4-3 Soil and Sediment Exceedances Tag Map – SWMU 17
4-3A Soil Exceedances Tag Map – SWMU 17
4-4 Groundwater and Surface Water Tag Map – SWMUs 16 and 17
4-5 Groundwater and Surface Water Isoconcentration Map – SWMUs 16 and 17
4-6 Groundwater VOCs Profile – Southern Plume [Cross Sections E-E' and C-C']
4-7 Groundwater VOCs Profile – Northern Plume [Cross Section F-F' and G-G']
4-8 Groundwater VOCs Profile – Northern Plume [Cross Section B-B']
4-9 Tree Coring Contamination Map
6-1 Human Health Conceptual Site Model – SWMU 16
6-2 Human Health Conceptual Site Model – SWMU 17
7-1 Ecological Conceptual Site Model – SWMU 16
7-2 Ecological Conceptual Site Model – SWMU 17

ACRONYM LIST

°C	degrees Celsius
ABB-ES	ABB Environmental Services
ACH	air changes per hour
AET	Apparent Effects Threshold
ALM	Adult Lead Model
ARAR	Applicable or Relevant and Appropriate Requirements
ASTM	American Society for Testing and Materials
ATSDR	Agency for Toxic Substances and Disease Registry
AWQC	Ambient Water Quality Criteria
BAF	Bioaccumulation factors
BCF	Bioconcentration factors
BEHP	bis(2-ethylhexyl) phthalate
BERA	Baseline Ecological Risk Assessment
bgs	below ground surface
BRAC	Base Realignment and Closure
BTEX	Benzene, toluene, ethylbenzene, and xylenes
Cal EPA	California Environmental Protection Agency
CDI	chronic daily intake
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action Navy
CLP	Contract Laboratory Program
cm/sec	centimeters per second
cm^2	square centimeters
CMI	Corrective Measures Implementation
CMS	Corrective Measures Study
CNO	Chief of Naval Operations
COC	Contaminant of concern or chain of custody
COPC	Chemical of potential concern
CRQL	Contract Required Quantitation Limit
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
CTE	central tendency exposure
CTO	Contract Task Order
CVOC	Chlorinated volatile organic compound

DAF	dilution and attenuation factor
DCA	dichloroethane
DCE	dichloroethene
DI	deionized
DNT	dinitrotoluene
DO	dissolved oxygen
DoD	United States Department of Defense
DOT	Department of Transportation
DPT	direct-push technology
ECD	electron capture detector
EEG	Environmental Enterprise Group, Inc.
EGIS	Environmental Geographic Information System
ESE	Environmental Science and Engineering
EM	electromagnetic
EPC	exposure point concentration
ERA	Ecological Risk Assessment
ER-L	Effects Range Low
ER-M	Effects Range Medium
ESE	Environmental Science and Engineering, Inc.
ESTCP	Environmental Security Technology Certification Program
ESV	ecological screening value
EU	exposure unit
FAQ	frequently asked questions
FDEP	Florida Department of Environmental Protection
FEMA	Federal Emergency Management Agency
gpm	gallons per minute
HEAST	Health Effects Assessment Summary Tables
HHRA	human health risk assessment
HI	Hazard Index
HQ	Hazard Quotient
HSA	hollow-stem auger
HSWA	Hazardous and Solid Waste Amendment of 1984
IAS	Initial Assessment Study
ILCR	Incremental Lifetime Cancer Risk
ID	Inside diameter or intake dose
IDW	investigation-derived waste
IEUBK	Integrated Exposure Uptake Biokinetic
ILCR	Incremental Lifetime Cancer Risk

IM	interim measures
INRMP	Integrated Natural Resources Management Plan
IPCS	International Programme on Chemical Safety
IR	Installation Restoration or ingestion rate
IRIS	Integrated Risk Information System
LEL	lowest effect level
LOAEL	Lowest Observed Adverse Effect Level
MATC	maximum acceptable toxicant concentration
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
MEK	methyl ethyl ketone
MET	minimal effect threshold
MHSPE	Dutch Ministry of Housing, Spatial Planning, and Environment
MIP	Membrane Interface Probe
mg/L	milligrams per liter
mS/cm	milliSiemen per centimeter
mV	millivolt
MPF	Maritime Prepositioning Force
MRL	Minimal Risk Level
MSC	Military Sealift Command
mS/cm	milliSiemen per centimeter
msl	mean sea level
MS/MSD	matrix spike/matrix spike duplicate
NA	not applicable
NACIP	Naval Assessment and Control of Installation Pollutants
NAD	North American Datum
NAVD	North American Vertical Datum
NAVFAC SE	Naval Facilities Engineering Command Southeast
NCEA	National Center for Environmental Assessment
NECC	nutrient and energy cycling check
NFESC	Naval Facilities Engineering Service Center
NOAA	National Oceanic and Atmospheric Administration
NOAEL	No Observed Adverse Effect Level
NSF	National Sanitation Foundation
NTU	nephelometric turbidity unit
NWI	National Wetlands Inventory
NWS	Naval Weapons Station
OPPTS	Office of Prevention, Pesticide, and Toxic Substances

ORNL	Oak Ridge National Laboratory
ORP	oxidation-reduction potential
OSWER	Office of Solid Waste and Emergency Response
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PEC	Probable Effect Concentrations
PEF	particulate emission factor
PEL	Probable Effects Level
PID	photoionization detector
POMFLANT	Polaris Missile Facility U.S. Fleet Atlantic
ppb	parts per billion
PPE	personnel protective equipment
PPRTV	Provisional Peer Reviewed Toxicity Value
PQL	Practical Quantitation Limit
PRG	Preliminary Remediation Goal
psi	pounds per square inch
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
RAGS	Risk Assessment Guidance for Superfund
RBC	Risk-based concentration
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RfC	Reference Concentration
RfD	Reference Dose
RFI	RCRA Facility Investigation
RME	reasonable maximum exposure
RPD	relative percent difference
RPM	Remedial Project Manager
SARA	Superfund Amendments and Reauthorization Act
SCDHEC	South Carolina Department of Health and Environmental Control
SCDNR	South Carolina Department of Natural Resources
SCHWMR	South Carolina Hazardous Waste Management Regulations
SCV	secondary chronic value
SCWQS	South Carolina Water Quality Standards
SDWA	Safe Drinking Water Act
SEL	Severe Effects Level
SERA	screening-level ecological risk assessment

SFF	Site Foraging Frequency
SMCL	Secondary Maximum Contaminant Level
SMDP	Scientific/Management Decision Point
SOP	Standard Operating Procedure
SQAL	sediment quality advisory level
SSL	soil screening level
STL	Severn-Trent Laboratories
SU	Standard unit
SVOC	semivolatile organic compound
SWDA	Solid Waste Disposal Act
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TBC	To Be Considered
TCA	trichloroethane
TCE	trichloroethene
TCL	Target Compound List
TCLP	Toxicity Characteristics Leaching Procedure
TDS	total dissolved solids
TEC	threshold effects concentration
TEF	Toxicity Equivalence Factor
TEL	Threshold Effects Level
TET	Toxic Effect Threshold
TNT	trinitrotoluene
TOC	Total organic carbon
TOR	top of riser
TOX	total organic halogens
TPH	total petroleum hydrocarbons
TPVC	top of polyvinyl chloride
TRV	Toxicity Reference Value
TRW	Technical Review Workgroup
TtNUS	Tetra Tech NUS, Inc.
UCL	upper confidence limit
µg/l	micrograms per liter
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UTL	upper tolerance limit

UXO	Unexploded ordnance
VC	vinyl chloride
VDEQ	Virginia Department of Environmental Quality
VF	volatilization factor
VOC	volatile organic compound
WQC	Water Quality Criteria
WQS	Water Quality Standard

EXECUTIVE SUMMARY

PURPOSE AND OBJECTIVE OF REPORT

This Resource Conservation and Recovery Act (RCRA) Facilities Investigation (RFI) Report summarizes the field activities, conducted from 2000 through 2005, and results for two adjacent Solid Waste Management Units (SWMUs): SWMU 16 [Old Southside Landfill] and SWMU 17 [Waste Oil Disposal Area], located at the Naval Weapons Station (NWS) Charleston, South Carolina. The objectives of the RFI were to characterize the nature and extent of contamination and to determine the associated risks to possible human and ecological receptors. Historically, several assessments of SWMUs 16 and 17 indicated the potential for contamination, and an RFI was recommended to comply with the NWS Charleston RCRA permit modification at the time, effective October 30, 2003.

HISTORICAL INFORMATION

- NWS Charleston is located 10 miles north of Charleston, South Carolina, and approximately 16 miles inland from the Atlantic Ocean. The facility is situated in two counties, Berkeley and Charleston, and occupies 16,868 acres.

SWMU 16

SWMU 16 is located in the southern part of NWS Charleston, encompasses an area of approximately 10 acres, and is located within the tidal marsh zone north of Goose Creek. The area is covered by trees, grasses, and shrubbery. Various debris, predominantly construction rubble, lies on the surface. The site was the primary landfill used for disposal of solid and liquid wastes generated at NWS between 1941 and 1978. Solid wastes included household waste, construction and demolition materials, empty containers from shop areas, and metal waste. In addition, approximately 500 mercury batteries were disposed at random locations in the landfill, and 90 mm shells were discarded at the site, of which approximately 40 were removed in 1980. Liquid wastes included oily wastes and solvents; an estimated 5,000 to 15,000 gallons of waste oil and solvents (i.e., toluene, methyl ethyl ketone, xylene, and acetone) were disposed at the site annually.

The site was closed in 1980, graded, and covered with approximately 2 feet of local soil fill. Rubbish consisting of mainly wood, concrete, metal, and plastic was removed from along the marsh edge, and riprap was installed along the edge of the marsh. All loose combustible material, except for creosoted wood, was burned. Oil drums located in the eastern part of the disposal area were crushed and placed under the soil cover. The ground beneath the drums was reportedly saturated with oil and therefore no

burning in this area was conducted. The remaining material was compacted, covered, and grassed. All salvageable material was removed from the site.

SWMU 17

SWMU 17 is located in the southern part of NWS Charleston, immediately east of SWMU 16 and across the road named Wilkinson Way. The site is rectangular in shape and was initially reported as 180 feet long and 90 feet wide; however, the actual area of disposal was suspected to be larger based on the geophysical survey conducted in 2000 and based on historical aerials showing disturbed areas. Therefore, the site boundary was conservatively expanded to 500 feet long and 200 feet wide. The site was used primarily for surface disposal of solid waste between 1950 and 1978, but oils and missile components were also disposed at the site. An estimated 3,000 to 4,000 gallons of engine oil were disposed at the site between 1965 and 1966. Historically, solid wastes observed across the site included rubble, paint cans and buckets, and missile components. A Thorium-alloy missile nose cone exhibiting low-level radioactivity was removed from the site in 1984.

SCOPE OF RFI AND REPORT

The scope of field work for the RFI was extensive and included a geophysical survey, a limited tidal study, field mapping of the high tide water elevation and known "hot spot" areas, a Membrane Interface Probe (MIP)/soil conductivity investigation to log the lithology and determine contamination profiles with depth, installation of temporary and permanent monitoring wells, staff gauges, and a piezometer, groundwater sampling, aquifer testing, water-level measurements, historical monitoring well abandonment, sampling of surface soil, subsurface soil, surface water, and sediment, surveying, investigation-derived waste (IDW) disposal, and site restoration. Specifically, the RFI included 40 soil borings (4 at SWMU 16 and 36 at SWMU 17) with up to 4 samples collected per boring including surface soils, 4 surface soil locations, 8 co-located surface water/sediment sample locations (7 at SWMU 16 and 1 at SWMU 17), 5 staff gauges (3 at SWMU 16 and 2 at SWMU 17), 55 MIP locations (SWMU 17), 70 temporary monitoring wells (SWMU 17), 34 permanent monitoring wells (5 at SWMU 16 and 29 at SWMU 17), 1 piezometer (SWMU 16), and abandonment of 5 historic monitoring wells.

SWMU 17 was used as a missile and waste oil disposal area in the past, and SWMU 16 was also suspected to contain unexploded ordnance (UXO). Therefore, each borehole location and access pathway was cleared by a UXO specialist prior to any invasive activity. No UXO was encountered during field activities at SWMU 17. At SWMU 16, no UXO was encountered during the 2001 field activities conducted largely beyond the site perimeter; however, for the 2004/2005 field activities planned within the landfill boundary, metal interferences occurred at all of the proposed drilling sites and much of the access

pathways, and so the drilling program was terminated. The indication of metal interferences confirms the presence of metal within the landfill.

Human health and ecological risk assessments were also conducted to support site decisions. The data collected during the investigation have been validated and placed into a database. The database was used during preparation of this RFI Report to support the risk assessments, including the comparison of analytical results with State and federal standards, and facility background levels.

In addition, a pilot-scale traatability study took place in 2004 and is in progress. The study is being conducted by Solutions-IES, and involves a patented process for injection of an edible oil emulsion to treat chlorinated solvents in groundwater downgradient of the SWMU 17 apparent source area. A rigorous demonstration is necessary to meet the requirements of the Environmental Security Technology Certification Program (ESTCP) funding the study. Results from select groundwater samples collected by Solutions-IES are included in the RFI Report to aid in the evaluation of nature and extent of contamination.

SITE-SPECIFIC GEOLOGY

The general stratigraphic sequence encountered at SWMUs 16 and 17 during the RFI consists of Holocene and Pleistocene (near marine to marine) deposits overlaying the Oligocene Ashley Formation. Both sites lie within the 100-year floodplain boundary. Holocene deposits found at SWMUs 16 and 17 include artificial fill, tidal marsh, and freshwater stream and swamp sediments. These Holocene deposits grade laterally into Pleistocene deposits to the east. Generally, Pleistocene deposits consist of interlayered beds of clay, sand, and fossiliferous sand of near marine (back barrier) origin. Not all of the units are uniformly present at the sites. Deposits described as olive brown, non-plastic, friable silt and clay were encountered beneath the Pleistocene deposits; the contact was a distinct break from the overlying sediments of grayish green deposits in the eastern portion of SWMU 17. This unit is believed to be the Ashley Formation of the Cooper Group and is of marine origin. The unit, approximately 125 feet thick, is a major regional aquitard and marks the bottom of the surficial aquifer.

The Soil Survey of Berkeley County maps indicate that the Bohicket-Capers association and Wahee series are the predominant soil units found in the SWMUs 16 and 17 areas. Both soil types have very poor permeability and are generally described as approximately 0.6-foot loams underlain by clay and silty clay approximately 4 to 8 feet thick, formed in clayey coastal plain environments.

<u>SWMU 16</u>

At SWMU 16, the subsurface materials consist primarily of three units. Fill material (sand and silt with varying amounts of clay and waste material) was encountered in the top 5 to 8 feet below ground surface

(bgs). Beneath the fill material is interbedded marsh muck (clay and silt) and peat with a combined thickness of approximately 25 to 35 feet. The Ashley Formation of the Cooper Group is inferred to come in contact with the overlying marsh muck.

SWMU 17

At SWMU 17, the subsurface material consists primarily of five units above the Ashley Formation of the Cooper Group. A low permeable clay unit at the land surface was encountered throughout the SWMU and extends to about 5 to 10 feet bgs. Beneath the clay unit is a silt and sand unit that coarsens downward to a shelly sand unit. Both of these units were encountered throughout SWMU 17 and have a combined thickness ranging from 17 to 32 feet. Beneath the shelly sand in the west portion of SWMU 17 is a distinct silt and clay unit. The silt and clay unit changes laterally into a sand unit that was encountered beyond the eastern boundary of SWMU 17. The Ashley Formation of the Cooper Group is inferred to underlie both units (silt and clay and sand). The upper surface of the Ashley Formation of the Cooper Group has a relatively steep slope (2.4 percent) to the north and was encountered at 16 feet bgs at the southern boundary and at 42 feet bgs in the north.

SITE-SPECIFIC HYDROGEOLOGY

The surficial aquifer present in the sediments beneath SWMU 16 and 17 displays the characteristics of a semi-confined to unconfined system. Typically, the first water is encountered just beneath the upper clay unit that extents from the land surface elevation to a depth of 5 to 12 feet bgs.

A tidal study was completed in 2001 to evaluate the interaction between the surface water and groundwater. In summary, wells located in the upland areas outside of the marsh areas were not tidally influenced while those in the marsh deposits adjacent to the surface water bodies are believed to be influenced by tidal fluctuations. In 2001, during low tide, there was a groundwater divide or mound in the western portion (marsh) of SWMU 16. Groundwater in the marsh was flowing from the mound to the east, south, and west. A high gradient existed on the western side of the mound, possibly indicating a restricted hydraulic connection between groundwater and surface water (Goose Creek) in this area. During high tide, a depression in the potentiometric surface contours in the central portion of the study area was observed as a result of the increase in water levels and groundwater flowed toward this depression. These flow patterns in 2001 were reflective of drought conditions. Rainfall has increased since 2001 and the potentiometric surface has changed as a result. In 2005, the potentiometric surface mimicked the land surface topography. The groundwater divide was still present at SWMU 16 but was oriented more to the northeast-southwest. At SWMU 16, groundwater was flowing west, southwest and northwest toward Goose Creek while at SWMU 17 groundwater was flowing east toward the tributary of Goose Creek. During high tide in 2005, a similar flow pattern was observed.

A downward flow component was evident between the shallow and deep groundwater of the surficial aquifer. Data suggest that the deeper groundwater at SWMU 17 is flowing to the east and southeast toward the tributary to Goose Creek and ultimately the Cooper River. Generally, the marsh mud in SWMU 16 had the lowest average hydraulic conductivity at 0.51 feet per day (1.78E-04 centimeters per second), and the grayish green sand unit in the deep surficial aquifer on the eastern side of SWMU 17 had the highest at 17.91 feet per day (6.32E-03 centimeters per second). The hydraulic conductivity values show that at SWMU 17, the permeability increases significantly downward through the surficial aquifer compared to the SWMU 17 upper wells at 1.24 feet per day (4.38E-04 centimeters per second). The hydraulic gradients (averaged from high and low tide gradients) were relatively low, estimated at 0.0049 foot per foot for SWMU 16 and 0.0075 foot per foot for SWMU 17. The average groundwater velocities for the upper surficial aquifer were calculated to be 0.0063 feet per day (2.3 feet per year) for SWMU 16 and 0.031 feet per day (11.3 feet per year) at SWMU 17.

NATURE AND EXTENT OF CONTAMINATION

SWMUs 16 and 17 Surface and Subsurface Soil

SWMU 16 was a landfill containing industrial waste, and SWMU 17 was likely subjected to the sporadic draining of drums. Specifically for soil samples, this leads to variability in types and concentrations of contaminants and locations of detections and also leads to uncertainties in the evaluation of sample analytical results. Although many of the detections were erratic and relatively low level compared to screening criteria (generally one order of magnitude or less), four source areas of more elevated contamination were identified as follows:

- At SWMU 16 (surface soil sample location 16SS02), there is a debris area with elevated levels of polychlorinated biphenyls (PCBs) (Aroclor 1254), bis(2-ethylhexyl) phthalate (BEHP) and inorganics (primarily lead and chromium). This area can be considered a "hot spot" with exceedances more than two orders of magnitude in excess of screening criteria. Subsurface samples could not be collected in this area because of UXO clearance issues.

- At SWMU 17, the center of the depression area (soil boring 17SB17) was contaminated with chlorinated volatile organic compounds (VOCs), primarily trichloroethene (TCE). This area can be considered a "hot spot" with exceedances of screening criteria of more than two orders of magnitude in surface soil and more than four orders of magnitude in subsurface soil. Also, corresponding TCE impacts to groundwater from this source area are evident.

- At SWMU 17, north of the depression area (location 17SB14), an area near an empty rusted drum had subsurface soil concentrations of carbon tetrachloride and chloroform in excess of their respective screening criteria by more than one order of magnitude. For the entire site, there were several exceedances of these two VOCs and so additional source areas are likely.

- At SWMU 17, one final source location of lesser significance was identified in an unvegetated area (soil borings 17SB11 and 17SB12) near the road (Wilkinson Way) toward the western site boundary. Of most significance were surface soil screening criteria exceedances for lead, chromium, and PCBs and facility background exceedances for copper and zinc. Migration of contamination to subsurface soil or groundwater was not evident.

SWMUs 16 and 17 Groundwater

Groundwater results indicated chlorinated VOC plumes migrating outwardly from two source areas. One plume originates in the area of SWMU 16 where former landfill trenches were located, and another originates in the depression area of SWMU 17. Numerous VOCs were detected with concentrations radiating from the SWMU 17 depression areas; TCE was the primary groundwater contaminant. Vinyl chloride and 1,2-dichloroethene (DCE) were also detected at multiple locations in this area. The only semivolatile organic compound (SVOC) exceeding its drinking water standard was BEHP. Several inorganics were detected at the sites; arsenic and beryllium were detected at levels exceeding drinking water standards at locations beyond the SWMU 17 eastern border. Data collected from permanent monitoring wells in 2001 compared to data collected in 2005 showed varied relationships. Several of the permanent wells displayed a decrease in concentrations of inorganics, while others increased dramatically. At SWMU 16, concentrations of VOCs (particularly TCE) increased, and at SWMU 17 concentrations were varied, with a large decrease in tetrachloroethene (PCE).

SWMUs 16 and 17 Surface Water and Sediment

Several contaminants were detected in SWMU 16 surface water and sediment samples at concentrations exceeding screening criteria established for this RFI. However, the exceedances were nominal (one order of magnitude or less), and there was no correlation between chemical concentrations in surface water versus sediment. Antimony was the only chemical detected in surface water at concentrations exceeding its drinking water standard, yet there was no correlation of contaminants between surface water and groundwater. SWMU 17 surface water and sediment detections were primarily limited to inorganics, and there were no exceedances of note.

SUMMARY OF BASELINE HUMAN HEALTH RISK ASSESSMENT

The baseline human health risk assessments for SWMUs 16 and 17 were performed to characterize the potential risks to likely human receptors under current and future land use. Potential receptors under current versus future land use are expected to be the same. Regardless, future land use was evaluated in the baseline human health risk assessment, primarily for decision-making purposes. The future land use evaluation is based on the assumption that if various site conditions were to change in the future, potential exposure could occur if the site was developed.

SWMU 16

Potential receptors under current land use were occupational workers (e.g., maintenance workers) and adolescent trespassers. Potential receptors under future land use were construction/excavation workers. Potential future residents were not evaluated in the baseline human health risk assessment because SWMU 16 is a marshy area located in the 100-year foodplain, with saline water subject to tidal inundation and it is unlikely that the site will be developed for residential purposes in the future. Land use controls will be required to address any site restrictions.

Quantitative estimates of noncarcinogenic and carcinogenic risks were developed for potential human receptors via one or more of the following exposure pathways (inhalation of volatiles from surface water and sediment were considered to result in insignificant exposures and so these exposure pathways were not evaluated):

- Soil – Ingestion and dermal contact, inhalation of dusts and particulates, inhalation of volatiles
- Groundwater – dermal contact and inhalation of volatiles in an excavation trench (construction worker only)
- Surface Water – ingestion and dermal contact
- Sediment – ingestion and dermal contact

Under current land use, risks for the occupational worker receptor and trespasser were limited to one surface soil "hot spot" location (sample 16-S-02-00 at location 16SS02). Risks were primarily attributable to lead based on modeling indicating that the predicted blood levels of children and the fetuses of exposed adult workers were unacceptable considering the maximum concentration of lead (12,400 mg/kg). Additionally, for the occupational worker, significant noncarcinogenic risks occurred (Hazard Index (HI) of 6 compared to the USEPA target of 1) with Aroclor 1254 as the primary contributor, and significant carcinogenic risks (10^{-4}, which is at the limit of the target risk range of 10^{-4} to 10^{-6}) were attributed to BEHP and Aroclor 1254. Only construction/excavation workers were assumed to be exposed to contaminants in subsurface soil. To account for the possibility that subsurface soil could be brought to the surface in a future excavation

project, the potential exposure of occupational workers to contaminants in subsurface soil was also evaluated. In this case, risks would be significant (2.0×10^{-5}) yet still within the target risk range.

For the future construction/excavation worker, risks from exposure to lead were unacceptable based on modeling of predicted blood levels of fetuses of exposed adult workers. For other contaminants, noncarcinogenic and carcinogenic risks were acceptable.

In summary for SWMU 16, significant potential health risks for current/future trespassers, current/future occupational workers and future construction/excavation workers were estimated primarily as a result of exposure to lead in surface soil at one hot spot location from a debris pile area. In addition, for the current/future occupational worker, other contributors to the risks were BEHP, and Aroclor 1254 (and chromium to a minor extent) based on concentrations detected at the same "hot spot" location for surface soils. Risks estimated for subsurface soil, groundwater, surface water, and sediment were acceptable based on the target range. A residential exposure scenario was not evaluated for SWMU 16. Considering that SWMU 16 is a known landfill and subsurface soils were not adequately characterized, risks are likely significantly underestimated.

SWMU 17

Potential receptors under current land use were occupational workers (e.g., maintenance workers) and adolescent trespassers. Although likely future land use is expected to be the same as current land use, construction/excavation workers, full time occupational workers, and future residents (adults and children) were evaluated in the baseline human health risk assessment, primarily for decision-making purposes. The evaluation of these receptors is based on the assumption that if various site conditions were to change in the future, potential exposure could occur if the site was developed.

Quantitative estimates of noncarcinogenic and carcinogenic risks were developed for potential human receptors via one or more of the following exposure pathways (similar to SWMU 16, inhalation of volatiles from surface water and sediment were not evaluated for SWMU 17):

- Soil – Ingestion and dermal contact, inhalation of dusts and particulates, inhalation of volatiles
- Groundwater – Ingestion and dermal contact, inhalation of volatiles while showering, inhalation of volatiles inside buildings as the result of vapor intrusion, inhalation of volatiles in an excavation trench (by a construction worker only)
- Surface Water – ingestion and dermal contact
- Sediment – ingestion and dermal contact

Under current land use for occupational workers, significant carcinogenic risks were calculated ($2x10^{-5}$) yet still within the target risk range from exposure to TCE, PCBs, polycyclic aromatic hydrocarbons (PAHs), and arsenic in surface soil. These constituents were detected in approximately 20 percent (or less) of the surface soil samples although risk estimates were based on the maximum detected concentrations. Under current land use for trespassers, risks were insignificant. Exposure to lead in surface soil at SWMU 17 was evaluated using lead model analyses, and results were found to be acceptable based on predicted lead levels of children and the fetuses of exposed adult workers.

Under future land, elevated risks were calculated for residents (child and adult). Across the site, both noncarcinogenic and carcinogenic risks of 3 (child) and $6x10^{-02}$ (child and adult), respectively, exceeded USEPA risk benchmarks. The primary concern is future resident exposure to SWMU 17 groundwater as a result of several chlorinated VOCs, especially TCE, and inorganics (arsenic, beryllium, cobalt, and manganese) presenting both noncarcinogenic and carcinogenic risks. Although arsenic was a major contributor to risk based on maximum concentration, the average concentration was less than its drinking water standard and facility background concentration, and arsenic appeared to be within naturally occurring levels in surface water and sediment and only very slightly exceeding background levels in soil. Minor contributors to the groundwater carcinogenic risks (i.e., less than 10^{-5} and within the target risk range) were the explosives constituent RDX and BEHP; however, these constituents were infrequently detected. Groundwater risks at SWMU 17 were based on the maximum detected concentrations of all COPCs and are, therefore, overestimated. Also for future residents, significant carcinogenic risks (less than 10^{-4}, which is near the limit of the target risk range) were attributable to PAHs in surface soil. PAHs were detected in approximately 20 percent (or less) of the surface soil samples although risk estimates were based on the maximum detected concentrations.

Only construction/excavation workers were assumed to be exposed to contaminants in subsurface soil. To account for the possibility that subsurface soil could be brought to the surface in a future excavation project, the potential exposure of future residents and occupational workers to contaminants in subsurface soil were also evaluated. In this case, noncarcinogenic and carcinogenic risks for the resident [3.0 (child) and $4x10^{-4}$ (child and adult), respectively] exceeded the target risk range. For the occupational worker, carcinogenic risk was also significant at $1x10^{-4}$, which is at the limits of the acceptable range. The primary contributor to both carcinogenic and noncarcinogenic risks was TCE, mainly by inhalation of vapors from soil into ambient air. The risks for TCE in subsurface soil were based on the maximum detected concentration (910 mg/kg in sample 17-B-17-03 at location 17SB03) at the depression area, which is an apparent source of the southern groundwater plume.

In summary for SWMU 17, under current land use, risks for the trespasser and occupational worker are acceptable. Under future industrial land use, however, for both future occupational workers and future residents, a significant potential concern exists from inhalation of TCE from subsurface soil, should it be

brought to the surface in a future excavation project. Minor risks were calculated for excavation/construction and occupational workers from inhalation of TCE from groundwater to ambient air. Under future residential land use, elevated noncarcinogenic and carcinogenic risks were calculated for potential exposure to several chlorinated VOCs and several metals in groundwater. Also for the future resident, exposure to benzo(a)pyrene and arsenic in surface soil was estimated as a minor concern. No COPCs were identified for sediment, and risks estimated for surface water were less than the benchmarks.

SUMMARY OF ECOLOGICAL RISK ASSESSMENT

Screening level ecological risk assessments were performed for SWMUs 16 and 17 to characterize the potential risks to likely ecological receptors from exposure to contaminants in surface soil, sediment, and surface water. Several chemicals were detected in maximum concentrations that exceeded conservative screening levels and toxicity reference values and, thus, were further evaluated as a part of the less conservative "Step 3a" refinement.

SWMU 16

Plants and Soil Invertebrates

In surface soil, concentrations of Aroclor 1254, antimony, cadmium, chromium, lead, mercury, and zinc posed elevated risks to soil invertebrates and plants. In particular, hazard quotients (HQs) for Aroclor 1254 and lead were 2,950 and 1,127, respectively. However, risks are limited to one surface soil sample (16-S-02-00 at location 16SS02). Although localized impacts could occur in the vicinity of 16SS02, no impacts to plants and invertebrates at SWMU 16 are expected at other locations.

Benthic Invertebrates and Aquatic Organisms

In sediment, potential risk due to concentrations of alpha- and gamma-BHC (pesticides), Aroclor 1242, copper, mercury, and nickel are possible because concentrations at some locations exceeded toxicity data. However, maximum screening HQs based on screening criteria were relatively low (alpha-BHC HQ = 4.2, gamma-BHC HQ = 1.9, Aroclor 1242 HQ = 4.8, copper HQ = 5.3, mercury HQ = 2.2, and nickel HQ = 1.8).

In surface water, aluminum, with an HQ of 126, and iron were detected at concentrations greater than alternate benchmarks for two of the surface water samples (16SW05 and 16SW07), located south and downgradient of the debris area in the southeastern boundary of the SWMU. It is possible that contaminants in surface soil have migrated to these locations; however, at all other surface water locations risks are negligible.

Summary of Food-chain Modeling

Potential risks to insectivorous and herbivorous small mammals and birds from bioaccumulative contaminants in surface soil were evaluated. Based on the food-chain modeling results, lead posed significant potential risks to insectivorous and/or representative herbivorous receptors with an average HQ of 110, but only in the vicinity of location 16SS02. More minor contributors to risk at this location included Aroclor 1254, cadmium, chromium, mercury, and zinc.

Risks to piscivorous small mammals and birds from bioaccumulative contaminants in sediment were also evaluated. Aroclor 1242 (with an average HQ=18) and to a lesser extent mercury (with an average HQ=4.7) posed potential risks to piscivorous receptors, but only for any receptors that forage exclusively at two of the sediment locations (16SD02 and 16SD05, respectively).

SWMU 17

Plants and Soil Invertebrates

In surface soil, concentrations of chromium, copper, lead, manganese, nickel, and zinc posed potential risks to soil invertebrates and plants, with the maximum HQ of 30 calculated for zinc. Concentrations of these metals were greater than alternate toxicity guidelines for plants and invertebrates at some locations, in particular locations 17SB11 and 17SB12 within the unvegetated area of the site. Potential risk is probably minimal at other locations.

Benthic Invertebrates and Aquatic Organisms

For sediment and surface water, no chemicals were determined to pose potential risks overall.

Summary of Food-chain Modeling

Based on the food-chain modeling results, Aroclor 1248, chromium, lead, mercury, and zinc concentrations posed minor potential risks to insectivorous and/or herbivorous small mammals and birds with all average HQs less than 8.0. Risks were isolated to the vicinity of 17SB11 and 17SB12 within the unvegetated area of the site, and to a lesser extent, 17SB17 within the depression area of the site.

RECOMMENDATIONS

SWMU 16

Considering risks at SWMU 16 and its historical use as an industrial landfill, a Corrective Measures Study (CMS) is warranted to explore remedial alternatives. Interim measures may be considered to address localized surface soil/debris contamination (lead, PCBs, and BEHP) associated with the debris pile area.

SWMU 17

Considering risks at SWMU 17 and the random nature of historical waste disposal operations, a CMS is warranted to explore remedial alternatives. Interim measures may be considered to address localized subsurface soil contamination (i.e., TCE) in the depression area that appears to be a source of groundwater contamination. Interim measures may also be considered to address surface debris (e.g., rusted empty drums).

1.0 INTRODUCTION

Tetra Tech NUS, Inc. (TtNUS) has prepared this Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report for the Old Southside Landfill [Solid Waste Management Unit (SWMU) 16] and the Old Southside Missile and Waste Oil Disposal Area (SWMU 17), located at Naval Weapons Station (NWS) Charleston, South Carolina (see Figures 1-1 and 1-2). This report was prepared for Naval Facilities Engineering Command Southeast (NAVFAC SE) under Contract Task Order (CTO) 0137 for the Comprehensive Long-Term Environmental Action Navy (CLEAN) III Contract Number N62467-94-D-0888.

1.1 PURPOSE OF REPORT

The objectives of the RFI at SWMUs 16 and 17 were to characterize the nature and extent of contamination and to determine the associated risks to possible human and ecological receptors. Historically, several assessments of SWMUs 16 and 17 indicated the potential for contamination, and an RFI was recommended to comply with the NWS Charleston RCRA permit modification at the time, effective October 30, 2003.

RFI activities were conducted in accordance with several work plans:

- Generic RFI and Corrective Measures Study Work Plan (referred to herein as the Generic Work Plan) completed by ABB Environmental Services (ABB-ES) (1995).
- RFI Work Plan for SWMU 16 and 17 completed by TtNUS (2001)
- RFI Supplemental Work Plan for SWMU 16 and SWMU 17 completed by TtNUS (2004)

Together, these work plans were designed to provide direction for field and laboratory staff to ensure that specific procedures were properly implemented in a safe and scientifically defensible manner. The RFI field investigation for SWMU 16 and 17 was conducted in several phases from 2000 through 2005 because the sites were complicated and data gaps remained.

1.2 SCOPE OF REPORT

The scope of work for the RFI was extensive and included a geophysical survey, a limited tidal study, field mapping of the high tide water elevation and known "hot spot" areas, a Membrane Interface Probe (MIP)/soil conductivity investigation to log the lithology and determine contamination profiles with depth, installation of temporary and permanent monitoring wells, staff gauges, and a piezometer, groundwater sampling, aquifer testing, water-level measurements, historical monitoring well abandonment, and

sampling of surface soil, subsurface soil, surface water, and sediment. Human health and ecological risk assessments were also conducted to support site decisions.

The data collected during the investigation have been validated and placed into a database. The database was used during preparation of this RFI Report to support the risk assessments, including the comparison of analytical results with State and federal standards, and facility background levels.

In addition, a pilot-scale treatability study took place in 2004 and is in progress. The study is being conducted by Solutions-IES, and involves a patented process for injection of an edible oil emulsion to treat chlorinated solvents in groundwater downgradient of the SWMU 17 apparent source area. A rigorous demonstration is necessary to meet the requirements of the Environmental Security Technology Certification Program (ESTCP) funding the study. Solutions-IES reports are included as Appendix C-5. Results from some of the groundwater samples collected by Solutions-IES either before the treatability study or outside of the treatment area (i.e., samples unaffected by the treatment) are included in the RFI Report to aid in the evaluation of nature and extent of contamination. Sample results inside the treatment area following the injection were excluded.

1.3 HISTORICAL INFORMATION

1.3.1 Facility Background

NWS Charleston is located 10 miles north of Charleston, South Carolina and approximately 16 miles inland from the Atlantic Ocean (Figure 1-1). The facility is situated in two counties, Berkeley and Charleston, and occupies 16,868 acres. The eastern section of the facility is bordered by the Cooper River and the Back River; the western section is bordered by the CSX Railroad.

NWS Charleston performs the following mission:

- Maintain and operate facilities and provide, as appropriate, services and material to support operations of commands of the operating forces of the Navy, and other organizations designated by the Chief of Naval Operations (CNO), and to perform such functions and tasks as may be directed by a higher authority.

- Support the Maritime Prepositioning Force (MPF) Program.

- Serve as homeport for ships as directed by the CNO and Commander, Military Sealift Command (MSC).

NWS Charleston is divided into three areas: the South Annex, the Weapons Station, and the Polaris Missile Facility U.S. Atlantic Fleet (POMFLANT) Area (Figure 1-2). The areas are managed separately by the Navy and are collectively referred to as the Naval Weapons Station.

South Annex

The South Annex, originally owned and operated by the Army, was used as a port of embarkation, a storage and renovation area for ammunition, a transportation depot, and a major storage and maintenance area. The Navy acquired the South Annex in 1981 to increase the support services provided at NWS Charleston.

Weapons Station

NWS Charleston was commissioned in 1941 by the Navy to alleviate dangers associated with weapons handling at the Charleston Naval Shipyard. During the 1950s, NWS Charleston increased military functions to handle guided missiles and service submarines. In 1971, the mission of NWS Charleston was expanded to include the home porting of ammunition ships. The Weapons Station was certified for tactical nuclear weapons in 1976.

POMFLANT Area

In 1954, the Navy acquired the POMFLANT area for Weapons Station use. The POMFLANT area originally belonged to the Army and was used for operations in conjunction with the South Annex. The primary function of the POMFLANT area was the maintenance and support of Trident submarines. However, these operations no longer occur at the Weapons Station.

1.3.2 Regulatory Setting

NAVFAC SE has the responsibility for implementing the Navy's Installation Restoration (IR) Program in the southeastern United States. This program is intended to focus on the cleanup of contamination from past hazardous waste operations and past hazardous material spills and is modeled around procedures for a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response action. At facilities that have a RCRA hazardous waste permit in place, the IR Program's procedures are changed to follow those of a RCRA corrective action. Because NWS Charleston is currently under a RCRA permit, all cleanup actions are being modeled around RCRA corrective action procedures.

The Naval Assessment and Control of Installation Pollutants (NACIP) program was originally conducted in three phases: (1) Phase I, Initial Assessment Study (IAS); (2) Phase II, Confirmation Study (including a

Verification Stage and a Characterization Stage); and (3) Phase III, Planning and Implementation of Remedial Measures. The updated nomenclature for the RCRA RFI process is as follows:

- RCRA Facilities Assessment (RFA)
- RCRA Facilities Investigation (RFI)
- Interim Corrective Measures or Corrective Measures Study (CMS)
- Corrective Measures Implementation (CMI)

1.3.3 SWMU 16 - Background and History

SWMU 16 – Old Southside Landfill is located in the southern part of the NWS, encompasses an area of approximately 10 acres, and is located within the tidal marsh zone north of Goose Creek (see Figures 1-2 and 1-3). The area is covered by trees, grasses, and shrubbery. Various debris, predominantly construction rubble, lies on the surface. The site was the primary landfill used for disposal of solid and liquid wastes generated at NWS between 1941 and 1978. Solid wastes included household waste, construction and demolition materials, empty containers from shop areas, and metal waste. In addition, approximately 500 mercury batteries were disposed at random locations in the landfill, and 90 mm shells were discarded at the site, of which approximately 40 were removed in 1980. Liquid wastes included oily wastes and solvents generated by NWS, POMFLANT, and ships. An estimated 5,000 to 15,000 gallons of waste oil and solvents [i.e., toluene, methyl ethyl ketone (MEK), xylene, and acetone] were disposed at the site annually (Harmon Engineering and Testing, 1984).

The site was closed in 1980 and covered with approximately 2 feet of local soil fill. According to NWS plans (Southern Division, 1979), the cover fill was obtained from borrow pits located south of Building 233 and east of Building 235. Buildings 233 and 235 function as clean ammunition bunkers. There is no reason to suspect the soil to be hazardous because it is from an undisturbed, non-industrial area of the base. The SWMU was graded before covering. The general intent of the regrading was to cover all rubbish and provide adequate drainage for the site. Rubbish consisting of mainly wood, concrete, metal, and plastic was removed from along the marsh edge, and riprap was installed along the edge of the marsh. All loose combustible material, except for creosoted wood, was burned. Oil drums located in the eastern part of the disposal area were crushed and placed under the soil cover. The ground beneath the drums was reportedly saturated with oil and therefore no burning in this area was conducted. The remaining material was compacted, covered, and grassed. All salvageable material was removed from the site (ESE, 1987).

1.3.4 SWMU 16 - Previous Investigations

Four previous investigations have been performed at SWMU 16, summarized in detail in the RFI Work Plan (TtNUS, 2001), as follows:

- Navy Assessment and Control of Installation Pollutants (NACIP) Phase I IAS
- NACIP Phase II Confirmation Study – Verification Step
- NACIP Phase II Confirmation Study – Characterization Step
- Interim RCRA Facility Assessment (RFA)

Harmon Engineering and Testing conducted the Phase I IAS in 1983 (1984). The IAS included reviews of archival and activity records, interviews with facility personnel, and an onsite survey during which two soil samples from seep locations were collected from the southeastern and central perimeters of the site. The IAS recommended further investigation with a Confirmatory Study at the site.

A NACIP Phase II Confirmation Study – Verification Step was conducted by Geraghty & Miller, Inc. from December 1984 to January 1985 (1985). The study included the installation and sampling of five monitoring wells. Additional water-level measurements and groundwater sampling were recommended based on the findings of the investigation.

Environmental Science and Engineering, Inc. (ESE) conducted an NACIP Phase II Confirmation Study - Characterization Step in 1986 (1987). The study included the installation of two additional monitoring wells. Additionally, eight surface water samples and eight sediment samples were collected from tributaries to Goose Creek. Water-level measurements were collected from all monitoring wells at the site. Contamination was encountered.

In May 1988, Kearney/Centaur completed the Interim RFA for NWS Charleston (1988). The RFA included review of United States Environmental Protection Agency (USEPA) Region IV and South Carolina Department of Health and Environmental Control (SCDHEC) files, a Visual Site Inspection, and review of the NACIP IAS and Characterization Step reports. Because of past disposal activities and detection of hazardous constituents in soil, sediment, surface water, and groundwater, SWMU 16 was identified as requiring further surface water and subsurface investigation to determine the extent of soil, sediment, surface water, and groundwater contamination.

1.3.5 SWMU 17 – Background and History

SWMU 17 – Old Southside Missile and Waste Oil Disposal Area is located in the southern part of NWS, immediately east of SWMU 16 and across the road named Wilkinson Way (see Figures 1-2 and 1-3).

The site is rectangular in shape and reportedly 180 feet long and 90 feet wide; however, the actual area of disposal was suspected to be larger based on the geophysical survey conducted in 2000 and based on historic aerials showing disturbed areas. Therefore, the site boundary was conservatively expanded to 500 feet long and 200 feet wide. The site was used primarily for surface disposal of solid waste between 1950 and 1978, but oils and missile components were also disposed at the site. An estimated 3,000 to 4,000 gallons of engine oil were disposed at the site between 1965 and 1966. Solid wastes observed across the site during the IAS in 1984 included rubble, paint cans and buckets, and missile components. A Thorium-alloy missile nose cone exhibiting low-level radioactivity was removed from the site following the onsite survey of the IAS. (Harmon Engineering and Testing, 1984).

1.3.6 SWMU 17 – Previous Investigations

Two previous investigations have been performed at SWMU 17, as follows:

- NACIP Phase I IAS
- RFA

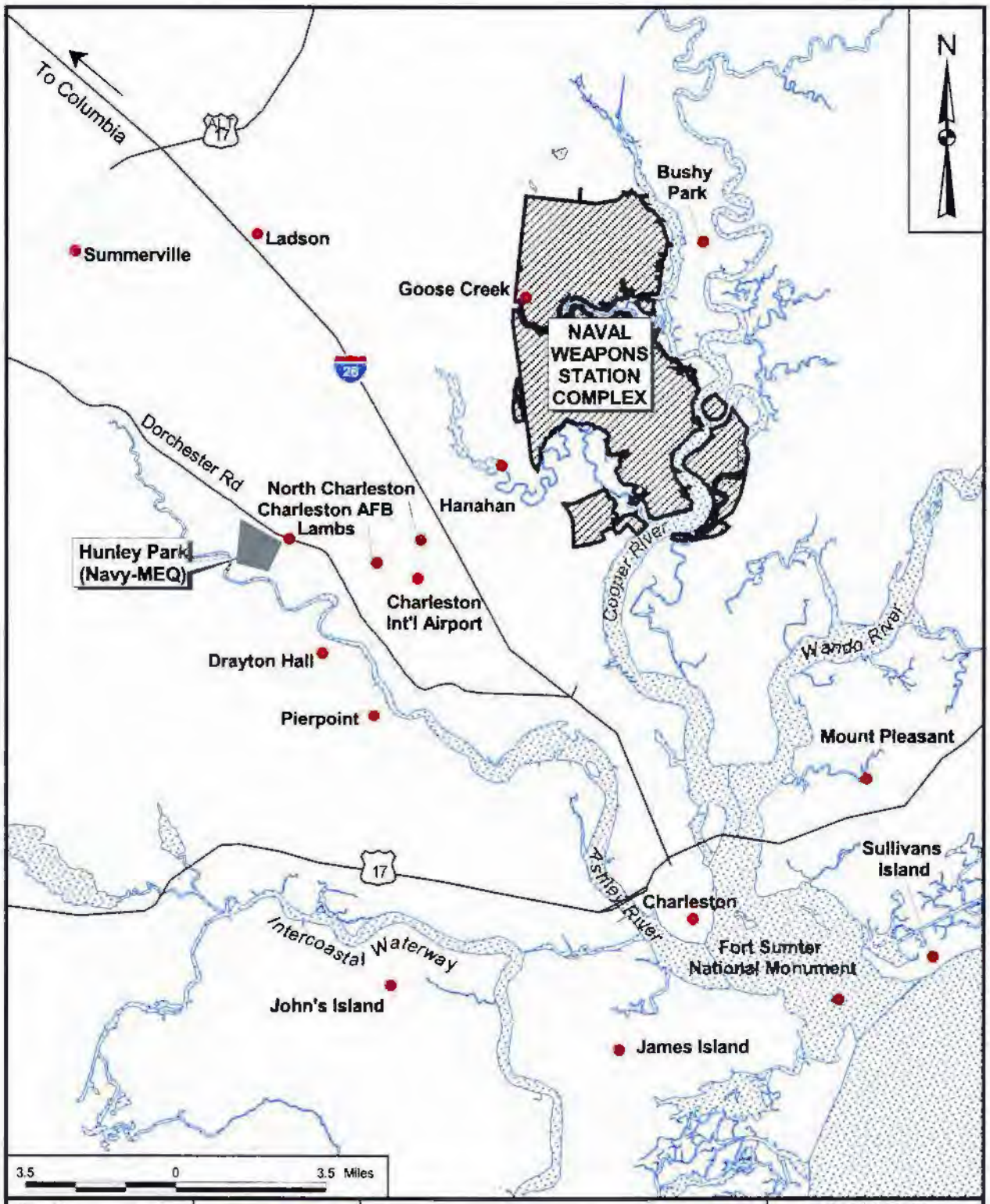
Harmon Engineering and Testing conducted the Phase I IAS in 1983 (1984). The IAS included reviews of archival and activity records, interviews with facility personnel, and an onsite survey. The IAS recommended no Confirmatory Study at the site.

In May 1988, Kearney/Centaur completed the Interim RFA for NWS Charleston. The RFA included reviews of USEPA Region IV and SCDHEC files, a Visual Site Inspection, and review of the NACIP IAS and Characterization Step (for adjacent SWMU 16) reports. Because of past surface disposal activities and detection of lead and chromium in the groundwater, SWMU 17 was identified as requiring further surface and subsurface investigations to determine the extent of soil and groundwater contamination.

1.4 REPORT ORGANIZATION

This report is divided into eight sections. Section 1.0, Introduction, provides historical information about NWS Charleston and SWMUs 16 and 17. Section 2.0, Environmental Setting, provides geological and geographical information about NWS Charleston and the surrounding areas. Section 3.0, Investigation Summary, describes the sampling program and presents SWMUs 16 and 17 geology and hydrogeology based on field results. Section 4.0, Nature and Extent of Contamination, addresses the nature and extent of site contamination for all media investigated. Section 5.0, Chemical Fate and Transport, is a reference-like section describing the chemical and physical properties of the analytes detected at SWMUs 16 and 17. Section 6.0, Baseline Human Health Risk Assessment, and Section 7.0, Ecological Risk Assessment, present the methodologies and results of the human health and ecological risk assessments, respectively.

Section 8.0, Conclusions and Recommendations, focuses on the magnitude of site-related risks and path forward to address those risks. Appendices A through G provide support documentation for the field investigation and supplemental information for the evaluation of results.



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J. LAMEY	9/26/01
CHECKED BY	DATE
L. KLINK	10/11/04
COST/SCHEDULE AREA	
SCALE	AS NOTED

NAVFAC

NAVAL WEAPONS STATION CHARLESTON
LOCATION MAP
CHARLESTON, SOUTH CAROLINA

CONTRACT NUMBER	
0528	
APPROVED BY	DATE
APPROVED BY	DATE
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FIGURE 1-1	0

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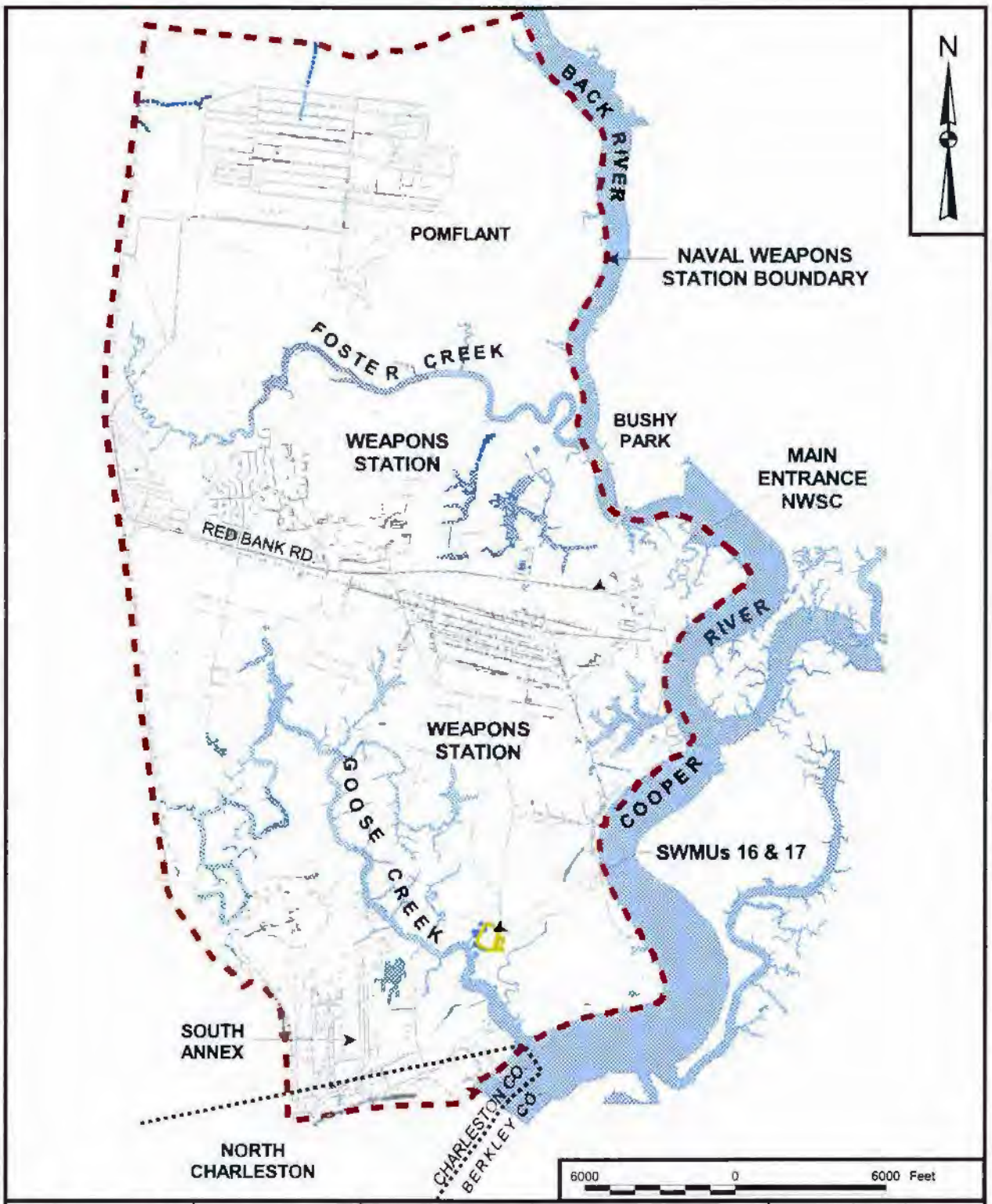

DRAWN BY J. LAMEY — DATE 1/22/04		SITE LOCATION MAP SWMU 16 (OLD SOUTH SIDE LANDFILL) SWMU 17 (OLD SOUTH SIDE MISSILE ORDNANCE AND WASTE OIL DISPOSAL AREA) NAVAL WEAPONS STATION CHARLESTON, SOUTH CAROLINA	CONTRACT NUMBER 0528
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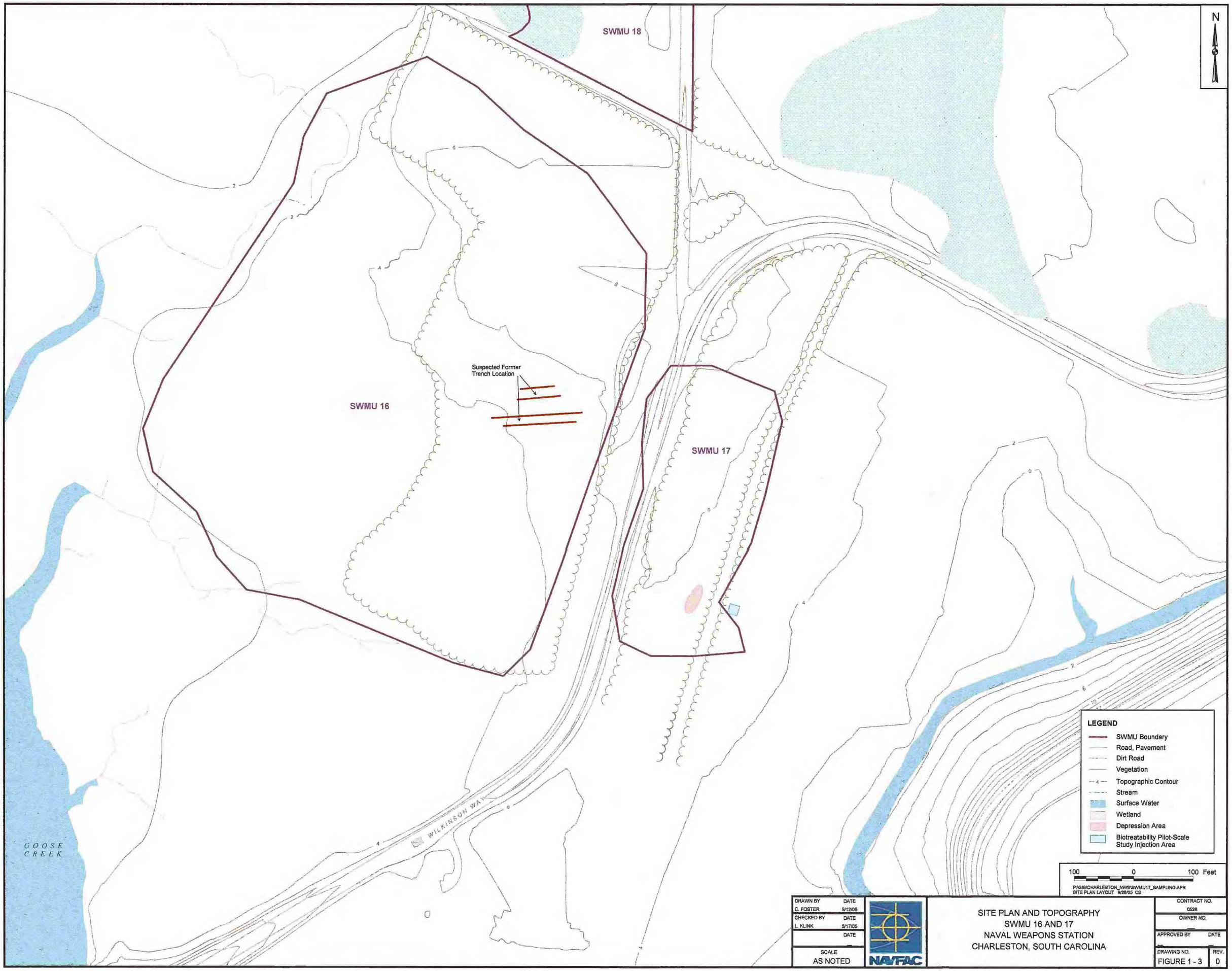
P:\GIS\CHARLESTON_MWS\APR\LOCATION_MAP.APR SWMUs 16&17 LOCATION 1/22/04 JAL


N
SWMU 18
SWMU 16
SWMU 17
Suspected Former Trench Location
WILKINSON WAY
GOOSE CREEK
LEGEND
SWMU Boundary
Road, Pavement
Dirt Road
Vegetation
Topographic Contour
Stream
Surface Water
Wetland
Depression Area
Biotreatability Pilot-Scale Study Injection Area
100 0 100 Feet
P:\GIS\CHARLESTON_NWS\SWMU17_SAMPLING.APR
SITE PLAN LAYOUT 9/26/05 CS
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CHECKED BY L. KLINK DATE 5/17/05
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NAVFAC
SITE PLAN AND TOPOGRAPHY
SWMU 16 AND 17
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA
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APPROVED BY DATE
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2.0 ENVIRONMENTAL SETTING

This section contains general information relative to the environmental setting common to all of the sites under investigation at NWS Charleston. Following is a list of the topics and the subsections in which they are discussed:

- Section 2.1, Climate
- Section 2.2, Topography
- Section 2.3, Surface Water Drainage
- Section 2.4, Geology
- Section 2.5, Hydrogeology

Most of the information contained in these sections was derived from existing literature for the Charleston, South Carolina area; specific references are made to these sources, where appropriate.

2.1 CLIMATE

The Charleston area is characterized by warm, humid summers and mild winters. The area is subject to hurricanes between June 1 and November 30. The average temperature and precipitation data from a 30-year period, provided by the Southeast Regional Climate Center, are presented in Table 2-1.

A wind-rose indicating the prevailing wind direction for the NWS Charleston area is provided on Figure 2-1 and is based on data collected at Charleston International Airport for a 5-year period between January 1, 1986 and December 31, 1990.

2.2 TOPOGRAPHY

NWS Charleston is located within the Atlantic Coastal Plain physiographic province (Figure 2-2). The area exhibits little topographic relief with elevations at the Base ranging from sea level to approximately 40 feet above mean sea level (msl). The grade of the slopes typically ranges from 4 to 6 percent, with the exception of the steep bluff areas bordering the Cooper River. A few gently rolling, hilly areas are located on the Base that have slopes with a grade ranging from 8 to 10 percent.

The northern section of NWS Charleston (POMFLANT) is bordered to the east and northeast by the Back River Reservoir, to the south by Foster Creek, and to the west by CSX Railroad (Figure 1-2). POMFLANT elevations are 30 feet or more above msl near the central and northwestern areas. The central section of NWS Charleston is bounded to the north by Foster Creek, to the east by the Cooper River and the Back

River, to the south by Goose Creek, and to the west by CSX Railroad (Figure 1-2). NWS Charleston elevations are highest in the north-central area, where they reach over 40 feet above msl, and lowest in the southern area, where they reach sea level. The southern section of NWS Charleston (South Annex) is bounded to the east by the Cooper River, to the northeast by Goose Creek, and to the west by CSX Railroad (Figure 1-2).

2.3 SURFACE WATER DRAINAGE

NWS Charleston is located west of and adjacent to the Cooper River and the Back River. Foster Creek, a meandering third-order tributary, flows eastward across the north-central part of the Base to the Back River, a second-order tributary of the Cooper River. Goose Creek is a meandering second-order tributary flowing through the southwestern corner of the Base to the Cooper River (Figure 1-2).

Surface drainage on the Base is generally provided by drainage ditches, which flow into the major creeks and rivers bordering and traversing the Base. Several of the ponds located on the Base have small dams to control the flow of excess runoff. Surface water for the northern portion of the Base drains into the Foster Creek basin and into the Back River. Surface water for the southern central and portions of NWS Charleston drains into the Goose Creek basin and also directly into the Cooper River. All drainage from the facility eventually discharges to the Cooper River, which flows south into Charleston Harbor, then into the Atlantic Ocean.

The banks of the streams and rivers, and areas as far as several hundred feet away from these waterways traversing and bordering the Base, lie within the 100-year floodplain. Thus, approximately half of the Base is located within this floodplain. The 100-year floodplain ranges from 10.5 feet above msl near the Weapons Station to 8.5 feet above msl at the South Annex area of the Base.

Saltwater encroachment has a major impact on water quality in the Cooper River and Goose Creek. During high tide, saline waters can be found as far as 25 miles upstream of Charleston Harbor. Streams at the Base discharge into larger streams within the saltwater encroachment limit.

2.4 GEOLOGY

The Lower Coastal Plain of South Carolina consists of a series of sediments and partially lithified sedimentary rocks ranging in age from the Late Cretaceous Period to the Holocene Epoch. The Coastal Plain units strike northeast-southwest and dip seaward to the southeast (Figure 2-3) such that the sedimentary units are thickest near the coast and thin to the northwest. The Coastal Plain deposits thicken southward from 980 feet near the coast at the North Carolina-South Carolina border to more than 3,280 feet at the South Carolina-Georgia border (Colquhoun et al., 1983).

Figure 2-3 shows the major geological units that underlie NWS Charleston. Coastal terrace deposits form the uppermost geologic unit at the Base. These deposits average about 30 feet in thickness and consist primarily of sand and clay with local beds of seashells and limestone that were deposited during a series of marine transgressions and regressions in the Pleistocene and Pliocene epochs (Aucott et al., 1987). In the NWS Charleston area, the coastal terrace deposits are underlain by unconsolidated to weakly consolidated Holocene to Miocene clastic sediments, which are composed of calcareous and organic-rich clays, silts, and sands (Figure 2-3). These surficial deposits in the NWS Charleston area are commonly referred to as the Ladson Formation. The thickness of the Ladson Formation in the NWS Charleston area ranges from a maximum of approximately 82 feet to less than 17 feet in isolated areas.

Unconformably underlying the Ladson Formation is the phosphatized late Eocene to late Oligocene Cooper Group, which is composed of the Ashley and Parkers Ferry Formation (Weems and Lemon, 1993). The Cooper Group is approximately 200 feet thick near the Base, and it is a massive, olive-colored, impure, fine-grained carbonate deposit of very low permeability. It consists of calcium carbonate, phosphate, fine-grained sand and clay that were deposited in a relatively deep-water marine environment. The Cooper deposits, which dip to the southeast at 8 to 24 feet per mile, pinch out about 20 miles north of Charleston and thicken south of the city.

Below the Cooper Group is a thick sequence of sedimentary units that extends to the basement complex approximately 2,300 feet below msl. Mean sea level generally lies within the Ladson Formation at NWS Charleston. This sequence of sedimentary deposits below the Cooper Group includes (in increasing age) the Santee Limestone (180 feet thick); the Black Mingo Group (200 feet thick); and the Peedee, Black Creek, Middendorf, and Cape Fear formations (1,700 feet thick total) (Colquhoun et al., 1983).

Crystalline bedrock lies below the sedimentary units near NWS Charleston and consists of diabase, basalt, quartz, and meta-sedimentary rocks. Seismic activity that occurs within pre-Cretaceous rocks beneath the Lower Coastal Plain indicates that active faults and fracture zones exist. The permeability of the crystalline bedrock is lower than that of the overlying Coastal Plain sediments (Aucott et al., 1987).

2.5 HYDROGEOLOGY

The following subsections discuss general groundwater information in the area of NWS Charleston.

The Lower Coastal Plain near NWS Charleston consists of an unconfined surficial aquifer (Ladson Formation), a confined Tertiary aquifer system (Santee Limestone and Black Mingo Group), and a confined Cretaceous aquifer system (Pedee, Black Creek, Middendorf, Cape Fear Formations) (Colquhoun et al., 1983).

2.5.1 Hydrogeology of the Surficial Aquifer

The surficial aquifer occurs within the Ladson Formation, which consists of fine- to coarse-grained sand and clay. It is an unconfined, laterally extensive aquifer that ranges from 17 to 82 feet thick near NWS Charleston. This water table aquifer is recharged by infiltration of precipitation and discharges principally as seepage into surface water bodies and secondarily via pumping. Downward migration into the underlying aquifers is inhibited by the low permeability sediments of the Cooper Group.

Although locally isolated higher permeability zones are found within the Cooper Group (near Edisto Island and Ravenal, not in the vicinity of the Base), it is considered to be a confining unit that allows virtually no vertical migration of groundwater from the surficial aquifer to the deeper aquifer. Only a few feet of the Ashley Formation of the Cooper Group need to be present to effectively retard the vertical movement of groundwater (Park, 1985).

Groundwater depths in the surficial aquifer range from approximately 0 to 15 feet bgs across the Base, and the water table surface tends to mimic the local topography. The shallow groundwater system discharges into the Cooper River directly or indirectly via discharge into its tributaries.

The predominant groundwater flow direction in the NWS Charleston area is east and southeast toward the Cooper River. Across the Base, the overall southeasterly flow direction continues; although, because the topography is relatively flat, minor surface irregularities and stream drainage patterns produce local variations in the shallow flow directions.

Below the surficial aquifer is the Ashley Formation of the Cooper Group. As stated earlier, the Cooper Group is considered to be a low permeability confining unit that separates the surficial aquifer from the underlying aquifers.

2.5.2 Hydrogeology and Water Quality of Deep Aquifer Systems

Underlying the Cooper Group is the Tertiary aquifer system, which is composed of the Santee Limestone and the Black Mingo Group (sand and sandstone, limestone, and clay). These units are an approximate 400 foot thick combined near NWS Charleston (Colquhoun, et al. 1983). Groundwater flows to the east in the Tertiary aquifer system, which is recharged by infiltration along updip outcrop areas to the west. Water yields from wells completed in the Santee Limestone range from 200 to 500 gallons per minute (gpm). The Black Mingo Group underlies the Santee Limestone and constitutes much of the Tertiary aquifer system. Water yields from wells completed in the sands of the Black Mingo Group range from 58 to 660 gpm, and transmissivities range from 500 to 3,700 square feet per day for these wells. Under

natural conditions, groundwater elevations are artesian (often above the ground surface), but widely vary due to pumping primarily and tidal fluctuations secondarily. Variations in groundwater elevations resulting from other factors such as rainfall are obscured.

Along the Atlantic coastline in South Carolina, the water quality of the Tertiary aquifer system has been affected by saltwater intrusion. As a result, high concentrations of chloride and sodium are present. Calcium and bicarbonate ions are dominant, and the groundwater is extremely hard (Park, 1985).

The Cretaceous aquifer system is a confined system that is approximately 2,000 feet thick near NWS Charleston and consists of sand and clay of the Peedee, Black Creek, Middendorf, and Cape Fear Formations. The Cretaceous aquifer system yields water under artesian conditions because outcrop/recharge areas are far to the west in areas of higher elevations. Typical potentiometric surface elevations range from approximately 20 to 120 feet above msl. The predominant horizontal groundwater flow direction is toward the east. Well yields range from 125 to 2,000 gpm (Park, 1985). Generally, the Black Creek is the most productive formation, and the Peedee is the least productive.

In the Lower Coastal Plain, the groundwater in the Black Creek and Middendorf Formations has a high pH (8.0 to 9.2), high dissolved solids [greater than 500 to 2,700 milligrams per liter (mg/L)], fluoride (greater than 4.0 mg/L), chloride (greater than 250 mg/L), and sodium (several hundred mg/L) concentrations, and is classified geochemically as a sodium bicarbonate water. The groundwater geochemistry in these units within the Lower Coastal Plain is the result of dissolution of carbonate material and calcium for sodium ion exchange (Park, 1985).

TABLE 2-1

CLIMATIC CONDITIONS FOR NWS CHARLESTON
CHARLESTON, SOUTH CAROLINA

Climatic Variable	Average Conditions, January through December											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
TEMPERATURE (°F)												
Average Maximum Temperature	58.9	62.6	69.2	76.1	83.0	87.8	90.6	89.2	84.9	77.1	67.2	62.0
Average Minimum Temperature	38.4	40.8	47.0	53.4	62.1	69.3	73.2	72.3	67.5	56.6	46.0	41.2
PRECIPITATION (in.)												
Average Total	3.99	3.31	3.60	2.98	3.76	5.71	6.29	7.05	5.73	3.19	2.52	3.45

Source: Southeast Regional Climate Center, sercc@dnr.state.sc.us
Period of Record: 1971-2000.

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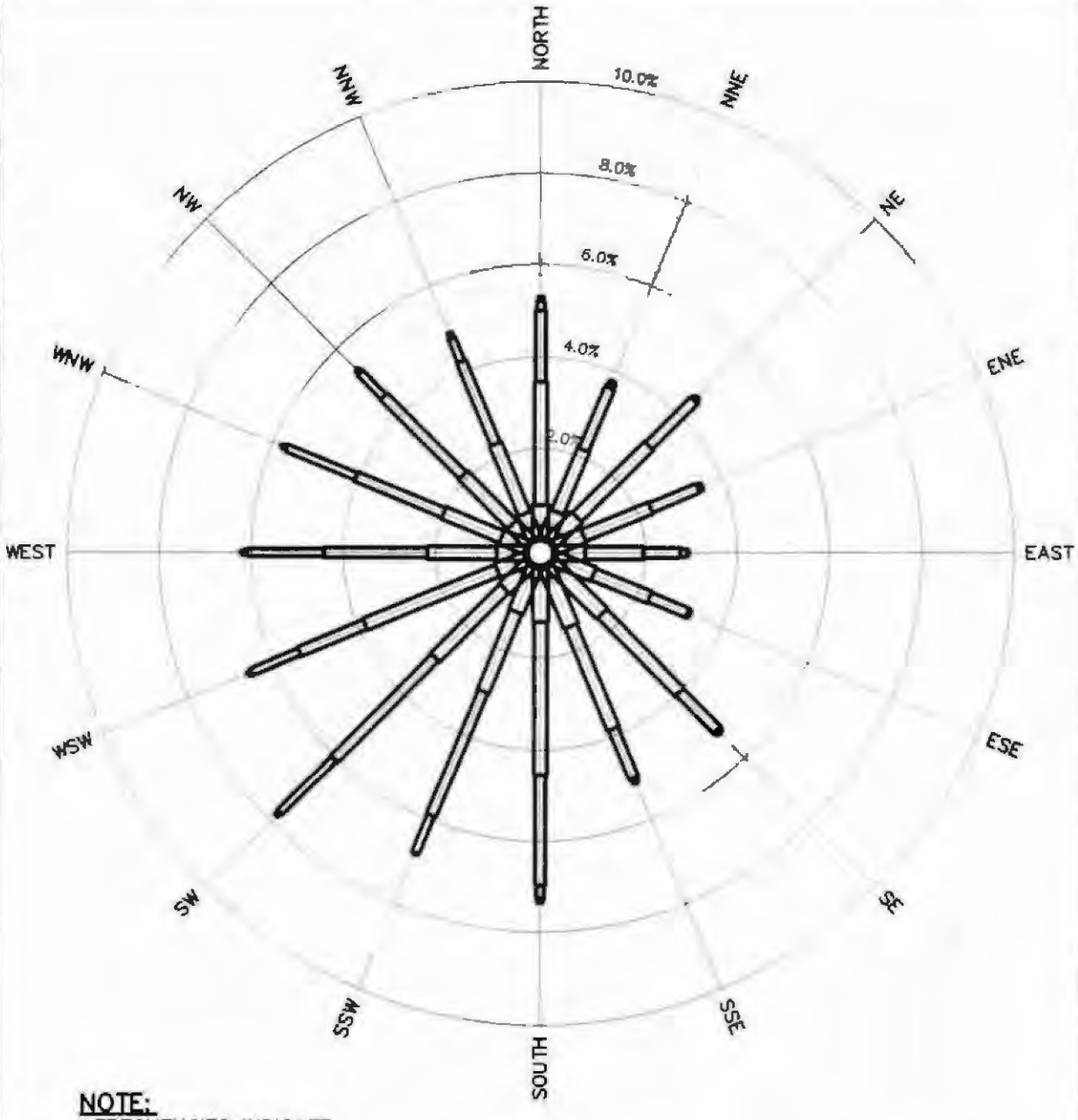

NOTE:
FREQUENCIES INDICATE DIRECTION FROM WHICH THE WIND IS BLOWING.

WIND SPEED (KNOTS)

CALM 1–3 4–6 7–10 11–16 17–21 >21

CALM WINDS 14.61%

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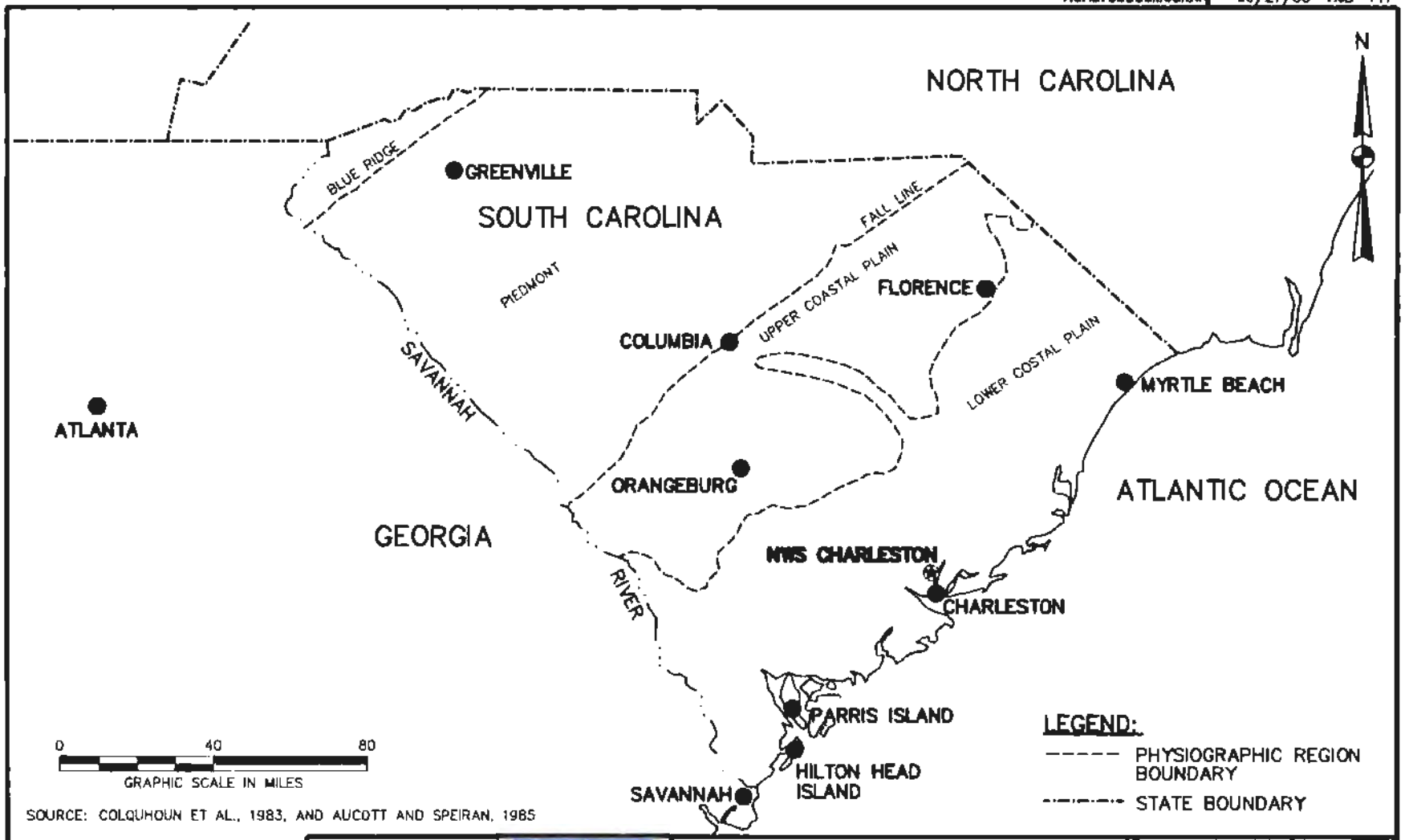

SOURCE: COLQUHOUN ET AL., 1983, AND AUCOTT AND SPEIRAN, 1985

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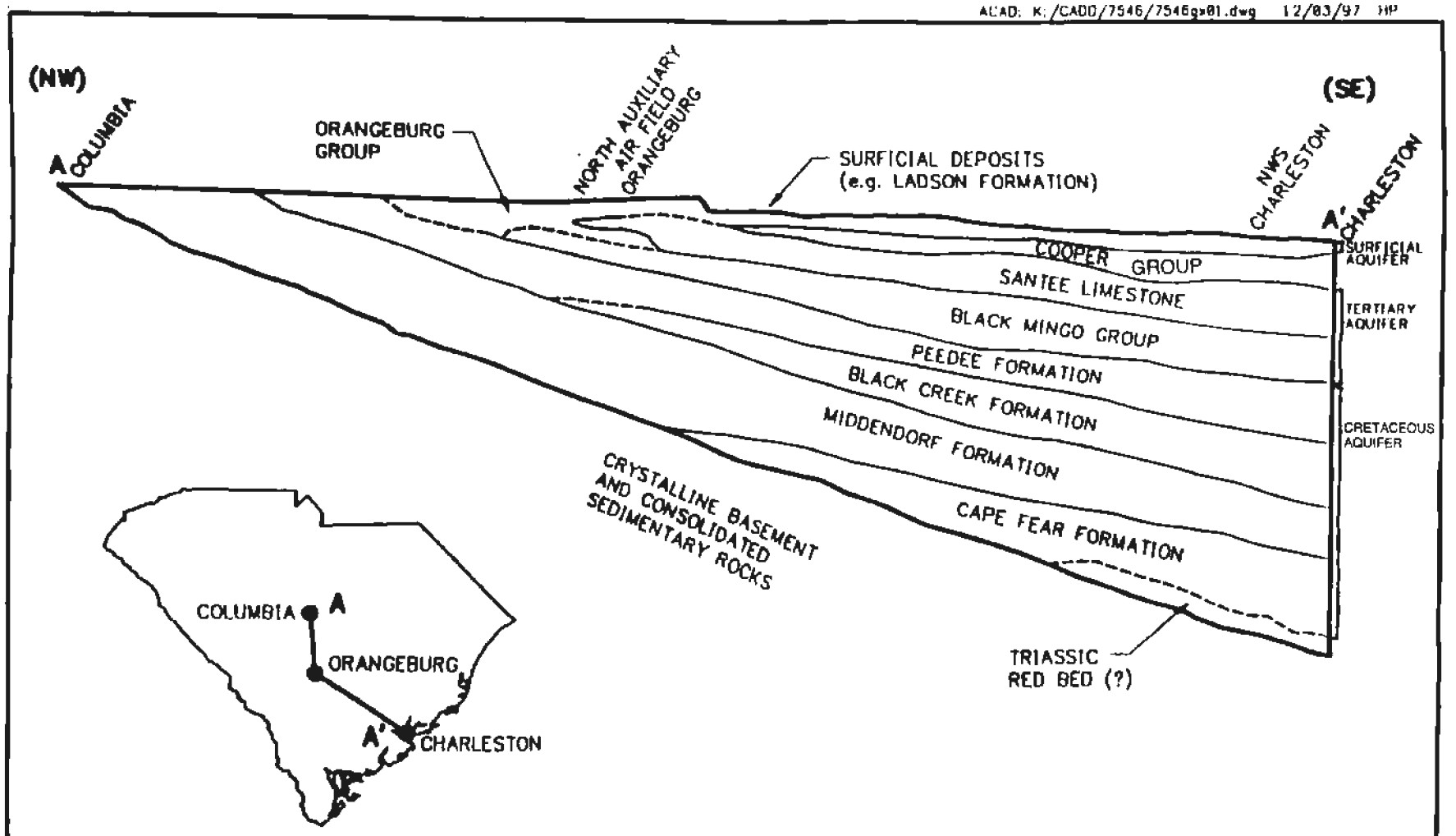

SOURCE: MODIFIED FROM AUCOTT AND SPEIRAN, 1985

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CHECKED BY DATE	GENERALIZED GEOLOGIC CROSS-SECTION TRANSECTING FROM COLUMBIA TO CHARLESTON, SOUTH CAROLINA NAVAL WEAPONS STATION CHARLESTON CHARLESTON, SOUTH CAROLINA	APPROVED BY	DATE
COST/SCHED-AREA		APPROVED BY	DATE
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3.0 INVESTIGATION SUMMARY

RFI field work was performed in accordance with procedures described in the Generic Work Plan, Volume I, Chapter 4.0 (ABB-ES, 1995), the Project-Specific Work Plan (TtNUS, 2001), and the Supplemental Work Plan (TtNUS, 2004). Deviations from the Generic Work Plan were described in the project-specific work plans. A detailed description of the RFI data collection field work, including deviations from the TtNUS work plans, is presented in this section. A brief summary of field investigations conducted prior to the RFI is also presented in this section. TtNUS conducted RFI field work from 2000 to 2005 at SWMUs 16 and 17; the following is a brief summary:

- July and November 2000 - A geophysical survey was conducted at both SWMUs 16 and 17. Results were presented in the TtNUS work plan (2001) to aid in establishing sample locations.

- June and October 2001 - Multiple activities were conducted:
  - Permanent monitoring well installation (5 at SWMU 16 and 4 at SWMU 17 in the shallow surficial aquifer) and groundwater sampling.
  - Soil boring (4 at SWMU 16 and 19 at SWMU 17) and surface/subsurface soil sample collection.
  - Surface soil sample collection (2 at SWMU 16).
  - Surface water/sediment sample collection (7 at SWMU 16 and 1 at SWMU 17).
  - Staff gauge installation (3 at SWMU 16 and 1 at SWMU 17).
  - Four rounds groundwater-level measurements.
  - Aquifer tests.
  - Tidal study.
  - Abandonment of 5 pre-RFI monitoring wells.

- March 2002 - Activities conducted:
  - Temporary monitoring well installation (10 shallow and 5 deep in the surficial aquifer at SWMU 17) and groundwater sampling.

- April 2003 - Activities conducted:
  - Membrane interface probe (MIP) drilling at 22 locations at SWMU 17.
  - Temporary monitoring well installation (21 shallow and 1 deep in the surficial aquifer at SWMU 17) and groundwater sampling for confirmation of MIP results.
  - Screening of groundwater samples using the Color-Tec method, an experimental field-based analytical method for low-level detection of chlorinated solvents.
  - Soil boring (10 at SWMU 17) and soil sample collection.

- March 2004 - Activities conducted:
  - Permanent monitoring well installation (3 at SWMU 17 in the shallow surficial aquifer) to aid the Solutions-IES pilot-scale treatability study evaluation (for reference purposes, Appendix C-5 provides all Solutions-IES reports available at the time the draft RFI was being prepared).

- October 2004 through March 2005 - Activities conducted:
  - Field mapping of the high tide water line at SWMU 16.
  - MIP drilling at 33 locations at SWMU 17.
  - Temporary monitoring well installation (33 locations) and groundwater sampling for confirmation of MIP results.
  - Permanent monitoring well installation (22 at SWMU 17) and groundwater sampling.
  - Piezometer installation (1 at SWMU 16).
  - Soil boring (7 at SWMU 17) and subsurface soil sample collection.
  - Surface soil sample collection (2 at SWMU 16).
  - Staff gauge installation (1 at SWMU 17).
  - Two rounds groundwater-level measurements.
  - Aquifer tests.

3.1 FIELD INVESTIGATIONS PRIOR TO THE RFI

3.1.1 SWMU 16 – Old Southside Landfill

Four previous studies/investigations have been performed at SWMU 16, as follows:

- Navy Assessment and Control of Installation Pollutants (NACIP) Phase I IAS
- NACIP Phase II Confirmation Study – Verification Step
- NACIP Phase II Confirmation Study – Characterization Step
- Interim RCRA Facility Assessment (RFA).

Harmon Engineering & Testing conducted the Phase I IAS in 1983. The IAS included reviews of archival and activity records, interviews with facility personnel, and an onsite survey during which two soil samples from seep locations were collected from the southeast and central perimeters of the site. Analyses of the samples included total organic halogens (TOX), oil and grease, silver, and mercury. The presence of oil and grease, mercury, and 1,1,1-trichloroethane (TCA) was detected in the soil samples from seep locations along the central portion and southeastern corner of the site during the IAS. The IAS recommended further investigation with a confirmatory study at the site.

An NACIP Phase II Confirmation Study – Verification Step was conducted by Geraghty & Miller, Inc., from December 1984 to January 1985 (1985). The study included the installation and sampling of five shallow (12 to 15 feet in depth) monitoring wells: NWS-2-1 and NWS-2-2 northeast of the site and east of SWMU 18-Southside Ordnance Disposal Area, NWS-2-3 within SWMU 17, and NWS-2-4 and NWS-2-5 along the perimeter of site. Groundwater samples were analyzed for volatile organic compounds (VOCs), metals, pH, and total dissolved solids (TDS). Water levels were measured in the wells. Additional water-level measurements and groundwater sampling were recommended based on the findings of the investigation.

Environmental Science and Engineering, Inc. (ESE) conducted an NACIP Phase II Confirmation Study – Characterization Step in 1986 (1987). The study included the installation of two additional monitoring wells (NWS-2-6 and NWS-2-7) along the site perimeter. The wells were screened from approximately 8 to 38 feet below ground surface (bgs), extending approximately 10 feet into the Ashley Formation. All seven monitoring wells were sampled and analyzed for polynuclear aromatic hydrocarbons (PAHs), metals, petroleum hydrocarbons, pH, and specific conductance. Additionally, eight surface water samples and eight sediment samples were collected from tributaries to Goose Creek and analyzed for PAHs, metals, and petroleum hydrocarbons. Water-level measurements were collected from all monitoring wells at the site.

In May 1988, Kearney/Centaur completed the Interim RFA for NWS Charleston (1988). The RFA included the review of USEPA Region IV and SCDHEC files, a Visual Site Inspection, and review of the NACIP IAS and Characterization Step reports. Because of past disposal activities and detection of hazardous constituents in soil, sediment, surface water, and groundwater, SWMU 16 was identified as requiring further surface water and subsurface investigation to determine the extent of soil, sediment, surface water, and groundwater contamination.

3.1.2 SWMU 17 – Old Missile Ordnance and Waste Oil Disposal Area

Four previous studies/investigations have been performed at SWMU 17, as follows:

- NACIP Phase I IAS
- RFA
- NACIP Phase II Confirmation Study – Verification Step
- NACIP Phase II Confirmation Study – Characterization Step

One monitoring well (NWS-2-3) that was associated with SWMU 16 investigations (Confirmation Studies–Verification Step and Characterization Step) was also used for SWMU 17 investigations.

Harmon Engineering & Testing conducted the Phase I IAS in 1983 (1984). The IAS included reviews of archival and activity records, interviews with facility personnel, and an onsite survey. The IAS recommended no Confirmatory Study at the site.

As part of the NACIP Phase II Confirmation Study – Verification Step for SWMU 16 conducted by Geraghty & Miller, Inc., monitoring well NWS-2-3 was installed within the boundaries of SWMU 17 and sampled for VOCs, metals, pH, and TDS. Additionally, water-level measurements were collected from the monitoring wells at SWMUs 16 and 17.

During the NACIP Phase II Confirmation Study – Characterization Step for SWMU 16 conducted by ESE, Inc. in 1986, groundwater from monitoring well NWS-2-3 located within SWMU 17 was sampled and analyzed for PAHs, metals, petroleum hydrocarbons, pH, and specific conductance. Additionally, water-level measurements were collected from the monitoring wells at SWMUs 16 and 17.

The presence of organic compounds [benzene, 1,2-dichloroethane (DCA), and methylene chloride], petroleum hydrocarbons, and metals was detected in groundwater during the two Confirmation Study investigations. None of the metals were more than an order of magnitude greater than background concentrations. No surface or subsurface soils have been collected at the site to date.

In May 1988, Kearney/Centaur completed the Interim RFA for NWS Charleston. The RFA included review of USEPA Region IV and SCDHEC files, a Visual Site Inspection, and review of the NACIP IAS and Characterization Step reports. Because of past surface disposal activities and detection of lead and chromium in the groundwater, SWMU 17 was identified as requiring further surface and subsurface investigations to determine the extent of soil and groundwater contamination.

3.2 RFI FIELD INVESTIGATION

The sample identification, location designation, and the analysis for the samples are summarized in Table 3-1. Quality assurance/quality control (QA/QC) and investigation-derived waste (IDW) samples are summarized in Table 3-2.

3.2.1 Deviations from the Work Plan

The following deviations from the work plans were necessitated by site conditions:

- SWMU 16: The proposed temporary wells, permanent monitoring wells, and soil borings proposed for the 2004 through 2005 supplemental investigation could not be installed. Metal was detected at all of the proposed drilling sites, so unexploded ordnance (UXO) clearances were not granted, and the

drilling program was terminated. For the same reason, two Shelby tube soil samples for geotechnical analyses of the landfill cover could not be collected. The proposed locations for drilling are depicted in the drilling permits of Appendix A-1.

- SWMU 17: Three proposed wells downgradient of the known groundwater "hot spot" area (near existing 17MIP21) to support a pilot-scale treatability study being conducted by the Navy through Solutions-IES were not installed when it was determined the wells were not needed.

3.2.2 Unexploded Ordnance Avoidance

SWMU 17 was used as a missile and waste oil disposal area in the past, and SWMU 16 was also suspected to contain UXO. Therefore, TtNUS provided a UXO specialist to clear the proposed drilling locations. Each borehole location and access pathway was cleared by the UXO specialist with a magnetometer prior to any invasive activity. At drilling locations, the subsurface was cleared by hand augering to 6 to 8 feet bgs. During hand augering, a gradiometer was lowered into the boring every 2 feet, to the total depth.

No UXO was encountered during field activities at SWMU 17. At SWMU 16, no UXO was encountered during the 2001 field activities. However for the 2004/2005 field activities, metal interferences occurred at all of the proposed drilling sites (see Appendix A-1 Drilling Permit Authorizations for locations) and much of the access pathways, and so the drilling program was terminated. The indication of metal interferences confirms the presence of metal within the landfill.

3.2.3 Permanent and Temporary Well and Piezometer Installation and Groundwater Sampling

Sample locations for both permanent monitoring wells and temporary wells are shown on Figure 3-1. The well permit authorizations are provided in Appendix A-1. The sample identification, location designations, and analyses for the samples are summarized in Table 3-1.

Monitoring Well Installation

A total of 34 permanent monitoring wells (5 at SWMU 16 and 29 at SWMU 17) and one shallow piezometer just north of SWMU 16 were installed during the RFI field investigation. Of the 34 wells, 25 were shallow, 5 were intermediate, and 2 were deep, within the surficial aquifer. See Table 3-3 for the monitored hydrogeologic units, well identification, and other construction details for the monitoring wells. Three wells (17MW12D, 17MW14D, and 17MW18D) are designated as deep wells; however the wells were installed within the intermediate portion of the surficial aquifer. The depths of the shallow wells ranged from 13 to 20 feet bgs. In some cases during the supplemental RFI field work, the shallow wells

were installed below the water table to depths targeting contaminated intervals based on MIP and existing monitoring well data. The depths of the intermediate wells ranged from 22 to 28 feet bgs. The intermediate wells were installed just below the shallow wells in the associated well cluster. The depths of the deep wells range from 37 to 42 feet bgs. The deep wells were installed such that the well screen was placed immediately above the first low permeability unit encountered or above the Ashley Formation of the Cooper Group, or just below the intermediate or shallow well within a cluster targeting known depths of contamination.

Boring logs and monitoring well construction sheets were completed for each monitoring well and soil boring. Copies of these forms are provided in Appendix A-2 and A-3. Carolina Drilling installed the monitoring wells during the 2001 field effort, and during the 2004/2005 drilling effort, the wells were installed by Gregg Drilling Company, both licensed South Carolina drillers. The monitoring wells were developed after construction using a submersible pump and/or surged using a stainless steel bailer. Well development logs were completed during development and are provided in Appendix A-4. Monitoring well construction details are provided in Table 3-3.

Temporary Well Installation

A total of 70 temporary wells have been installed within the SWMU 17 study area since the RFI began. The temporary wells were installed using direct-push technology (DPT) and constructed of either 1-inch diameter polyvinyl chloride (PVC) well screen and riser, or stainless steel screen with carbon steel riser. For the PVC wells, the well borehole was advanced with nominal 2-inch inside diameter (ID) casing to the desired depth when the screen and riser were lowered into the casing. Then the casing was removed exposing the screen to the formation and leaving an expendable steel drive point. Stainless steel temporary wells (Geoprobe® Screen Point Samplers) were advanced to the desired depth. The outer casing was then retracted, exposing the well screen, the well was sampled, and then the casing and screen were removed from the borehole.

Fifteen temporary well points were installed during the 2002 event of the RFI and constructed with 1-inch diameter PVC well screen and PVC riser.

Twenty-two temporary well points were installed during the 2003 event of the RFI using stainless steel Geoprobe® Screen Point Samplers.

Thirty-three temporary well points were installed during the 2004/2005 event of the RFI. The wells were constructed with 1-inch PVC riser and PVC well screen (slot size 0.010 inch). The sand pack was installed above the formation material that collapsed around the PVC riser to approximately 2 feet above

the screen. A bentonite seal was then installed above the sand pack or formation material to prevent precipitation from entering the well.

The temporary wells were abandoned after sampling by removing the PVC screen and riser (if employed) then grouting the borehole to the ground surface using a tremie pipe.

Temporary well construction details are summarized on Table 3-4.

Groundwater Sampling

The wells were sampled using a peristaltic pump. Water quality parameters, such as temperature, pH, specific conductance, salinity, dissolved oxygen (DO), oxidation-reduction potential (ORP), and turbidity were collected during purging of the permanent and temporary wells and recorded on low flow purge sheets and/or groundwater sample log sheets. During the 2004/2005 sampling effort the salinity was not measured and recorded at several of the permanent wells; however salinity values were derived from the recorded temperature and specific conductance using a calculator at http://www.fivecreeks.org. The most recent water quality information for each sampling point is summarized in Table 3-5. Copies of the low flow purge sheets and groundwater sample log sheets are provided in Appendix A-5 and A-6, respectively.

As observed from Table 3-5, the temperature in the shallow permanent wells ranged from 15.31 (17MW20S) to 20.9 (17MW11S) degrees Celsius (°C) with an average temperature of 17.7 °C. The temperature in the deeper (intermediate and deep) surficial aquifer wells ranged from 16.3 to 19.6 °C with an average temperature of 17.1 °C. The temperatures were fairly consistent from the shallow to the deep portion of the surficial aquifer as observed at the well clusters.

The pH in the shallow permanent wells values ranged from 3.79 (17MW16S) to 7.17(17MW03S) with an average pH of 5.17. For the deeper surficial aquifer wells, the pH values ranged from 6.23 (17MW17I) to 7.15 (17MW17D) with an average value of 6.70. At the well clusters, the pH values increased with depth from a pH of approximately 4 in the shallow wells to about 7 in deep wells.

The specific conductance in the shallow permanent wells ranged from 0.11 milliSiemen per centimeter (mS/cm) (17MW13S) to 33.5 mS/cm (16MW05S). The specific conductance in the permanent deeper surficial aquifer wells ranged from 0.477 (17MW12D) to 11.7 mS/cm (17MW18D), respectively. The salinity readings correlate with specific conductance and indicate that the shallow groundwater near the streams is saline, for example 1.6 percent at 16MW03S closest to Goose Creek at SWMU 16 and 1.0 percent at 17TW07S closest to the tributary, and the salinity values diminish to 0 around well 17MW03S and along Wilkinson Way in the central portion of the site. The deep surficial groundwater is

saline in the near shore wells. Also, groundwater from two deep surficial aquifer wells (17MW14D and 17MW18D) further east of SWMU 17 have fairly high salinity values of 0.7 and 0.8 percent, respectively. The near shore shallow and deep groundwater salinity may be attributed to recharge of the shallow surficial aquifer by surface water (surface water salinity is about 1.4 percent) during high tide and drought conditions. The deep surficial aquifer is partly recharged by downward migration of shallow groundwater, allowing mixing of deep groundwater and shallow saline groundwater.

Seven of 24 shallow permanent wells had DO levels of less than 0.1 mg/L (anaerobic conditions), with six located at SWMU 17 and the remaining one at SWMU 16 (16MW04S). Other wells had DO levels ranging from 0.2 to 4.5 mg/L (anaerobic to aerobic conditions). Four of the nine deeper wells had DO levels of less then 0.1 mg/L (anaerobic conditions). The five remaining wells have values ranging from 1.28 (17MW17D and 17MW16I) to 4.71 mg/L (17MW06D) (aerobic conditions). There are no discernable trends in the DO levels laterally or vertically.

The ORP in shallow permanent wells values ranged from -399 millivolt (mV) (16MW03S) to 369 mV (16MW01S), with an average ORP value of 95 mV. For the deeper wells, ORP values ranged from -143 (17MW17I) to 57 mV (17MW06D), with an average value of -86 mV. At the well clusters, the ORP values decreased with depth from approximately 200 mV in the shallow wells to about -100 mV in deep surficial aquifer wells.

The wells were purged to reduce the turbidity to less than the benchmark of 10 nephelometric turbidity units (NTUs). This effort was successful in 40 wells; generally, permanent wells cleared up better then the temporary wells. Because metals analyses was being conducted during the 2005 RFI event, the temporary wells were constructed better and purged more thoroughly than for the 2002 and 2003 temporary wells when only VOC analyses were conducted; otherwise, the metals results would have been biased high. In addition, the temporary wells installed during 2005 were more elaborately constructed to include a sand pack, which reduced turbidities. See Table 3-5 for turbidity values for permanent and temporary wells.

3.2.4 MIP Installation and Interpretation

A total of 56 MIP points were installed during the RFI. The MIP points were advanced using DPT. See Table 3-4 for the MIP total depths and temporary well co-location. One MIP point (17MIP22) was installed adjacent to existing background well 17MW01 to obtain a baseline for lithologic purposes. MIP logging was conducted to obtain real-time, continuous VOC concentration data in the vadose and saturated zones. The VOC detector log data was used to determine the temporary well depth and the spatial location of the wells in order to target the contaminated portions of the surficial aquifer. The MIP system was used to better define the horizontal and vertical extent of the groundwater contamination plume(s), in addition to

better defining the horizontal and vertical extent of the contaminant hot spot. A detailed description of the VOC detectors and the results of the MIP field investigation can be found in the reports provided by the subcontractor, Columbia Technologies, in Appendix B.

MIP Conductivity Interpretation

In addition, the MIP system collects soil conductivity data continuously. Generally, the conductivity probe can be used to differentiate between clay and sand layers; elevated conductivity readings indicate the presence of clay and silt. All but one MIP point (17MIP22 at the background location) was co-located with a temporary well, and several MIP logs were completed at monitoring well boring locations, which allowed for better correlation of lithologies between the MIP log and the boring logs.

During the 2003 field effort, 17MIP22 was installed at 17MW01 (17MW01S-B) to check the lithologic correlation between MIP conductivity logs and soil boring logs. The soil boring log showed that a green silt and clay layer was encountered at about 35.5 feet bgs, and the MIP conductivity log shows an elevated reading of about 150 mS/M at that same depth. Initially, this clay and silt layer was believed to be the Ashley Formation of the Cooper Group. Subsequent comparisons between well borings and MIP logs from the 2005 field effort suggested that the Ashley Formation at 17MW01 was not encountered at 35.5 feet bgs. Rather the Ashley Formation of the Cooper Group was encountered below the green silt and clay at 40 feet bgs based on further evaluation of boring logs. The Ashley Formation of the Cooper Group was also encountered at 31 feet bgs at 17MW18S/I/D, however, the adjacent 17MIP42 conductivity log showed no elevated readings at that depth. At 17MW17S/I/D, the Ashley Formation was encountered at 37 feet bgs but the adjacent 17MIP41 log showed no elevated reading. These results suggest that the Ashley Formation of the Cooper Group does not produce an elevated reading on the MIP conductivity log.

3.2.5 Surface Water Sampling

Six surface water samples were collected at SWMU 16 and one was collected at SWMU 17 in 2001. The sample identification, location designations, and analyses for the samples are summarized in Table 3-1, and sample locations are shown in Figure 3-1. The SWMU 16 samples were collected from streams within marsh areas west of the site which drain into Goose Creek, and the SWMU 17 sample was collected from the stream within a marsh area east of the site that ultimately drains into Goose Creek. Water quality parameters including temperature, pH, specific conductance, turbidity, DO, and salinity were collected and recorded on sample log sheets. This information is summarized in Table 3-6. Copies of the sample log sheets are provided in Appendix A-7.

The pH readings were relatively similar across the site showing that the surface waters are pH normal with values around 7, and the DO oxygen readings ranged from 4.13 to 9.63 mg/L indicating aerobic conditions. The surface waters are saline throughout the study area (average salinity of 1.4 percent) and the high specific conductance readings (19.1 to 24.5 mS/cm) reflect the high salinity of the surface water.

The streams at SWMU 16 and SWMU 17 consist of channels within a tidal marsh that are typically inundated during high tide and often inundated during low tide except for the upper reaches of the streams. For example, the staff gauges at sampling locations 16SW/SD05 and 17SW/SD01 were dry during low tide in 2001.

3.2.6 Sediment Sampling

Six sediment samples were collected at SWMU 16 and one was collected at SWMU 17 in 2001. The sample identification, location designations, and analyses for the samples are summarized in Table 3-1. The SWMU 16 and SWMU 17 samples were collected from the same locations as the respective surface water samples as described in the previous section. Sediment sample locations are shown on Figures 3-2 and 3-3 for SWMUs 16 and 17, respectively (and Figure 3-1). Physical properties of the sediment such as material description, color, and moisture were recorded on sample log sheets provided in Appendix A-8.

3.2.7 Surface/Subsurface Soil Sampling

Information such as sample analyses, sample identification, and sample depths is provided on Table 3-1. Soil sampling locations are shown on Figures 3-2 and 3-3 for SWMUs 16 and 17, respectively. Physical properties of the soils such as material description, color, and moisture were recorded on sample log sheets provided in Appendix A-9.

SWMU 16

Subsurface soil samples were collected from four soil borings at SWMU 16 (16SB01 through 16SB04). Soil borings were located in anomalous areas based on geophysical survey results for SWMU 16 and considered as likely biased high concentration sampling locations. One of the four borings, 16SB04, was located within an area of crushed waste oil drums. Surface soil samples were additionally collected in 2001. The surface soil sample collected at 16SS01 was collected to determine the chemical characteristics of the 2-foot soil cover material. The surface soil sample collected at 16SS02 was from an area with appreciable surface debris observed during the geophysical survey. During the 2004/2005 supplemental investigation, two more surface soil samples were collected to obtain additional data from

this debris pile area. The geophysical survey results are provided in Appendix C-1, and supporting field mapping of debris is provided in Appendix C-2.

SWMU 17

A total of 19 soil borings (17SB01 through 17SB19) were installed in 2001 to characterize and define the extent of contamination. One surface and two subsurface soil samples were collected from each boring, using a hand auger to collect the surface soil and hollow-stem auger (HSA) and split-spoon sampling techniques to collect the subsurface soil. Surface soil samples were collected from 0 to 1 foot bgs, and subsurface soil samples were collected from 1 to 3 and 5 to 7 feet bgs. The soil boring locations were based on the results of the geophysical survey targeting the anomalies and based on field observations such as the presence of empty drums. The geophysical survey report is provided in Appendix C-1.

An additional 10 soil borings (17SB20 through 17SB29) were installed during the 2003 field event using DPT to better define the extent of the contamination. One surface soil sample was collected from 0 to 1 foot bgs, and the subsurface soil samples were collected from 1 to 3 feet and 3 to 5 feet bgs at each boring. The locations were determined by the results of the 2001 sampling effort.

Five soil borings (17SB30 through 17SB34) were installed during the 2005 field effort using hand augers. Three of the borings (17SB30, 17SB31, and 17SB32) were located at a depression area that also appeared to be a significant source of groundwater contamination; the sample collection interval was selected at the highest photoionization detector (PID) reading within the vadose zone. For the remaining two borings (17SB33 and 17SB34), the sample interval was selected where MIP anomalies suggested that soil contamination might be present.

3.2.8 Quality Assurance/Quality Control Samples

Duplicate samples were collected at a frequency of 1 in 10 environmental samples, and matrix spike/matrix spike duplicate (MS/MSD) samples were collected at a frequency of 1 in 20. The duplicate and MS/MSD locations were recorded on the sample log sheet. A total of 30 trip blanks, 10 rinse blanks, and 10 field blanks were collected during the RFI. Sample log sheets were generated for each sample collected and are provided in Appendix A-10. Table 3-2 provides a summary of the QA/QC samples. The trip blanks were provided by the laboratory and accompanied the containers used to collect the VOC samples. The field blanks were samples of source water used to decontaminate drilling tools and sampling tools. The samples consisted of potable water and deionized (DI) water. The rinse blanks were collected by pouring DI water over sampling tools into the sample container. When disposable sampling tools were used, only one rinse blank sample per type of sample tool was collected during each major

field sampling effort. Also, soil samples were collected from beneath the decontamination pad upon completion of each major drilling effort to confirm that no leakage occurred during field activities.

3.2.9 Staff Gauge Installation

Three of the four staff gauges installed in 2001 (16SG02, 16SG03, and 17SG04) consisted of painted green steel fence post. At some locations, a PVC pipe was attached for long-term monitoring. The remaining staff gauge (16SG01) was established on the upper flat surface of a concrete culvert. An additional staff gauge (17SG05) installed in 2005, and consisted of a 2-inch by 4-inch by 8 foot long wooden plank attached to a support beam for the outfall coming from the dredge spoil application area located east of SWMU 17. Staff gauge locations are shown on Figure 3-1.

3.2.10 Groundwater Level Measurements

Six rounds of synoptic water-level measurements were collected during the RFI. Four rounds were obtained in 2001 and two in 2005. The water level and groundwater elevation data are provided on Tables 3-6, 3-7, and 3-8. Water levels were collected during both high tide and low tide to demonstrate the tidal influence on the groundwater flow pattern. During each round, all monitoring wells were gauged within a 4-hour period. The region was experiencing drought conditions several years prior to and including 2001 (USGS, 2002). Rainfall since 2001 seems to have increased as indicated by the water levels measured in 2005 in wells that were not tidally influenced. Staff gauges 16SG02 and 16SG03 were not measured during the 2005 water-level measurements because of wet conditions impeding access. Similarly, staff gauge 17SG04 could not be accessed during the 2005 water-level measurements. The groundwater level and surface water measurements were used in developing site-specific potentiometric surface maps. Field forms with water level data are provided in Appendix A-11.

3.2.11 Field Mapping and Surveying

Monitoring well, soil boring, staff gauge, sediment, surface water, and surface soil sample locations were surveyed for horizontal and vertical control in accordance with the RFI work plans for SWMUs 16 and 17 (ABB-ES, 1995; TtNUS, 2001 and 2004). The surveying was performed by Donaldson Garrett & Associates, Inc. in 2001, Hoggard-Eure Associates in 2002, and Palmetto Land Surveying in 2003 and 2005. The survey coordinates are referenced to the North American Vertical Datum (NAVD) 88 (vertical elevations) and the North American Datum (NAD) 83 (horizontal locations). A summary of the survey data is provided in Appendix A-12.

The high tide water line was staked on November 15, 2004; this date was chosen based on tidal predictions from http://co-ops.nos.noaa.gov (NOAA) identifying the date of the highest high tide for all of

2004. Ten points were staked and surveyed; see Figure 3-1 for the high tide line location. Also, the debris pile at SWMU 16 and the depression area at SWMU 17 were staked and surveyed. SWMU 16 trenches shown on aerial photos were placed on site maps via the Base environmental geographic information system (EGIS) and surveyed using these coordinates in order to field locate.

Field location procedures using historic coordinates were also used in an attempt to find NWS-2-6, which was proposed for abandonment. The well was not found and is suspected to have been destroyed when the bridge was installed extending from Wilkinson Way. Also, the rip-rap that was reportedly installed along the shore line at SWMU 16 was not visible and therefore could not be surveyed.

3.2.12 Geophysical Survey

A geophysical survey was initiated at SWMU 16 and 17 in July 2000, but extremely hot weather, tidal waters, and significant vegetation prevented the completion of the survey. Follow-up geophysical surveys were conducted during November 2000 at SWMU 16.

Electromagnetic (EM) and magnetic surveys were conducted at SWMUs 16 and 17 to identify landfill limits, to identify anomalies for placement of soil borings, to potentially locate buried mercury batteries, and to identify any possible UXO concerns. The survey at each site was conducted along survey lines at grid spacings of 25 to 50 feet based on site conditions using a portable magnetometer and EM survey equipment. Control points were surveyed for horizontal location to accurately align the geophysical survey grid with the site. All geophysical data were recorded using an electronic data recorder, reduced and evaluated by a geophysicist, and results graphically overlaid on a map of the site. Anomalous areas were identified for potential further investigation. A field trip report containing the results of the geophysical survey is provided in Appendix C-1 in the form of a technical memorandum.

3.2.13 Investigation-Derived Waste

IDW generated during the RFI included forty 55-gallon drums of water and 46 drums of soil stored on pallets at the Base during the RFI. TtNUS sampled the IDW to profile the waste for disposal and a sample log sheet was generated with every sample collected. IDW sample log sheets are provided in Appendix A-10. The drummed IDW material was disposed of as both nonhazardous and hazardous waste. In particular, aqueous IDW (purge and development water) associated with the source of the plume in the SWMU 17 depression area was identified as hazardous or potentially hazardous waste based on characteristic and disposed accordingly. Manifests and certifications are presented in Appendix A-13.

3.2.14 Sample Analysis

All samples collected were analyzed by Katahdin Laboratory and Severn-Trent Laboratories (STL), both South Carolina-certified laboratories. Detailed analytical results are presented in Appendix E. The appendix is divided by soil (surface soil, Appendix E-1; subsurface soil Appendix E-2), groundwater (TtNUS, Appendix E-3; Solutions-IES, Appendix E-4), surface water (Appendix E-5), sediment (Appendix E-6), QA/QC (Appendix E-7), and IDW samples (Appendix E-8) Appendix E-9 presents the chain-of-custody (COC) forms.

3.2.15 Slug Tests

Slug tests were performed on all permanent monitoring wells installed by TtNUS during the RFI. Rising and falling head tests were typically performed on the monitoring wells to estimate the hydraulic conductivity of the surficial aquifer. However, if the water level was below the screen, the falling head test was not performed. The procedure for performing the rising head slug test consisted of injecting a slug of known volume below the water level within the well. After the water level re-stabilized, the slug was suddenly removed to create a decrease in water level within the well. A pressure transducer and a data logger were used to record the rate of water-level recovery back to the static level to determine the hydraulic characteristics of the aquifer. The procedure for performing the falling head slug test consisted of rapidly injecting a slug of known volume into the well below the water surface so that the water level within the well rose. The subsequent rate of water level recovery to the original static water level was measured to determine hydraulic characteristics of the aquifer. The data were analyzed using the Hvorslev Method (Hvorslev, 1951). Slug test calculations and data are presented in Appendix D-1. The data are summarized in Section 3.4.3.

3.2.16 Tidal Study

A tidal study was performed in October 2001 to determine what effect, if any, ocean tides had on groundwater flow patterns. SWMU 16/17 is located adjacent to the tidally influenced Goose Creek. The objective of the tidal studies was to monitor water-level elevations in the marsh and/or wells over a 2-day period and determine how the aquifer and the adjacent surface water interact. The study consisted of installing pressure transducers in four wells and at two staff gauge locations. A PVC pipe was installed at the staff gauge locations to accommodate the transducers for long-term monitoring. Water-level measurements were recorded at 15-minute intervals using a data logger to automatically monitor water-level fluctuations. The results of the tidal study are discussed in Section 3.4 and in a detailed report provided in Appendix D-2.

3.2.17 Monitoring Well Abandonment

Six historic SWMU 16 wells (NWS-2-1 through NWS-2-5 and NWS-2-7) were abandoned because of poor and unknown construction. The sixth well, NWS-2-6, was not found and is suspected to have been removed when the bridge was installed extending from Wilkinson Way. Locations are shown in Figure 3-17. Wells were abandoned according to South Carolina Well Standards and Regulations (SCDHEC, 2002). The well riser and screen were pulled from the borehole, and the borehole was backfilled with bentonite/cement grout from the bottom of the borehole to the ground surface.

3.2.18 Site Restoration

Because the sites are marshy, extensive efforts were required to restore the areas impacted by drilling activities. The work was conducted by Environmental Enterprise Group, Inc. (EEG) and consisted of smoothing out and filling in rutted areas, breaking up clods, hydroseeding, and improving the dirt access road. The areas restored included the northern end of the utility cut right of way at SWMU 17 and both sides of Wilkinson Way. The dirt access road extended from Wilkinson Way into the southern area of the utility cut, then along the utility cut to the pilot-scale treatability study area; a turnaround was also provided. The road improvement consisted of a geo-fabric layer covered with graded aggregate base course macadam.

The topsoil brought in was certified clean as documented by an affidavit from the borrow facility (Appendix A-14). Gravel specified for the access road was a non-limestone type (Appendix A-14) to avoid potential pH impact on the site soil/groundwater.

3.3 SITE-SPECIFIC GEOLOGY

The general stratigraphic sequence encountered at SWMUs 16 and 17 during the RFI consists of Holocene and Pleistocene (near marine to marine) deposits overlaying the Oligocene Ashley Formation. Both sites lie within the 100-year floodplain boundary based on the Federal Emergency Management Agency (FEMA) flood insurance rate map (1982).

The stratigraphic units are discussed in order from surface to depth in the following section. The information presented for each unit is based on site-specific data gathered from soil borings for monitoring well installation, DPT borings, and MIP logs. Additionally, information from the United States Department of Agriculture (USDA) Soil Survey of Berkeley County, South Carolina (1980) was used for correlation of soil types. Figures 3-1, 3-2, and 3-3 depict the boring and monitoring well locations for SWMUs 16 and 17. Figure 3-4 provides the trace and orientation of the eight cross sections drawn to depict the stratigraphic relationships among the lithologic units at SWMUs 16 and 17. The cross sections

for SWMU 16 and 17 are presented on Figure 3-5 through 3-9. Descriptions of the cross sections are included below in Section 3.3.1.

Holocene Deposits

Holocene deposits found at SWMUs 16 and 17 include artificial fill, tidal marsh, and freshwater stream and swamp sediments. In some areas of SWMU 16, the upper soil horizons have been disturbed locally by development and consequently contain fill materials. Artificial fill was found in a few borings drilled along Wilkinson Way and in boring 16SB03 installed in the marsh at SWMU 16. (Recall that nominal investigation within the SWMU 16 landfill was conducted because of UXO clearance issues). The Soil Survey of Berkeley County maps indicate that the Bohicket-Capers association and Wahee series are the predominant soil units found in the SWMUs 16 and 17 areas. Both soil types have very poor permeability and are generally described as approximately 0.6-foot loams underlain by clay and silty clay approximately 4 to 8 feet thick, formed in clayey coastal plain environments.

At SWMU 16, tidal marsh deposits (muck) are interlayered with stream and swamp deposits (peat) and have a combined thickness of approximately 25 to 35 feet. These Holocene deposits grade laterally into Pleistocene deposits to the east.

Pleistocene Deposits

Generally, Pleistocene deposits consist of interlayered beds of clay, sand, and fossiliferous sand of near marine (back barrier) origin. Not all of the units are uniformly present at the sites. The uppermost stratum consists of clay with varying amounts of silt and minor amounts of sand and is typically 5 to 10 feet thick. (The permeability of this sandy clay is very poor after heavy rain events when standing water is observed throughout the site for extended periods of time.) A yellowish brown to grayish green silt and sand unit ranging in thickness from 5 to about 20 feet was encountered beneath the upper sandy clay layer. This silt and sand unit is very soft and sampling recovery rates were very low. Because of the poor sample recovery, only drill cuttings were logged at many of the soil boring locations. Underlying the silt and sand unit (coarsening downward) is a layer of dark grayish green sand with varying amounts of silt and shell fragments. This unit has a gradational contact with the overlying silt and sand layer. A distinct grayish green (soft, sticky, and plastic) clay and silt unit was encountered beneath the shelly sand bed. The grayish green clay and silt unit was found to be discontinuous and grades laterally to a well sorted green deposits in the eastern portion of SWMU 17.

Oligocene Deposits

Deposits described as olive brown, non-plastic, friable silt and clay were encountered beneath the Pleistocene deposits during drilling activities. The contact was a distinct break from the overlying sediments of grayish green deposits in the eastern portion of SWMU 17. This unit is believed to be the Ashley Formation of the Cooper Group and is of marine origin. The unit, approximately 125 feet thick (Weems and Lemon, 1993), is a major regional aquitard and marks the bottom of the surficial aquifer.

3.3.1 Descriptions of Cross Sections

To further describe the subsurface geologic units underlying SWMUs 16 and 17, eight cross sections have been developed. Figure 3-4 shows the locations of these cross sections in plan view, and Figures 3-5 through 3-9 present the cross Sections A-A′ through H-H′.

Cross section A-A' (Figure 3-5) is located in the western portion of SWMU 16 and transects the site south to north along the marsh boundary of Goose Greek. From land surface to approximately 5 to 6 feet bgs, a sandy clay material was encountered that is believed to be fill material and pinches out to the north and south at the site perimeter monitoring wells. Unique to the western side of SWMU 16, beneath the fill is marsh mud consisting of organic clay and peat. It is interpreted that the Ashley Formation of the Cooper Group was encountered during the RFI below the organic clay and peat deposits at a depth of about 33 feet bgs. The historical log for NWS-2-7 also encountered the Ashley Formation of the Cooper Group at the same approximate depth, describing it as a pale green marl.

Cross section B-B' (Figure 3-6) transects SWMU 17 in a south-to-north direction along Wilkinson Way between SWMUs 16 and 17. As observed on the cross section, the upper sandy clay unit extends the length of the section, thinning from 8 feet thick in the north to 4 feet thick in the south. Beneath the upper sandy clay layer is a coarsening-downward sequence that consists of two units, a silt and sand unit that grades downward into dark grayish green silty sand with shell fragments. Both of these units extend the entire length of the cross section and have a combined thickness ranging from 20 feet at 17MIP06 to 32 feet at the southern 17MIP31. Beneath these two units is a distinct dark grayish green (soft, sticky, and plastic) silt and clay unit. As shown on the cross section, elevated readings were measured by the conductivity probe as expected when encountering this layer. This is illustrated at well locations 17MW12D and 17TW37-B where the soil borings penetrated the silt and clay layer. The Ashley Formation of the Cooper Group was encountered at 17MW01S and inferred to extend the length of the cross section based on data from other deep borings in the area and because it is a known regional feature.

Cross section C-C' (Figure 3-6) also transects SWMU 17 in a south-to-north direction (east of Wilkinson Way) in SWMU 17 and through the treatability study area known to be the contaminant hot spot. As observed on the cross section, the upper sandy clay unit extends the length of the section, is 10 feet thick in the north, gradually thins to 5 feet in the central portion at 17MW20S, and thickens to 11 feet at the southern end. Beneath the upper sandy clay layer is a coarsening-downward sequence that consists of two units, a silt and sand unit that grades downward into dark grayish green silty sand with shell fragments. However, in the central portion of the cross section, a lens of clayey sand was encountered between these two units. The silt and sand unit extends the length of the section and changes laterally from a grayish green silt and sand in the south to a yellow brown in the central portion of the section then grades back to grayish green color to the north. The underlying dark grayish shelly silty sand grades into contact with the Ashley Formation of the Cooper Group in the south. Beneath these two units in the south is a distinct dark grayish green (soft, sticky, and plastic) silt and clay unit that was inferred from MIP conductivity logs to be at about 27 feet bgs under the contaminant hot spot where the treatability study is being conducted. The silt and clay unit pinches out and grades into a well-sorted grayish green sand at 17MIP33 that continues to the northern end of the section. The Ashley Formation of the Cooper Group was encountered at 17MW04S at 16 feet bgs and inferred to extend the length of the cross section based on data from other deep borings in the area and because it is a known regional feature.

Cross section D-D' (Figure 3-7) transects SWMU 17 in a south-to-north direction along the marsh east of SWMU 17 and extending north beyond the site boundary to 17TW10S/D. As illustrated on the cross section, the upper sandy clay unit extends the length of the section and has a thickness ranging from 12 feet in the north to 5 feet at the southern end. Beneath the upper sandy clay layer is a coarsening-downward sequence that consists of two units, a silt and sand unit that grades downward into dark grayish green silty sand with shell fragments. Both these units extend the entire length of the cross section and have a combined thickness of about 17 to 19 feet. Beneath these two units is a well-sorted grayish green sand that extends the length of the section. A 4-foot thick lens of silty sand with shell fragments was encountered in several borings in the central portion of the section overlying the Ashley Formation of the Cooper Group. The contact was abrupt and distinct at wells 17MW16D, 17MW17D, and 17MW18D and was encountered at depths of 42 feet, 37.5 and 31 feet bgs, respectively.

Cross section E-E' (Figure 3-7) transects SWMU 17 in a west-to-east direction across the central portion of SWMU 17. The cross section passes through the treatability study hot spot area and extends to the marsh area to the east. The upper sandy clay unit extends the length of the section and is 4 to 8 feet thick. Beneath the upper sandy clay layer is a coarsening-downward sequence that consists of two units, a silt and sand unit that grades downward into dark grayish silty sand with shell fragments. Both units extend the entire length of the cross section and have a combined thickness of about 18 feet to 23 feet. A dark grayish green clayey sand lens was encountered at 17MW06D within the shelly sand. Beneath

the shelly sand in the central portion of the section is a distinct dark grayish green (soft, sticky, and plastic) silt and clay unit that was encountered at 17MW12D and is inferred from the MIP conductivity log for 17MIP34 to be at about 27 feet bgs under the contaminant hot spot. The silt and clay unit pinches out past the eastern boundary of SWMU 17 and grades into a well-sorted grayish green sand to the west between 17MW12D and 17MIP25 and to the east where the silt and clay grades into the sand unit at 17MIP54. The Ashley Formation of the Cooper Group was encountered at 17MW18D at 31 feet bgs and inferred to extend the length of the cross section based on data from other deep borings in the area and because it is a known regional feature.

Cross section F-F' (Figure 3-8) transects SWMUs 16 and 17 in a west-to-east direction in the south-central portion of the sites and passes just to the north of the treatability study hot spot area at 17MW19S, extending to the marsh area to the east. The upper sandy clay unit extends from the eastern end of the section to NWS-2-4, then is replaced by fill material at 16SB03 and NWS-2-7 (and is also likely replaced by fill material to some degree at Wilkinson Way). The fill material pinches out west of well NWS-2-7, grading into marsh sediments consisting of organic clay and peat. Beneath the upper sandy clay layer in the eastern portion of the section is a coarsening-downward sequence that consists of two units, a silt and sand unit that grades downward into a dark grayish green silty sand with shell fragments. Both these units extend to the central portion of the cross section where they pinch out near the SWMU 16 high tide water line of 2004 and grades into the marsh mud SWMU 16. These two units have an combined thickness of about 18 feet to 25 feet. Beneath these two units in the east-central portion of the section is a distinct dark grayish green (soft, sticky, and plastic) silt and clay unit that was encountered at 17TW37-B and is inferred from MIP conductivity logs for 17MIP23, 17MIP14, 17MIP13, 17MIP43, and 17MIP33. The silt and clay unit pinches out near the eastern boundary of SWMU 17 and grades into a well-sorted grayish green sand to the east between 17MW16D and 17MIP33 and to the west where the silt and clay unit grades into the marsh mud between 16SB04 and NWS-2-4. The Ashley Formation of the Cooper Group was encountered at 17MW16D at 42 feet bgs, at 17TW07D at 44 feet bgs and at NWS-2-7 at 30 feet bgs.

Cross section G-G' (Figure 3-8) transects SWMU 17 in a west-to-east direction in the northern portion of SWMU 17 and passes to the north of the treatability study hot spot area, extending to the marsh area to the east. The upper sandy clay unit extends from the eastern end across the section where it changes to a silty sand west of Wilkinson Way between SWMUs 16 and 17. This material is likely fill material used to install the road. The upper clay ranges in thickness from about 4 to 9 feet. Beneath the upper sandy clay layer is a coarsening-downward sequence that consists of two units, a silt and sand unit that grades downward into dark grayish green silty sand with shell fragments. Both these units extend the entire length of the cross section and have a combined thickness of about 17 to 24 feet. Beneath these two units in the western portion of the section is a distinct dark grayish green (soft, sticky, and plastic) silt and

clay unit that is inferred from the MIP conductivity logs for 17MIP32, and 17MIP10. The silt and clay unit pinches out in the central portion of the section beyond the eastern boundary of SWMU 17. This unit grades into a well-sorted grayish green sand to the east where it extends to the eastern end of the cross section. The Ashley Formation of the Cooper Group was not encountered at wells along this section, however, it is inferred to extend the length of the cross section based on data from other deep borings in the area and because it is a known regional feature.

Cross section H-H' (Figure 3-9) transects SWMUs 16 and 17 in a west-to-east direction in the northern portion of SWMU 16 and north of the SWMU 17 boundary. The upper sandy clay unit extends from west of 16MW01S to the eastern end of the section and is locally replaced by sandy silt at 17SB01, which is likely fill material used to build Wilkinson Way. The upper sandy clay unit pinches out at SWMU 16 in the vicinity of 16MW02S, grading into marsh sediments consisting of organic mud and peat. Beneath the upper sandy clay layer throughout most of the section is a coarsening-downward sequence that consists of two units, a silt and sand unit that grades downward into dark grayish green silty sand with shell fragments. Both of these units extend from the eastern end to the west near 16MW02S, where they pinch out and grade into the marsh mud underlying SWMU 16. These two units have a combined thickness of about 16 feet to 26 feet. Beneath these two units in the central portion of the section, a dark grayish green (soft, sticky, and plastic) silt and clay unit is inferred based on data from intersecting cross sections. The silt and clay unit also pinches out and grades into a well-sorted grayish green sand to the east between 17MW13S and 17TW09S/D and to the west where it grades into the marsh mud. The Ashley Formation of the Cooper Group is inferred to exist at about 31 to 42 feet bgs, deeper in the central portion of the section.

The site-specific geology is summarized as follows:

- At SWMU 16, the subsurface materials consist primarily of three units. Fill material (sand and silt with varying amounts of clay and waste material) was encountered in the top 5 to 8 feet bgs. Beneath the fill material is interbedded marsh muck (clay and silt) and peat with a combined thickness of approximately 25 to 35 feet. The Ashley Formation of the Cooper Group is inferred to come in contact with the overlying marsh muck.

- At SWMU 17, the subsurface material consists primarily of five units above the Ashley Formation of the Cooper Group. A low permeable clay unit at the land surface was encountered throughout the SWMU and extends to about 5 to 10 feet bgs. Beneath the clay unit is a silt and sand unit that coarsens downward to a shelly sand unit. Both of these units were encountered throughout SWMU 17 and have a combined thickness ranging from 17 to 32 feet. Beneath the shelly sand in the west portion of SWMU 17 is a distinct silt and clay unit. The silt and clay unit changes laterally into a sand

unit that was encountered beyond the eastern boundary of SWMU 17. The Ashley Formation of the Cooper Group is inferred to underlie both units (silt and clay and sand). The upper surface of the Ashley Formation of the Cooper Group has a relatively steep slope (2.4 percent) to the north and was encountered at 16 feet bgs at the southern boundary and at 42 feet bgs in the north.

3.4 SITE-SPECIFIC HYDROGEOLOGY

This section presents information concerning the occurrence and movement (flow direction and rate) of groundwater in the surficial aquifer present in the sediments overlying the Ashley Formation of the Cooper Group. Beneath SWMUs 16 and 17, the Ashley Formation of the Cooper Group serves as a regional confining unit between deeper aquifer systems and the surficial aquifer. Therefore, this RFI Report will only address environmental concerns related to the surficial aquifer.

3.4.1 Groundwater Occurrence

The surficial aquifer present in the sediments beneath SWMU 16 and 17 displays the characteristics of a semi-confined to unconfined system. Typically, the first water is encountered just beneath the upper clay unit that extents from the land surface to about 5 to 12 feet bgs. After monitoring well completion, the static water level equilibrates at levels above the depth at which saturated material was first noted while drilling.

3.4.2 Groundwater Flow Direction

The direction of groundwater flow for the shallow portion of the surficial aquifer has been determined from potentiometric surface maps (Figures 3-10 through 3-15) developed from static water-level data collected during six separate water-level gauging events: October 10, 2001 (high and low tide), December 3, 2001 (low tide), December 4, 2001 (high tide), March 1, 2005 (high tide), and February 22, 2005 (low tide). Associated data are provided on Tables 3-7, 3-8, and 3-9. The direction of groundwater flow in the deep portion of the surficial aquifer is also addressed in this section.

In addition to the potentiometric surface maps, a tidal study was completed in 2001 to evaluate the interaction between the surface water and groundwater and details are provided Appendix D-2. In summary, the groundwater elevations did not fluctuate at wells located in the upland areas outside of the marsh areas and believed to be isolated hydraulically from the surface water by the low-permeability marsh clay. The groundwater elevations in wells screened in the silt and clay marsh deposits adjacent to the surface water bodies did fluctuate slightly and are believed to be influenced by surface water tidal fluctuations. Figure 3-16 provides the graphs of the six points included in the study. Groundwater contours for the October 10, 2001 rounds of data are shown on Figures 3-10 and 3-11.

The tidal study results supplement evaluation of the groundwater flow patterns. The region was experiencing drought conditions several years prior to 2001 (USGS, 2002). Rainfall has increased since 2001 as indicated by the water levels measured in 2005 in wells that are not tidally influenced. The synoptic water-level measurements taken during the October 10, 2001 were part of the tidal study, and the results are discussed in the tidal study report (Appendix D-2).

Groundwater flow patterns for December 3, 2001 (low tide) and December 4, 2001 (high tide) are illustrated by the potentiometric surface maps developed from static water-level data collected from nine wells and four staff gauges. During low tide (Figure 3-12), there was a northwest-southeast oriented groundwater divide or mound in the western portion (marsh) of SWMU 16. Groundwater in the marsh was flowing from the mound to the east, south, and west. The groundwater was probably discharging into Goose Creek to the west and south. A high gradient existed on the western side of the mound, possibly indicating a restricted hydraulic connection between groundwater and surface water in this area. The gradient on the northeastern side of the mound was much less steep and was defined by wells that are not tidally influenced (see the tidal study results). During high tide (Figure 3-13), a depression in the potentiometric surface contours in the central portion of the study area was observed as a result of the increase in water levels to the west, south, and southeast. Groundwater flowed toward this depression during the high tide portion of the tidal cycle. These flow patterns were reflective of drought conditions that caused water-level elevations in non-tidally influenced wells to be depressed due to evapotranspiration and the lack of precipitation recharge over a long period of time.

The groundwater flow patterns for February 22, 2005 (low tide) and March 1, 2005 (high tide) were developed using static water-level data collected from 26 wells and two staff gauges. The potentiometric surface mimics the land surface topography. During low tide (Figure 3-14), there was a northeast-southwest oriented groundwater divide or mound in the central portion of the study area. At SWMU 17, groundwater was flowing east toward the tributary of Goose Creek, and at SWMU 16 to the west, southwest and northwest toward Goose Creek. A higher gradient existed on the eastern side of the mound as a result of topography.

During high tide (Figure 3-15), a similar flow pattern was observed. The groundwater potentiometric surface mimics the land surface topography, and there was a groundwater divide the central portion of the site.

During the 2005 phase of the RFI, six wells were installed in the deep portion of the surficial aquifer adjacent to shallow wells. The head differentials at six well clusters, 17MW12S/D, 17MW14S/D, 17MW15S/I/D, 17MW16S/I/D, 17MW17S/I/D, and 17MW18S/D ranged from 0.55 feet to 1.11 feet and

show that there is a downward flow component in these areas between the shallow and deep groundwater. The water levels in the two intermediate depth surficial wells were just slightly higher then the deep surficial wells, also showing a downward flow component between the intermediate and deep wells. The deep groundwater level data was reviewed to see if potentiometric surface maps could be developed to show the flow direction of the deeper groundwater. Due to insufficient data, contour maps could not be generated for the deep surficial aquifer. It was decided that well 17MW12D water-level data should not be grouped with the water level data from the deeper wells to the east because the well screen was installed in the intermediate portion of the surficial aquifer (see Table 3-4 for well construction details). Data suggest that the deeper groundwater at SWMU 17 is flowing to the east and southeast toward the tributary to Goose Creek and ultimately the Cooper River.

3.4.3 Groundwater Flow Characteristics

Hydraulic Conductivity

Slug tests were conducted in 31 monitoring wells to estimate the horizontal hydraulic conductivity of the surficial aquifer. The geometric mean value is the best representative measure of the arithmetic average hydraulic conductivity of the falling and rising head values. The results were subdivided into SWMU 16 shallow and SWMU 17 shallow, intermediate, and deep wells of the surficial aquifer, since differences were evident. The data are summarized in Table 3-10. Generally, the marsh mud in SWMU 16 had the lowest permeability (0.51 feet per day), and the grayish green sand unit in the deep surficial aquifer on the eastern side of SWMU 17 has the highest (17.91 feet per day). The hydraulic conductivity values derived from the slug tests are also presented on the cross sections (Figures 3-5 through 3-9) showing that at SWMU 17, the permeability increases significantly downward through the surficial aquifer.

Groundwater Velocity

Hydraulic gradients were estimated for SWMUs 16 and 17 by graphic interpretation of the potentiometric surface contour maps generated from the 2005 data (Figures 3-14 and 3-15). The 2001 potentiometric surface contour maps were not used because they do not reflect normal climatic conditions and there were fewer wells available. The hydraulic gradients used to estimate groundwater seepage velocities were calculated by averaging the hydraulic gradients from the high and low tide groundwater contours.

The seepage velocity, V_s, is calculated using the following equation:

$$V_s = K \times i \, (1/n)$$

Where:

V_s	=	estimated groundwater seepage velocity (feet/day)
K	=	horizontal hydraulic conductivity (feet/day)
i	=	hydraulic gradient (foot per foot)
n	=	effective porosity

SWMW 16

Estimated Site Conditions (upper surficial aquifer):

K = 0.51 feet/day

n = 0.40 (silt, from Fetter, 1998)

i = 0.0049 foot per foot (averaged from high and low tide gradients)

Therefore, $V_s = 0.51 \times 0.0049\ (1/0.40)$
$V_s = 0.0063$ feet/day
$V_s = 2.3$ feet/year

SWMU 17

Estimated Site Conditions (upper surficial aquifer):

K = 1.24 feet/day

n = 0.30 (sand, from Fetter, 1998)

i = 0.0075 foot per foot (averaged from high and low tide gradients)

Therefore, $V_s = 1.24 \times 0.0075\ (1/0.30)$
$V_s = 0.031$ feet/day
$V_s = 11.3$ feet/year

The hydraulic gradient and seepage velocity calculations are provided in Appendix C-3. The average groundwater seepage velocities for the upper surficial aquifer were calculated to be 0.0063 feet per day (2.3 feet per year) for SWMU 16 and 0.031 feet per day (11.3 feet per year) at SWMU 17.

TABLE 3-1

SAMPLING AND ANALYSES PROGRAM
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Sample Number	Location	Sample Date	Sample Depth	Explosives	Herbicides	Metals	Organophosphorus Pesticides	SVOCs	VOCs	Pesticides/PCBs
SWMU 16 GROUNDWATER										
16-G-01S-0305	16MW01S	3/2005	NA	•		•		•	•	•
16-G-01S-1001	16MW01S	10/2001	NA	•		•		•	•	•
16-G-02S-0205	16MW02S	2/2005	NA	•		•		•	•	•
16-G-02S-1001	16MW02S	10/2001	NA	•		•		•	•	•
16-G-03S-0205	16MW03S	2/2005	NA	•		•		•	•	•
16-G-03S-1001	16MW03S	10/2001	NA	•		•		•	•	•
16-G-04S-0205	16MW04S	2/2005	NA	•		•		•	•	•
16-G-04S-1001	16MW04S	10/2001	NA	•		•		•	•	•
16-G-04S-1001-D	16MW04S	10/2001	NA	•		•		•	•	•
16-G-05S-0205	16MW05S	2/2005	NA	•		•		•	•	•
16-G-05S-1001	16MW05S	6/2001	NA	•		•		•	•	•
SWMU 17 GROUNDWATER										
17-G-01S-0205	17MW01	2/2005	NA	•		•		•	•	•
17-G-01S-1001	17MW01	10/2001	NA	•		•		•	•	•
17-G-02S-0205	17MW02S	2/2005	NA	•		•		•	•	•
17-G-02S-1001	17MW02S	10/2001	NA	•		•		•	•	•
17-G-03S-0205	17MW03S	2/2005	NA	•		•		•	•	•
17-G-03S-0205-D	17MW03S	2/2005	NA	•		•		•	•	•
17-G-03S-1001	17MW03S	10/2001	NA	•	•	•	•	•	•	•
17-G-04S-0205	17MW04S	2/2005	NA	•		•		•	•	•
17-G-04S-1001	17MW04S	10/2001	NA	•		•		•	•	•
17-G-05S-0205	17MW05S	2/2005	NA	•		•		•	•	•
17-G-05S-0205-D	17MW05S	2/2005	NA	•		•		•	•	•
17-G-06D-0205	17MW06D	2/2005	NA	•		•		•	•	•
17-G-07S-0205	17MW07S	2/2005	NA	•		•		•	•	•
17-G-11S-0205	17MIP03-TW29-MW11S	2/2005	NA	•	•	•	•	•	•	•
17-G-12D-0205	17MW12D	2/2005	NA	•	•	•	•	•	•	•
17-G-12D-0205-D	17MW12D	2/2005	NA		•		•			
17-G-12S-0205	17MIP29-TW38-MW12S	2/2005	NA	•		•		•	•	•
17-G-12S-0205-D	17MIP29-TW38-MW12S	2/2005	NA	•		•		•	•	•
17-G-13S-0205	17MW13S	2/2005	NA	•		•		•	•	•
17-G-14D-0305	17MW14D	3/2005	NA	•		•		•	•	•
17-G-14S-0305	17MIP38-TW47-MW14S	3/2005	NA	•		•		•	•	•
17-G-15D-0305	17MW15D	3/2005	NA	•		•		•	•	•
17-G-15S-0305	17MIP39-TW48-MW15S	3/2005	NA	•		•		•	•	•
17-G-16D-0305	17MW16D	3/2005	NA	•		•		•	•	•
17-G-16I-0305	17MIP40-TW49-MW16I	3/2005	NA	•		•		•	•	•
17-G-16S-0305	17MW16S	3/2005	NA	•		•		•	•	•
17-G-17D-0305	17MW17D	3/2005	NA	•		•		•	•	•

TABLE 3-1

SAMPLING AND ANALYSES PROGRAM
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Sample Number	Location	Sample Date	Sample Depth	Explosives	Herbicides	Metals	Organophosphorus Pesticides	SVOCs	VOCs	Pesticides/PCBs
17-G-17I-0205	17MIP41-TW50-MW17I	2/2005	NA	•		•		•	•	•
17-G-17S-0205	17MW17S	2/2005	NA	•		•		•	•	•
17-G-18D-0205	17MW18D	2/2005	NA	•		•		•	•	•
17-G-18S-0205	17MIP42-TW51-MW18S	2/2005	NA	•	•	•	•	•	•	•
17-G-19S-0205	17MIP43-TW52-MW19S	2/2005	NA	•		•		•	•	•
17-G-20S-0205	17MIP48-TW57-MW20S	2/2005	NA	•		•		•	•	•
17-G-21S-0205	17MW21S	2/2005	NA	•		•		•	•	•
17-G-22S-0205	17MIP02-TW30-MW22S	2/2005	NA	•		•		•	•	•
17-G-22S-0205-D	17MIP02-TW30-MW22S	2/2005	NA	•		•		•	•	•
17-G-23S-0205	17MW23S	2/2005	NA	•		•		•	•	•
17MW6S**	17MW06S	11/2004	NA						•	
17PS-01*	17-PS-1	4/2004	NA						•	
17PS-02*	17-PS-2	4/2004	NA						•	
17PS-03*	17-PS-3	4/2004	NA						•	
17-PSTW-10*	17-PSTW-10	11/2004	NA						•	
17-PSTW-11*	17-PSTW-11	11/2004	NA						•	
17-PSTW-12*	17-PSTW-12	11/2004	NA						•	
17-PSTW-13*	17-PSTW-13	11/2004	NA						•	
17-PSTW-14*	17-PSTW-14	11/2004	NA						•	
17-PSTW-15*	17-PSTW-15	11/2004	NA						•	
17-PSTW-4*	17-PSTW-4	11/2004	NA						•	
17-PSTW-5*	17-PSTW-5	11/2004	NA						•	
17-PSTW-6*	17-PSTW-6	11/2004	NA						•	
17-PSTW-7*	17-PSTW-7	11/2004	NA						•	
17-PSTW-8*	17-PSTW-8	11/2004	NA						•	
17-PSTW-9*	17-PSTW-9	11/2004	NA						•	
17-Q-01-0302	17TW01S	3/2002	NA						•	
17-Q-02-0302	17TW02S	3/2002	NA						•	
17-Q-03-0302	17TW03	3/2002	NA						•	
17-Q-04-0302	17TW04S	3/2002	NA						•	
17-Q-05-0302	17TW05S	3/2002	NA						•	
17-Q-06D-0302	17TW06D	3/2002	NA						•	
17-Q-06S-0302	17TW06S	3/2002	NA						•	
17-Q-07D-0302	17TW07D	3/2002	NA						•	
17-Q-07S-0302	17TW07S	3/2002	NA						•	
17-Q-08D-0302	17TW08D	3/2002	NA						•	
17-Q-08S-0302	17TW08S	3/2002	NA						•	
17-Q-09D-0302	17TW09D	3/2002	NA						•	
17-Q-09S-0302	17TW09S	3/2002	NA						•	
17-Q-10D-0302	17TW10D	3/2002	NA						•	

TABLE 3-1

SAMPLING AND ANALYSES PROGRAM
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Sample Number	Location	Sample Date	Sample Depth	Explosives	Herbicides	Metals	Organophosphorus Pesticides	SVOCs	VOCs	Pesticides/PCBs
17-Q-10S-0302	17TW10S	3/2002	NA						•	
17-Q-11-0403	17MIP11-TW11	4/2003	NA						•	
17-Q-12-0403	17MIP12-TW12	4/2003	NA						•	
17-Q-13-0403	17MIP21-TW13	4/2003	NA						•	
17-Q-14-0403	17MIP16-TW14	4/2003	NA						•	
17-Q-15-0403	17MIP15-TW15	4/2003	NA						•	
17-Q-15-0403-D	17MIP15-TW15	4/2003	NA						•	
17-Q-16-0403	17MIP13-TW16	4/2003	NA						•	
17-Q-17-0403	17MIP18-TW17	4/2003	NA						•	
17-Q-18-0403	17MIP19-TW18	4/2003	NA						•	
17-Q-19-0403	17MIP20-TW19	4/2003	NA						•	
17-Q-20-0403	17MIP17-TW20	4/2003	NA						•	
17-Q-21-0403	17MIP09-TW21	4/2003	NA						•	
17-Q-22-0403	17MIP14-TW22	4/2003	NA						•	
17-Q-23-0403	17MIP08-TW23	4/2003	NA						•	
17-Q-24-0403	17MIP07-TW24	4/2003	NA						•	
17-Q-25D-0403	17MIP10-TW25SD	4/2003	NA						•	
17-Q-25S-0403	17MIP10-TW25SD	4/2003	NA						•	
17-Q-26-0403	17MIP06-TW26	4/2003	NA						•	
17-Q-26-0403-D	17MIP06-TW26	4/2003	NA						•	
17-Q-27-0403	17MIP05-TW27	4/2003	NA						•	
17-Q-28-0403	17MIP04-TW28	4/2003	NA						•	
17-Q-29-0403	17MIP03-TW29-MW11S	4/2003	NA						•	
17-Q-30-0403	17MIP02-TW30-MW22S	4/2003	NA						•	
17-Q-30-0403-D	17MIP02-TW30-MW22S	4/2003	NA						•	
17-Q-31-0403	17MIP01-TW31	4/2003	NA						•	
17-Q-32-0105	17MIP23-TW32	1/2005	NA	•		•		•	•	•
17-Q-32-0105-D	17MIP23-TW32	1/2005	NA	•		•		•	•	•
17-Q-33-0105	17MIP24-TW33	1/2005	NA	•		•		•	•	•
17-Q-34-0105	17MIP25-TW34	1/2005	NA	•		•		•	•	•
17-Q-35-0105	17MIP26-TW35	1/2005	NA	•		•		•	•	•
17-Q-36-0105	17MIP27-TW36	1/2005	NA	•		•		•	•	•
17-Q-37-0105	17MIP28-TW37	1/2005	NA	•		•		•	•	•
17-Q-38-0105	17MIP29-TW38-MW12S	1/2005	NA						•	
17-Q-39-0105	17MIP30-TW39	1/2005	NA	•		•		•	•	•
17-Q-39-0105-D	17MIP30-TW39	1/2005	NA	•		•		•	•	•
17-Q-40-0105	17MIP31-TW40	1/2005	NA	•		•		•	•	•
17-Q-41-0105	17MIP32-TW41	1/2005	NA	•		•		•	•	•
17-Q-42-0105	17MIP33-TW42	1/2005	NA	•		•		•	•	•
17-Q-43-0105	17MIP34-TW43	1/2005	NA	•		•		•	•	•

TABLE 3-1

SAMPLING AND ANALYSES PROGRAM
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Sample Number	Location	Sample Date	Sample Depth	Explosives	Herbicides	Metals	Organophosphorus Pesticides	SVOCs	VOCs	Pesticides/PCBs
17-Q-44-0105	17MIP35-TW44	1/2005	NA	•		•		•	•	•
17-Q-45-0105	17MIP36-TW45	1/2005	NA	•	•	•	•	•	•	•
17-Q-46-0105	17MIP37-TW46	1/2005	NA	•		•		•	•	•
17-Q-47-0105	17MIP38-TW47-MW14S	1/2005	NA						•	
17-Q-48-0105	17MIP39-TW48-MW15S	1/2005	NA						•	
17-Q-49-0105	17MIP40-TW49-MW16I	1/2005	NA						•	
17-Q-50-0105	17MIP41-TW50-MW17I	1/2005	NA						•	
17-Q-51-0105	17MIP42-TW51-MW18S	1/2005	NA						•	
17-Q-52-0105	17MIP43-TW52-MW19S	1/2005	NA						•	
17-Q-53-0105	17MIP44-TW53	1/2005	NA	•		•		•	•	•
17-Q-54-0105	17MIP45-TW54	1/2005	NA						•	
17-Q-54-0105-D	17MIP45-TW54	1/2005	NA						•	
17-Q-55-0105	17MIP46-TW55	1/2005	NA						•	
17-Q-56-0105	17MIP47-TW56	1/2005	NA						•	
17-Q-56-0105-D	17MIP47-TW56	1/2005	NA						•	
17-Q-57-0105	17MIP48-TW57-MW20S	1/2005	NA						•	
17-Q-58-0105	17MIP49-TW58	1/2005	NA						•	
17-Q-59-0105	17MIP50-TW59	1/2005	NA						•	
17-Q-60-0105	17MIP51-TW60	1/2005	NA						•	
17-Q-61-0105	17MIP52-TW61	1/2005	NA						•	
17-Q-62-0105	17MIP53-TW62	1/2005	NA						•	
17-Q-63-0105	17MIP54-TW63	1/2005	NA						•	
17-Q-64-0105	17MIP55-TW64	1/2005	NA						•	
SWMU 16 SURFACE WATER										
16-W-01-1001	16SWSD01	10/2001	NA	•		•		•	•	•
16-W-01-1001-D	16SWSD01	10/2001	NA	•		•		•	•	•
16-W-02-1001	16SWSD02	10/2001	NA	•	•	•	•	•	•	•
16-W-03-1001	16SWSD03	10/2001	NA	•		•		•	•	•
16-W-04-1001	16SWSD04	10/2001	NA	•		•		•	•	•
16-W-05-1001	16SWSD05	10/2001	NA	•		•		•	•	•
16-W-06-1001	16SWSD06	10/2001	NA	•		•		•	•	•
16-W-07-1001	16SWSD07	10/2001	NA	•		•		•	•	•
SWMU 17 SURFACE WATER										
17-W-01-1001	17SWSD01	10/2001	NA	•		•		•	•	•
SWMU 16 SUBSURFACE SOIL										
16-B-01-01	16SB01	6/2001	1-3	•		•		•	•	•
16-B-01-03	16SB01	6/2001	3-5	•		•		•	•	•
16-B-01-05	16SB01	6/2001	5-7	•		•		•	•	•
16-B-02-01	16SB02	6/2001	1-3	•		•		•	•	•
16-B-02-05	16SB02	6/2001	5-7	•		•		•	•	•

TABLE 3-1

SAMPLING AND ANALYSES PROGRAM
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Sample Number	Location	Sample Date	Sample Depth	Explosives	Herbicides	Metals	Organophosphorus Pesticides	SVOCs	VOCs	Pesticides/PCBs
16-B-03-01	16SB03	6/2001	1-3	•		•		•	•	•
16-B-03-01-D	16SB03	6/2001	1-3	•		•		•	•	•
16-B-03-03	16SB03	6/2001	3-5	•	•	•	•	•	•	•
16-B-03-05	16SB03	6/2001	5-7	•		•		•	•	•
16-B-04-01	16SB04	6/2001	1-3	•	•	•	•	•	•	•
16-B-04-03	16SB04	6/2001	3-5	•		•		•	•	•
16-B-04-03-D	16SB04	6/2001	3-5	•		•		•	•	•
16-B-04-05	16SB04	6/2001	5-7	•		•		•	•	•
SWMU 17 SUBSURFACE SOIL										
17-B-01-01	17SB01	6/2001	1-3	•		•		•	•	•
17-B-01-03	17SB01	6/2001	3-5	•		•		•	•	•
17-B-01-05	17SB01	6/2001	5-7	•		•		•	•	•
17-B-02-01	17SB02	6/2001	1-3	•		•		•	•	•
17-B-02-03	17SB02	6/2001	3-5	•		•		•	•	•
17-B-02-05	17SB02	6/2001	5-7	•		•		•	•	•
17-B-03-01	17SB03	6/2001	1-3	•		•		•	•	•
17-B-03-03	17SB03	6/2001	3-5	•		•		•	•	•
17-B-03-05	17SB03	6/2001	5-7	•		•		•	•	•
17-B-04-01	17SB04	6/2001	1-3	•		•		•	•	•
17-B-04-03	17SB04	6/2001	3-5	•		•		•	•	•
17-B-04-05	17SB04	6/2001	5-7	•		•		•	•	•
17-B-04-05-D	17SB04	6/2001	5-7	•		•		•	•	•
17-B-05-01	17SB05	6/2001	1-3	•		•		•	•	•
17-B-05-03	17SB05	6/2001	3-5	•		•		•	•	•
17-B-05-05	17SB05	6/2001	5-7	•		•		•	•	•
17-B-06-01	17SB06	6/2001	1-3	•		•		•	•	•
17-B-06-03	17SB06	6/2001	3-5	•		•		•	•	•
17-B-06-05	17SB06	6/2001	5-7	•		•		•	•	•
17-B-07-01	17SB07	6/2001	1-3	•		•		•	•	•
17-B-07-03	17SB07	6/2001	3-5	•		•		•	•	•
17-B-07-05	17SB07	6/2001	5-7	•		•		•	•	•
17-B-07-05-D	17SB07	6/2001	5-7	•		•		•	•	•
17-B-08-01	17SB08	6/2001	1-3	•	•	•	•	•	•	•
17-B-08-03	17SB08	6/2001	3-5	•		•		•	•	•
17-B-08-05	17SB08	6/2001	5-7	•		•		•	•	•
17-B-09-01	17SB09	6/2001	1-3	•		•		•	•	•
17-B-09-03	17SB09	6/2001	3-5	•		•		•	•	•
17-B-09-05	17SB09	6/2001	5-7	•		•		•	•	•
17-B-10-01	17SB10	6/2001	1-3	•	•	•	•	•	•	•
17-B-10-03	17SB10	6/2001	3-5	•		•		•	•	•

TABLE 3-1

SAMPLING AND ANALYSES PROGRAM
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Sample Number	Location	Sample Date	Sample Depth	Explosives	Herbicides	Metals	Organophosphorus Pesticides	SVOCs	VOCs	Pesticides/PCBs
17-B-10-05	17SB10	6/2001	5-7	•		•		•	•	•
17-B-11-01	17SB11	6/2001	1-3	•	•	•	•	•	•	•
17-B-11-01-D	17SB11	6/2001	1-3	•	•	•	•	•	•	•
17-B-11-03	17SB11	6/2001	3-5	•		•		•	•	•
17-B-11-05	17SB11	6/2001	5-7	•		•		•	•	•
17-B-12-01	17SB12	6/2001	1-3	•	•	•	•	•	•	•
17-B-12-03	17SB12	6/2001	3-5	•		•		•	•	•
17-B-12-05	17SB12	6/2001	5-7	•		•		•	•	•
17-B-13-01	17SB13	6/2001	1-3	•		•		•	•	•
17-B-13-03	17SB13	6/2001	3-5	•		•		•	•	•
17-B-13-05	17SB13	6/2001	5-7	•		•		•	•	•
17-B-14-01	17SB14	6/2001	1-3	•		•		•	•	•
17-B-14-03	17SB14	6/2001	3-5	•		•		•	•	•
17-B-14-05	17SB14	6/2001	5-7	•		•		•	•	•
17-B-15-01	17SB15	6/2001	1-3	•		•		•	•	•
17-B-15-03	17SB15	6/2001	3-5	•		•		•	•	•
17-B-15-05	17SB15	6/2001	5-7	•		•		•	•	•
17-B-16-01	17SB16	6/2001	1-3	•		•		•	•	•
17-B-16-03	17SB16	6/2001	3-5	•		•		•	•	•
17-B-16-05	17SB16	6/2001	5-7	•	•	•	•	•	•	•
17-B-17-01	17SB17	6/2001	1-3	•	•	•	•	•	•	•
17-B-17-03	17SB17	6/2001	3-5	•		•		•	•	•
17-B-17-05	17SB17	6/2001	5-7	•		•		•	•	•
17-B-18-01	17SB18	6/2001	1-3	•		•		•	•	•
17-B-18-03	17SB18	6/2001	3-5	•		•		•	•	•
17-B-18-05	17SB18	6/2001	5-7	•		•		•	•	•
17-B-19-01	17SB19	6/2001	1-3	•		•		•	•	•
17-B-19-03	17SB19	6/2001	3-5	•		•		•	•	•
17-B-19-05	17SB19	6/2001	5-7	•		•		•	•	•
17-B-20-01	17SB20	4/2003	1-3						•	
17-B-20-03	17SB20	4/2003	3-5						•	
17-B-21-01	17SB21	4/2003	1-3						•	
17-B-21-03	17SB21	4/2003	3-5						•	
17-B-22-01	17SB22	4/2003	1-3						•	
17-B-22-01-D	17SB22	4/2003	1-3						•	
17-B-22-03	17SB22	4/2003	3-5						•	
17-B-23-01	17SB23	4/2003	1-3						•	
17-B-23-03	17SB23	4/2003	3-5						•	
17-B-24-01	17SB24	4/2003	1-3						•	
17-B-24-03	17SB24	4/2003	3-5						•	

TABLE 3-1

SAMPLING AND ANALYSES PROGRAM
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Sample Number	Location	Sample Date	Sample Depth	Explosives	Herbicides	Metals	Organophosphorus Pesticides	SVOCs	VOCs	Pesticides/PCBs
17-B-25-01	17SB25	4/2003	1-3						•	
17-B-25-03	17SB25	4/2003	3-5						•	
17-B-26-01	17SB26	4/2003	1-3						•	
17-B-26-03	17SB26	4/2003	3-5						•	
17-B-26-03-D	17SB26	4/2003	3-5						•	
17-B-27-01	17SB27	4/2003	1-3						•	
17-B-27-03	17SB27	4/2003	3-5						•	
17-B-28-01	17SB28	4/2003	1-3						•	
17-B-28-03	17SB28	4/2003	3-5						•	
17-B-29-01	17SB29	4/2003	1-3						•	
17-B-29-03	17SB29	4/2003	3-5						•	
17-B-30-02	17SB30	1/2005	2-3	•		•		•	•	•
17-B-31-02	17SB31	1/2005	2-3	•		•		•	•	•
17-B-31-02-D	17SB31	1/2005	2-3	•		•		•	•	•
17-B-32-03	17SB32	1/2005	3-4	•	•	•	•	•	•	•
17-B-33-03	17MIP27-TW36	1/2005	3-5	•		•		•	•	•
17-B-34-06	17MIP41-TW50-MW17I	10/2001	6-8	•		•		•	•	•
SWMU 16 SEDIMENT										
16-D-01-1001	16SWSD01	10/2001	0-0.5	•		•		•	•	•
16-D-01-1001-D	16SWSD01	10/2001	0-0.5	•		•		•	•	•
16-D-02-1001	16SWSD02	10/2001	0-0.5	•	•	•	•	•	•	•
16-D-03-1001	16SWSD03	10/2001	0-0.5	•		•		•	•	•
16-D-04-1001	16SWSD04	10/2001	0-0.5	•		•		•	•	•
16-D-05-1001	16SWSD05	10/2001	0-0.5	•		•		•	•	•
16-D-06-1001	16SWSD06	10/2001	0-0.5	•		•		•	•	•
16-D-07-1001	16SWSD07	10/2001	0-0.5	•		•		•	•	•
SWMU 17 SEDIMENT										
17-D-01-1001	17SWSD01	1/2005	0-0.5	•		•		•	•	•
SWMU 16 SURFACE SOIL										
16-S-01-00	16SS01	10/2001	0-0.5	•		•		•	•	•
16-S-02-00	16SS02	10/2001	0-0.5	•		•		•	•	•
16-S-02-00-D	16SS02	10/2001	0-0.5	•		•		•	•	•
16-S-03-00	16SS03	1/2005	0-0.5	•		•		•	•	•
16-S-04-00	16SS04	1/2005	0-0.5	•		•		•	•	•
SWMU 17 SURFACE SOIL										
17-B-01-00	17SB01	6/2001	0-0.5	•	•	•	•	•	•	•
17-B-02-00	17SB02	6/2001	0-0.5	•		•		•	•	•
17-B-02-00-D	17SB02	6/2001	0-0.5	•		•		•	•	•
17-B-03-00	17SB03	6/2001	0-0.5	•		•		•	•	•
17-B-04-00	17SB04	6/2001	0-0.5	•		•		•	•	•

TABLE 3-1

SAMPLING AND ANALYSES PROGRAM
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Sample Number	Location	Sample Date	Sample Depth	Explosives	Herbicides	Metals	Organophosphorus Pesticides	SVOCs	VOCs	Pesticides/PCBs
17-B-05-00	17SB05	6/2001	0-0.5	•		•		•	•	•
17-B-06-00	17SB06	6/2001	0-0.5	•		•		•	•	•
17-B-07-00	17SB07	6/2001	0-0.5	•		•		•	•	•
17-B-08-00	17SB08	6/2001	0-0.5	•		•		•	•	•
17-B-09-00	17SB09	6/2001	0-0.5	•		•		•	•	•
17-B-09-00-D	17SB09	6/2001	0-0.5	•		•		•	•	•
17-B-10-00	17SB10	6/2001	0-0.5	•		•		•	•	•
17-B-11-00	17SB11	6/2001	0-0.5	•		•		•	•	•
17-B-12-00	17SB12	6/2001	0-0.5	•		•		•	•	•
17-B-13-00	17SB13	6/2001	0-0.5	•		•		•	•	•
17-B-14-00	17SB14	6/2001	0-0.5	•		•		•	•	•
17-B-15-00	17SB15	6/2001	0-0.5	•		•		•	•	•
17-B-15-00-D	17SB15	6/2001	0-0.5	•		•		•	•	•
17-B-16-00	17SB16	6/2001	0-0.5	•		•		•	•	•
17-B-16-00-D	17SB16	6/2001	0-0.5	•		•		•	•	•
17-B-17-00	17SB17	6/2001	0-0.5	•		•		•	•	•
17-B-17-00-D	17SB17	6/2001	0-0.5	•		•		•	•	•
17-B-18-00	17SB18	6/2001	0-0.5	•		•		•	•	•
17-B-19-00	17SB19	6/2001	0-0.5	•	•	•	•	•	•	•
17-B-20-00	17SB20	4/2003	0-0.5						•	
17-B-21-00	17SB21	4/2003	0-0.5						•	
17-B-22-00	17SB22	4/2003	0-0.5						•	
17-B-23-00	17SB23	4/2003	0-0.5						•	
17-B-24-00	17SB24	4/2003	0-0.5						•	
17-B-24-00-D	17SB24	4/2003	0-0.5						•	
17-B-25-00	17SB25	4/2003	0-0.5						•	
17-B-26-00	17SB26	4/2003	0-0.5						•	
17-B-27-00	17SB27	4/2003	0-0.5						•	
17-B-28-00	17SB28	4/2003	0-0.5						•	
17-B-29-00	17SB29	4/2003	0-0.5						•	

D suffix indicates a duplicate sample.

* Installed and samples collected by Solutions-IES in support of pilot-scale treatability study; data were included in RFI.
** Installed by TtNUS and samples collected by Solutions-IES in support of pilot-scale treatability study; data were included in RFI.

SVOCs = Semivolatile organic compounds.
PCBs = Polychlorinated biphyenyls.
VOCs = Volatile organic compounds.

TABLE 3-2

IDW AND QA/QC SAMPLING AND ANALYSIS PROGRAM
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Sample Number	Sample Location	Sample Date	Explosives	Metals	SVOCs	VOCs	Pesticides/ PCBs	TCLP Regulatory List
IDW								
16-0-062101-01	IDW SOIL CUTTINGS	Jun-01						•
16-0-062101-04	IDW DECON PAD SOIL	Jun-01						•
16-0-062101-05	IDW DECON WATER	Jun-01	•	•	•	•	•	
16-0-062101-07	IDW DVPT WATER	Jun-01	•	•	•	•	•	
17-0-062101-02	IDW SOIL CUTTINGS	Jun-01						•
17-0-062101-03	IDW SOIL CUTTINGS	Jun-01						•
17-0-062101-06	IDW DVPT WATER	Jun-01	•	•	•	•	•	
17-0-042803-02	IDW DECON WATER	Apr-03	•					
17-O-042803-01	IDW PURGE WATER	Apr-03	•	•	•	•	•	•
17-O-042803-02	IDW DECON WATER	Apr-03		•	•	•	•	
17-O-042803-03	IDW SOIL CUTTINGS	Apr-03						•
17-O-042803-04	IDW DECON PAD SOIL	Apr-03						•
17-O-032404-1	IDW SOIL CUTTINGS	Mar-04						•
17-O-032404-2	IDW DECON WATER	Mar-04	•	•	•	•	•	
17-O-032404-3	IDW DVPT WATER	Mar-04	•	•	•	•	•	
17-O-011805-01	IDW PURGE WATER	Jan-05	•	•	•	•	•	
17-O-011805-02	IDW SOIL CUTTINGS	Jan-05						•
17-O-01-0305	IDW DECON WATER	Mar-05	•	•	•	•	•	
17-O-02-0305	IDW DECON PAD SOIL	Mar-05						•
17-O-03-0305	IDW DRUM SPILL	Mar-05						•
17-O-04-0305	IDW SOIL CUTTINGS	Mar-05						•
17-O-05-0305	IDW DVPT WATER	Mar-05	•	•	•	•	•	
17-O-06-0305	IDW SOIL CUTTINGS	Mar-05						•
17-O-07-0305	IDW DVPT WATER	Mar-05	•	•	•	•	•	
17-O-08-0305	IDW SOIL CUTTINGS	Mar-05						•
17-O-09-0305	IDW DVPT WATER	Mar-05	•	•	•	•	•	
17-O-10-0305	IDW PURGE WATER	Mar-05	•	•	•	•	•	
QA/QC								
16-F-060501-01	FIELD BLANK DRILLER WATER TANK	Jun-01		•	•	•	•	
16-F-060501-02	FIELD BLANK DI WATER	Jun-01		•	•	•	•	

TABLE 3-2

IDW AND QA/QC SAMPLING AND ANALYSIS PROGRAM
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Sample Number	Sample Location	Sample Date	Explosives	Metals	SVOCs	VOCs	Pesticides/ PCBs	TCLP Regulatory List
16-F-101901-03	FIELD BLANK DI WATER	Oct-01		•	•	•	•	
16-F-101901-04	FIELD BLANK SOURCE TAP WATER	Oct-01		•	•	•	•	
17-F-042703-01	FIELD BLANK DRILLER WATER TANK	Apr-03				•		
17-F-042703-02	FIELD BLANK DI WATER	Apr-03				•		
17-F-011405-01	FIELD BLANK DRILLER WATER	Jan-05		•	•	•	•	
17-F-011405-02	FIELD BLANK DI WATER	Jan-05		•	•	•	•	
17-F-0305-03	FIELD BLANK FIRE HYDRANT	Mar-05		•	•	•	•	
17-F-0305-04	FIELD BLANK DI WATER	Mar-05		•	•	•	•	
17-R-060501-01	RINSATE SPLIT SPOON	Jun-01		•	•	•	•	
17-R-060601-02	RINSATE SPLIT SPOON	Jun-01	•	•	•	•	•	
17-R-060701-03	RINSATE HAND AUGER	Jun-01	•	•	•	•	•	
16-R-061101-04	RINSATE SPLIT SPOON	Jun-01		•	•	•	•	
16-R-101901-05	RINSATE SEDIMENT TROWEL	Oct-01		•	•	•		
16-R-101901-06	RINSATE TUBING	Oct-01		•	•	•		
17-R-042803-01	RINSATE CUTTING SHOE	Apr-03				•		
17-R-042803-02	RINSATE TUBING	Apr-03				•		
17-R-011305-01	RINSATE TUBING	Jan-05	•	•	•	•	•	
17-R-011805-02	RINSATE HAND AUGER	Jan-05	•	•	•	•	•	
16-T-061101-04	TRIP BLANK	Jun-01				•		
16-T-101901-05	TRIP BLANK	Oct-01				•		
16-T-101601-06	TRIP BLANK	Oct-01				•		
16-T-101801-08	TRIP BLANK	Oct-01				•		
16-T-101901-09	TRIP BLANK	Oct-01				•		
17-T-060501-01	TRIP BLANK	Jun-01				•		
17-T-060601-02	TRIP BLANK	Jun-01				•		
17-T-060701-03	TRIP BLANK	Jun-01				•		
17-T-101701-07	TRIP BLANK	Oct-01				•		
17-T-030702-10	TRIP BLANK	Mar-02				•		
17-T-030802-11	TRIP BLANK	Mar-02				•		
17-T-030902-12	TRIP BLANK	Mar-02				•		
17-T-042603-1	TRIP BLANK	Apr-03				•		

TABLE 3-2

IDW AND QA/QC SAMPLING AND ANALYSIS PROGRAM
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Sample Number	Sample Location	Sample Date	Explosives	Metals	SVOCs	VOCs	Pesticides/ PCBs	TCLP Regulatory List
17-T-042703-02	TRIP BLANK	Apr-03				•		
TB-011605-01	TRIP BLANK	Jan-05				•		
17-T-011305-01	TRIP BLANK	Jan-05				•		
17-T-011505-01	TRIP BLANK	Jan-05				•		
17-T-011705-01	TRIP BLANK	Jan-05				•		
17-T-011805-01	TRIP BLANK	Jan-05				•		
17-T-021405-01	TRIP BLANK	Feb-05				•		
17-T-022305-01	TRIP BLANK	Feb-05				•		
17-T-022405-02	TRIP BLANK	Feb-05				•		
17-T-022505-03	TRIP BLANK	Feb-05				•		
17-T-022605-04	TRIP BLANK	Feb-05				•		
17-T-022705-05	TRIP BLANK	Feb-05				•		
17-T-022805-06	TRIP BLANK	Feb-05				•		
17-T-030105-07	TRIP BLANK	Mar-05				•		
17-T-030805-08	TRIP BLANK	Mar-05				•		
17-T-030905-09	TRIP BLANK	Mar-05				•		
17-T-031005-10	TRIP BLANK	Mar-05				•		
17-T-031105-11	TRIP BLANK	Mar-05				•		

IDW = Investigation-derived waste.
SVOCs = Semivolatile organic compounds.
PCBs = Polychlorinated biphyenyls.
QA/QC = Quality assurance/quality control.
TCLP = Toxicity Characteristics Leaching Procedure.
VOCs = Volatile organic compounds.

TABLE 3-3

MONITORING WELL CONSTRUCTION SUMMARY
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Well Number	Northing	Easting	Ground Elevation (ft msl)	Top of Riser Elevation (ft msl)	Total Depth (ft bgs)	Screen Interval (ft bgs)	Screen Length (ft)	Top of Screen Elevation (ft msl)	Bottom of Screen Elevation (ft msl)	Total Depth (below top of riser)	Monitored Hydrogeologic Unit	Date Installed
16MW01S	397987.2661	2320919.034	4.89	7.83	14	4 - 14	10	0.89	-9.11	17.45	Upper surficial	6/10/2001
16MW02S	398042.1787	2320606.301	0.65	4.91	13	3 - 13	10	-2.35	-12.35	18.55	Upper surficial	6/11/2001
16MW03S	397728.0346	2320274.067	2.08	4.92	13	3 - 13	10	-0.92	-10.92	16.6	Upper surficial	6/12/2001
16MW04S	397189.5322	2320693.892	1.51	4.39	13	3 - 13	10	-1.49	-11.49	16.45	Upper surficial	6/12/2001
16MW05S	397306.6424	2320382.639	1.63	4.61	13	3 - 13	10	-1.37	-11.37	16.4	Upper surficial	6/11/2001
17MW01S	398024.2675	2321221.272	7.23	10.51	14	4 - 14	10	3.23	-6.77	18	Upper surficial	6/10/2001
17MW02S	397442.5013	2321322.98	4.56	7.72	15	5 - 15	10	-0.44	-10.44	18.3	Upper surficial	6/7/2001
17MW03S	397501.9857	2321135.31	5.95	8.83	15	5 - 15	10	0.95	-9.05	18.3	Upper surficial	6/7/2001
17MW04S	397023.706	2321129.466	4.39	7.2	15	5 - 15	10	-0.61	-10.61	18.3	Upper surficial	6/8/2001
17MW05S	397272.7887	2321215.29	5.31	7.83	19	8 - 18	10	-2.69	-12.69	20.9	Upper surficial	3/23/2004
17MW06S	397253.9852	2321209.39	5.49	7.95	19	8 - 18	10	-2.51	-12.51	20.46	Upper surficial	3/22/2004
17MW06D	397246.08	2321206.63	5.37	7.69	23.5	18 - 23	5	-12.63	-17.63	25.6	Upper surficial	2/9/2005
17MW07S	397234.3491	2321203.959	5.44	7.99	19	8 - 18	10	-2.56	-12.56	21.35	Upper surficial	3/22/2004
17MW11S	397501.23	2321062.28	7.36	9.78	20	10 - 20	10	-2.64	-12.64	22.25	Upper surficial	1/27/2005
17MW12S	397256.37	2321070.34	5.41	7.48	14	4 - 14	10	1.41	-8.59	16.7	Upper surficial	1/28/2005
17MW12D	397266.21	2321064.86	5.38	7.3	29	18 - 28	10	-12.62	-22.62	33.65	Intermediate surficial	1/28/2005
17MW13S	397847.74	2321436.38	5.39	7.56	14	4 - 14	10	1.39	-8.61	16.51	Upper surficial	2/8/2005
17MW14S	397539.42	2321498.64	3.95	6.27	14.5	4 - 14	10	-0.05	-10.05	17.56	Upper surficial	1/29/2005
17MW14D	397530.54	2321499.6	4.05	6.66	25.5	15 - 25	10	-10.95	-20.95	28.14	Intermediate surficial	1/29/2005
17MW15S	397434.77	2321457.71	3.76	6.01	20	10 - 20	10	-6.24	-16.24	22.1	Upper surficial	1/31/2005
17MW15D	397436.19	2321462.83	3.45	5.92	40	29 - 39	10	-25.55	-35.55	41.7	Lower surficial	1/31/2005
17MW16S	397351.01	2321430.67	3.52	5.83	15	5 - 15	10	-1.48	-11.48	17.5	Upper surficial	2/1/2005
17MW16I	397350.2	2321420.68	3.66	6.05	25	15 - 25	10	-11.34	-21.34	27.65	Intermediate surficial	2/11/2005
17MW16D	397350.51	2321425.29	3.48	5.92	42.5	32 - 42	10	-28.52	-38.52	45.15	Lower surficial	2/11/2005
17MW17S	397290.49	2321381.1	3.37	6.19	14.5	4 - 14	10	-0.63	-10.63	16.52	Upper surficial	2/13/2005
17MW17I	397295.98	2321382.43	3.42	6.07	23.5	13 - 23	10	-9.58	-19.58	19.99	Intermediate surficial	2/13/2005
17MW17D	397284.48	2321379.32	3.52	6	37.5	27 - 37	10	-23.48	-33.48	40.03	Lower surficial	2/12/2005
17MW18S	397198.18	2321362.01	3.76	5.41	14.5	4 - 14	10	-0.24	-10.24	16.25	Upper surficial	2/14/2005
17MW18D	397201.33	2321365.9	3.59	5.48	22.5	15 - 22	7	-11.41	-18.41	24.75	Intermediate surficial	2/14/2005
17MW19S	397336.43	2321197.09	5.5	7.81	18	8 - 18	10	-2.5	-12.5	20.65	Upper surficial	2/8/2005
17MW20S	397173.63	2321216.51	4.89	7.38	14	4 - 14	10	0.89	-9.11	17.7	Upper surficial	2/9/2005
17MW21S	397615.39	2321095.35	7.99	10.47	18	8 - 18	10	-0.01	-10.01	20.6	Upper surficial	1/28/2005
17MW22S	397557.42	2321078.76	7.77	10.28	20	10 - 20	10	-2.23	-12.23	22.5	Upper surficial	1/27/2005
17MW23S	397369.78	2321023.35	4.76	7.18	20	9 - 19	10	-4.24	-14.24	21.65	Upper surficial	1/27/2005

msl - mean sea level.
bgs - below ground surface.
Vertical Datum: North American Vertical Datum (NAVD) 88.
Horizontal Datum: North American Datum (NAD) 83.
Wells 17MW08, 17MW09, and 17MW10 were not installed as per Solutions-IES.

TABLE 3-4

TEMPORARY WELL AND MIP CONSTRUCTION SUMMARY
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Well Number *	Easting	Northing	MIPS Identification	MIPS Total Depth (ft bgs)	Ground Elevation (ft msl)	Well Total Depth (ft bgs)	Screen Interval (ft bgs)	Screen Type	Screen Length (ft)	Monitored Hydrogeologic Unit	Date Installed	Drilling Co.
17TW01S	2321216.039	397293.5292	NA	NA	5.80	11	6 - 11	1-inch PVC	5	Upper surficial	3/7/2002	Gregg
17TW02S	2321277.746	397480.6117	NA	NA	5.31	11	6 - 11	1-inch PVC	5	Upper surficial	3/7/2002	Gregg
17TW03S	221322.496	397592.8545	NA	NA	5.77	11	6 - 11	1-inch PVC	5	Upper surficial	3/7/2002	Gregg
17TW04S	2321393.786	397755.6598	NA	NA	5.82	11	6 - 11	1-inch PVC	5	Upper surficial	3/7/2002	Gregg
17TW05S	2321379.148	397939.679	NA	NA	6.61	11	6 - 11	1-inch PVC	5	Upper surficial	3/8/2002	Gregg
17TW06S	2321344.913	397165.3775	NA	NA	4.06	11	6 - 11	1-inch PVC	5	Upper surficial	3/8/2002	Gregg
17TW06D	2321344.913	397165.3775	NA	NA	4.06	34	25 - 30	1-inch PVC	5	Lower surficial	3/8/2002	Gregg
17TW07S	2321469.574	397369.2304	NA	NA	3.94	11	6 - 11	1-inch PVC	5	Upper surficial	3/8/2002	Gregg
17TW07D	2321469.574	397369.2304	NA	NA	3.94	46	38 - 42	1-inch PVC	4	Lower surficial	3/8/2002	Gregg
17TW08S	2321496.331	397506.479	NA	NA	4.05	11	6 - 11	1-inch PVC	5	Upper surficial	3/8/2002	Gregg
17TW08D	2321496.331	397506.479	NA	NA	4.05	24	15 - 20	1-inch PVC	5	Lower surficial	3/8/2002	Gregg
17TW09S	2321581.657	397690.4458	NA	NA	4.26	11	6 - 11	1-inch PVC	5	Upper surficial	3/8/2002	Gregg
17TW09D	2321581.657	397690.4458	NA	NA	4.26	24	15 - 20	1-inch PVC	5	Lower surficial	3/8/2002	Gregg
17TW10S	2321609.828	397863.153	NA	NA	3.94	11	6 - 11	1-inch PVC	5	Upper surficial	3/8/2002	Gregg
17TW10D	2321609.828	397863.153	NA	NA	3.94	24	15 - 20	1-inch PVC	5	Lower surficial	3/8/2002	Gregg
17TW11	2321286.557	397507.5383	17MIP11	23	6.39	7	3 - 7	1-inch Steel	4	Upper surficial	4/26/2003	Columbia Tech
17TW12	2321251.421	397428.3918	17MIP12	24	5.74	9	5 - 9	1-inch Steel	4	Upper surficial	4/26/2003	Columbia Tech
17TW13	2321272.747	397284.6711	17MIP21	28	4.60	9	5 - 9	1-inch Steel	4	Upper surficial	4/26/2003	Columbia Tech
17TW14	2321220.829	397294.2477	17MIP16	27	4.97	9.5	5.5 - 9.5	1-inch Steel	4	Upper surficial	4/26/2003	Columbia Tech
17TW15	2321201.934	397318.4417	17MIP15	28	5.36	10.5	6.5 - 11	1-inch Steel	4	Upper surficial	4/26/2003	Columbia Tech
17TW16	2321190.756	397348.7641	17MIP13	27	5.54	9	5 - 9	1-inch Steel	4	Upper surficial	4/26/2003	Columbia Tech
17TW17	2321185.695	397291.6376	17MIP18	28	6.10	8.5	4.5 - 8.5	1-inch Steel	4	Upper surficial	4/26/2003	Columbia Tech
17TW18	2321200.381	397268.3657	17MIP19	26	5.78	10	6 - 10	1-inch Steel	4	Upper surficial	4/26/2003	Columbia Tech
17TW19	2321180.729	397240.7929	17MIP20	21	5.53	13	9 - 13	1-inch Steel	4	Upper surficial	4/27/2003	Columbia Tech
17TW20	2321160.748	397273.3748	17MIP17	27	5.63	13	9 - 13	1-inch Steel	4	Upper surficial	4/27/2003	Columbia Tech
17TW21	2321097.428	397361.97	17MIP09	24	5.25	8	4 - 8	1-inch Steel	4	Upper surficial	4/27/2003	Columbia Tech
17TW22	2321140.901	397350.108	17MIP14	27	6.00	8	4 - 8	1-inch Steel	4	Upper surficial	4/27/2003	Columbia Tech
17TW23	2321110.023	397406.3765	17MIP08	20	5.59	17	13 - 17	1-inch Steel	4	Upper surficial	4/27/2003	Columbia Tech
17TW24	2321124.336	397453.8257	17MIP07	28	5.93	19.5	16 - 20	1-inch Steel	4	Upper surficial	4/27/2003	Columbia Tech
17TW25D	2321179.186	397487.2806	17MIP10	27	6.18	19	15 - 19	1-inch Steel	4	Intermediate surficial	4/27/2003	Columbia Tech
17TW25S	2321179.186	397487.2806	17MIP10	27	6.18	8	4 - 8	1-inch Steel	4	Upper surficial	4/27/2003	Columbia Tech
17TW26	2321149.913	397539.2926	17MIP06	22	6.11	19.5	16 - 20	1-inch Steel	4	Upper surficial	4/27/2003	Columbia Tech

TABLE 3-4

TEMPORARY WELL AND MIP CONSTRUCTION SUMMARY
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Well Number *	Easting	Northing	MIPS Identification	MIPS Total Depth (ft bgs)	Ground Elevation (ft msl)	Well Total Depth (ft bgs)	Screen Interval (ft bgs)	Screen Type	Screen Length (ft)	Monitored Hydrogeologic Unit	Date Installed	Drilling Co.
17TW27	2321029.324	397412.8475	17MIP05	21	5.26	19	15 - 19	1-inch Steel	4	Upper surficial	4/27/2003	Columbia Tech
17TW28	2321043.73	397460.575	17MIP04	23	6.38	18	14 - 18	1-inch Steel	4	Upper surficial	4/27/2003	Columbia Tech
17TW29	2321057.274	397507.789	17MIP03	21	7.18	18	14 - 18	1-inch Steel	4	Upper surficial	4/27/2003	Columbia Tech
17TW30	2321071.043	397554.2938	17MIP02	22	7.71	18	14 - 18	1-inch Steel	4	Upper surficial	4/27/2003	Columbia Tech
17TW31	2321085.196	397603.4518	17MIP01	21	8.40	18	14 - 18	1-inch Steel	4	Upper surficial	4/27/2003	Columbia Tech
17TW32	2321021.9400	397368.6700	17MIP23	33.1	4.66	11	6 - 11	1-inch PVC	5	Upper surficial	1/13/2005	Columbia Tech
17TW33	2321017.1900	397326.5800	17MIP24	34.1	3.97	11	6 - 11	1-inch PVC	5	Upper surficial	1/13/2005	Columbia Tech
17TW34	2321003.1900	397293.8600	17MIP25	38.2	4.77	11	6 - 11	1-inch PVC	5	Upper surficial	1/13/2005	Columbia Tech
17TW35	2320988.7600	397244.9300	17MIP26	38.2	4.36	11	6 - 11	1-inch PVC	5	Upper surficial	1/13/2005	Columbia Tech
17TW36	2320980.5300	397202.3100	17MIP27	39	4.95	10	5 - 10	1-inch PVC	5	Upper surficial	1/13/2005	Columbia Tech
17TW37	2321086.1400	397337.1600	17MIP28	31	5.60	16	11 - 16	1-inch PVC	5	Upper surficial	1/13/2005	Columbia Tech
17TW38	2321063.1300	397266.9300	17MIP29	30.2	4.86	10	5 - 10	1-inch PVC	5	Upper surficial	1/15/2005	Columbia Tech
17TW39	2321056.4900	397221.2700	17MIP30	35.2	5.14	10	5 - 10	1-inch PVC	5	Upper surficial	1/15/2005	Columbia Tech
17TW40	2321034.4700	397139.9300	17MIP31	38.3	4.47	11	6 - 11	1-inch PVC	5	Upper surficial	1/15/2005	Columbia Tech
17TW41	2321237.1900	397530.0300	17MIP32	30	5.95	11	6 - 11	1-inch PVC	5	Upper surficial	1/13/2005	Columbia Tech
17TW42	2321272.8800	397369.4600	17MIP33	38.2	4.55	17	12 - 17	1-inch PVC	5	Upper surficial	1/13/2005	Columbia Tech
17TW43	2321156.3200	397248.8000	17MIP34	30.1	6.18	20	15 - 20	1-inch PVC	5	Upper surficial	1/13/2005	Columbia Tech
17TW44	2321356.9000	397490.1000	17MIP35	38.1	4.93	11	6 - 11	1-inch PVC	5	Upper surficial	1/13/2005	Columbia Tech
17TW45	2321341.4000	397401.3400	17MIP36	37.8	4.60	32	27 - 32	1-inch PVC	5	Upper surficial	1/13/2005	Columbia Tech
17TW46	2321302.8100	397279.0900	17MIP37	38.2	4.06	15	10 - 15	1-inch PVC	5	Upper surficial	1/13/2005	Columbia Tech
17TW47	2321501.9300	397531.0300	17MIP38	30	4.03	15	10 - 15	1-inch PVC	5	Upper surficial	1/12/2005	Columbia Tech
17TW48	2321465.8600	397436.4300	17MIP39	30.2	3.29	15	10 - 15	1-inch PVC	5	Upper surficial	1/12/2005	Columbia Tech
17TW49	2321420.1300	397351.8200	17MIP40	38.1	3.22	21	16 - 21	1-inch PVC	5	Upper surficial	1/12/2005	Columbia Tech
17TW50	2321384.7300	397292.8800	17MIP41	39	3.46	29	24 - 29	1-inch PVC	5	Intermediate surficial	1/12/2005	Columbia Tech
17TW51	2321366.8500	397208.0900	17MIP42	39.1	3.37	10	5 - 10	1-inch PVC	5	Upper surficial	1/12/2005	Columbia Tech
17TW52	2321196.7900	397334.3900	17MIP43	37	5.50	18	13 - 18	1-inch PVC	5	Upper surficial	1/14/2005	Columbia Tech
17TW53	2321212.2000	397187.0300	17MIP44	30.2	4.72	15	10 - 15	1-inch PVC	5	Upper surficial	1/13/2005	Columbia Tech
17TW54	2321198.8800	397211.5800	17MIP45	30.1	4.72	16	11 - 16	1-inch PVC	5	Upper surficial	1/13/2005	Columbia Tech
17TW55	2321281.0100	397208.4100	17MIP46	19	4.07	14	9 - 14	1-inch PVC	5	Upper surficial	1/12/2005	Columbia Tech
17TW56	2321175.6000	397229.4600	17MIP47	29.8	5.78	16	11 - 16	1-inch PVC	5	Upper surficial	1/14/2005	Columbia Tech
17TW57	2321216.05	397173.68	17MIP48	27	4.68	11.5	6.5 - 12	1-inch PVC	5	Upper surficial	1/14/2005	Columbia Tech
17TW58	2321211.45	397212.47	17MIP49	27	4.58	13	8 - 13	1-inch PVC	5	Upper surficial	1/14/2005	Columbia Tech

TABLE 3-4

TEMPORARY WELL AND MIP CONSTRUCTION SUMMARY
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Well Number *	Easting	Northing	MIPS Identification	MIPS Total Depth (ft bgs)	Ground Elevation (ft msl)	Well Total Depth (ft bgs)	Screen Interval (ft bgs)	Screen Type	Screen Length (ft)	Monitored Hydrogeologic Unit	Date Installed	Drilling Co.
17TW59	2321181.41	397311.74	17MIP50	27	6.33	12	7 - 12	1-inch PVC	5	Upper surficial	1/14/2005	Columbia Tech
17TW60	2321263.33	397309.48	17MIP51	29	4.57	12	7 - 12	1-inch PVC	5	Upper surficial	1/14/2005	Columbia Tech
17TW61	2321270.19	397328.22	17MIP52	31	4.66	10	5 - 10	1-inch PVC	5	Upper surficial	1/14/2005	Columbia Tech
17TW62	2321278.42	397271.27	17MIP53	28.2	4.15	8.5	3.5 - 8.5	1-inch PVC	5	Upper surficial	1/14/2005	Columbia Tech
17TW63	2321304.37	397250.46	17MIP54	27	4.32	9.5	4.5 - 9.5	1-inch PVC	5	Upper surficial	1/14/2005	Columbia Tech
17TW64	2321301.81	397299.07	17MIP55	26	4.14	8.5	3.5 - 8.5	1-inch PVC	5	Upper surficial	1/14/2005	Columbia Tech

NA - Not applicable.
msl - mean sea level.
bgs - below ground surface.
Vertical Datum: NAVD 88
Horizontal Datum: NAD 83
* 17MIP22 was installed in April 2003 adjacent to 17MW01S, depth was 40 ft bgs.

TABLE 3-5

SUMMARY OF GROUNDWATER QUALITY PARAMETERS COLLECTED DURING PURGING
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Well Number	Temperature (°C)	pH	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/L)	Salinity (%)	Turbidity (NTU)	ORP (mV)	Screen Interval (feet bgs)
16MW01S	17.51	4.33	0.603	2.32	< 0.2	1.20	369	4 - 14
16MW02S	18.59	6.98	25.7	0.79	1.8	23.00	-370	3 - 13
16MW03S	19.89	7.17	22.9	0.85	1.6	68.10	-399	3 - 13
16MW04S	16.54	6.74	31.2	0	2.4	33.60	-363	3 - 13
16MW05S	18.56	6.93	33.5	0.47	2.4	2.32	-366	3 - 13
17MW01S	16.57	5.00	0.27	0.22	< 0.2	2.30	65	4 - 14
17MW02S	17.25	4.05	3.4	1.94	0.21	3.40	353	5 - 15
17MW03S	18.34	5.09	0.201	1.48	0.01	5.40	189	5 - 15
17MW04S	16.69	5.04	2.82	0	< 0.2	7.22	90	5 - 15
17MW05S	16.78	5.45	0.849	0.85	< 0.2	16.00	61	8 - 18
17MW06D	19.59	6.89	0.651	4.71	< 0.2	0.49	57	8 - 18
17MW06S	ns	ns	ns	ns	ns	ns	ns	18 - 23
17MW07S	17.98	5.40	0.868	1.24	< 0.2	11.00	34	8 - 18
17MW11S	20.92	4.98	0.229	3.86	< 0.2	4.28	213	10 - 20
17MW12D	18.67	6.68	0.477	0	< 0.2	10.01	-102	18 - 28
17MW12S	15.93	4.92	0.181	0.2	< 0.2	2.90	199	4 - 14
17MW13S	16.16	4.77	0.105	1.58	< 0.2	2.60	303	4 - 14
17MW14D	16.57	6.25	9.7	1.72	0.7	18.00	-93	15 - 25
17MW14S	16.38	3.84	11.6	1.74	0.8	2.90	263	4 - 14
17MW15D	16.33	7.13	0.747	0	< 0.2	6.47	-67	29 - 39
17MW15S	15.52	5.09	18.1	0	1.3	12.80	111	10 - 20
17MW16D	18.57	7.07	1.09	0	< 0.2	5.98	-49	32 - 42
17MW16I	18.9	6.38	14.3	1.28	1	11.00	-107	15 - 25
17MW16S	17.26	3.79	24.9	0	1.8	5.53	255	5 - 15
17MW17D	17.23	7.15	0.771	1.28	< 0.2	9.62	-132	27 - 37
17MW17I	18.39	6.23	11.5	1.39	0.8	13.00	-143	13 - 23
17MW17S	17.03	3.96	15.9	0.86	1.1	7.30	236	4 - 14
17MW18D	17.78	6.50	11.7	0	0.8	3.01	-134	15 - 22
17MW18S	15.43	4.24	22.1	0	1.7	4.26	189	4 - 14
17MW19S	18.07	5.65	0.23	1.12	< 0.2	2.38	53	8 - 18
17MW20S	15.31	3.92	4	0	< 0.2	0.37	318	4 - 14
17MW21S	19.27	5.40	0.425	4.5	0.02	2.80	212	8 - 18
17MW22S	20.48	6.23	0.287	1.89	0.01	1.75	153	10 - 20
17MW23S	18.67	5.00	0.451	0	< 0.2	4.25	112	9 - 19
17TW01S	17.9	5.24	0.27	6.6	0	>999	55	6 - 11
17TW02S	18.6	4.92	0.16	7.48	0	>999	202	6 - 11
17TW03S	18.5	5.00	0.31	5.38	0	538.00	152	6 - 11
17TW04S	18.1	4.69	0.14	3.56	0	>999	155	6 - 11
17TW05S	19.5	5.01	0.23	6.53	0	>999	137	6 - 11
17TW06D	18.7	7.50	1.1	3.94	0	95.00	-34	25 - 30
17TW06S	17.8	5.33	14	4.75	0.8	536.00	43	6 - 11

TABLE 3-5

SUMMARY OF GROUNDWATER QUALITY PARAMETERS COLLECTED DURING PURGING
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Well Number	Temperature (°C)	pH	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/L)	Salinity (%)	Turbidity (NTU)	ORP (mV)	Screen Interval (feet bgs)
17TW07D	18.2	7.12	4.11	5.19	0.2	565.00	-65	38 - 42
17TW07S	16.9	3.80	17.4	7.91	1	>999	198	6 - 11
17TW08D	18.2	6.51	9.11	5.2	0.5	144.00	-31	15 - 20
17TW08S	16.4	4.46	12.4	4.7	0.7	>999	162	6 - 11
17TW09D	17.5	6.23	6.39	6.31	0.3	44.00	-3	15 - 20
17TW09S	16.3	4.32	7.8	6.46	0.4	381.00	174	6 - 11
17TW10D*	--	--	--	--	--	--	---	15 - 20
17TW10S	19.5	5.28	13.6	5.49	0.8	>999	99	6 - 11
17TW11*	--	--	--	--	--	--	---	3 - 7
17TW12	16.9	5.06	0.24	5.89	0	990.00	---	5 - 9
17TW13	17	4.73	4.2	4.38	0.2	500.00	---	5 - 9
17TW14	17.5	4.71	0.47	4.44	0	>999	---	5.5 - 9.5
17TW15	17.6	4.61	0.28	6.55	0	>999	---	6.5 - 11
17TW16	17.1	5.15	0.32	6.42	0	370.00	---	5 - 9
17TW17*	--	--	--	--	--	--	---	4.5 - 8.5
17TW18	18	4.60	0.48	6.36	0	800.00	---	6 - 10
17TW19	16.8	4.73	0.46	3.82	0	900.00	---	9 - 13
17TW20	16.6	4.72	0.25	5.38	0	750.00	---	9 - 13
17TW21	17.3	4.94	0.15	3.76	0	>999	---	4 - 8
17TW22*	--	--	--	--	--	--	---	4 - 8
17TW23	17.8	5.92	0.38	3.97	0	650.00	---	13 - 17
17TW24	18.8	6.29	0.43	3.96	0	170.00	---	16 - 20
17TW25D	17.5	5.87	0.34	3.46	0	>999	---	15 - 19
17TW25S	17.3	4.59	0.1	6.25	0	>999	---	4 - 8
17TW26	19.8	5.38	0.3	4.23	0	>999	---	16 - 20
17TW27	19.5	5.69	0.33	5.65	0	>999	---	15 - 19
17TW28	19.5	5.55	0.28	6.43	0	>999	---	14 - 18
17TW29	20.2	5.70	0.33	4.5	0	660.00	---	14 - 18
17TW30	20.5	5.69	0.31	3.93	0	>999	---	14 - 18
17TW31	20	5.88	0.4	6.04	0	>999	---	14 - 18
17TW32	16.11	5.80	1.3	2.45	0.1	16.00	-42	6 - 11
17TW33	15.86	6.10	1.2	0	0.1	52.00	-40	6 - 11
17TW34	15.44	6.80	7.2	0	0.4	4.80	-115	6 - 11
17TW35	17.64	6.80	4.1	0	0.2	43.00	-55	6 - 11
17TW36	12.97	7.40	3.6	9.46	0.2	46.00	0	5 - 10
17TW37	17.2	5.79	0.23	0	0	138.00	55	11 - 16
17TW38	16.3	5.30	0.24	0	0	7.00	98	5 - 10
17TW39	14.88	6.10	0.21	0	0	300.00	-422	5 - 10
17TW40	16.32	6.30	0.35	0	0	169.00	-323	6 - 11
17TW41	16.3	4.70	0.28	0	0	22.00	220	6 - 11
17TW42	15.76	7.00	0.32	0	0	400.00	13	12 - 17

TABLE 3-5

SUMMARY OF GROUNDWATER QUALITY PARAMETERS COLLECTED DURING PURGING
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Well Number	Temperature (°C)	pH	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/L)	Salinity (%)	Turbidity (NTU)	ORP (mV)	Screen Interval (feet bgs)
17TW43	18.2	6.43	0.88	0	0	8.00	-49	15 - 20
17TW44	16.6	4.05	3.3	0	0.2	2.00	263	6 - 11
17TW45	17	7.62	0.52	0	0	2.00	-105	27 - 32
17TW46	18.1	5.84	6.3	0	0.3	4.00	0	10 - 15
17TW47	19.1	6.50	12	0	0.7	6.70	-174	10 - 15
17TW48	19.2	7.40	12	0	0.7	5.88	-114	10 - 15
17TW49	19.5	7.50	5.1	0	0.3	20.80	-112	16 - 21
17TW50	19	8.90	0.72	0	0	14.10	-201	24 - 29
17TW51	18.3	6.70	18	0.12	1	29.00	-144	5 - 10
17TW52	17.8	5.66	25	0	1.8	10.00	71	13 - 18
17TW53	16.5	5.24	0.51	0	0.3	26.00	46	10 - 15
17TW54	18	5.12	0.12	0	0.1	15.00	96	11 - 16
17TW55	17.1	5.69	11	0	0.6	1.00	3	9 - 14
17TW56	17.48	7.10	0.63	0	0	330.00	10	11 - 16
17TW57	16.94	6.70	5.6	0	0.3	7.42	-31	6.5 - 12
17TW58	17.68	6.40	1.8	0	0.1	90.00	-67	8 - 13
17TW59	16.3	5.11	24	5.96	0.8	160.00	112	7 - 12
17TW60	16.4	4.62	3.1	0	0.2	35.00	116	7 - 12
17TW61	16.3	4.24	3.4	0	0.2	7.00	210	5 - 10
17TW62	17.5	3.99	7.4	0	0.4	265.00	210	3.5 - 8.5
17TW63	17.2	4.45	13	0	0.7	8.00	134	4.5 - 9.5
17TW64	15.2	4.36	11	1.62	0.6	50.00	138	3.5 - 8.5

* Temporary wells went dry during purging and did not yield enough water to take readings.
bgs - Below ground surface.
mg/L - milligram per liter.
mS/cm - milliSiemens per centimeter.
ns - Not sampled by TtNUS
NTU - Nephelometric turbidity unit.
ORP - Oxidation-reduction potential.

TABLE 3-6

SUMMARY OF SURFACE WATER QUALITY PARAMETERS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Surface Water Location	Sample Number	Temperature (°C)	pH	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/L)	Salinity (%)	Turbidity (NTU)
16SW/SD01	16-W-01-1001	20.7	7.48	19.7	5.82	1.3	10
16SW/SD02	16-W-02-1001	21.1	7.45	19.3	4.13	1.3	63
16SW/SD03	16-W-03-1001	21.1	7.54	20.7	8.69	1.4	1
16SW/SD04	16-W-04-1001	20.9	7.71	21.1	8.05	1.4	20
16SW/SD05	16-W-05-1001	23.8	6.80	22.3	4.97	1.4	101
16SW/SD06	16-W-06-1001	20.3	7.76	19.4	9.07	1.3	25
16SW/SD07	16-W-07-1001	23.8	7.13	24.5	7.06	1.5	80
17SW/SD01	17-W-01-1001	17.9	6.51	19.1	9.63	1.3	77

mS/cm - milliSiemens per centimeter.
mg/L - milligram per Liter.
NTU - Nephelometric turbidity unit.

TABLE 3-7

WATER-LEVEL MEASUREMENTS
OCTOBER 10, 2001 (HIGH AND LOW TIDE)
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Well Number	Measuring Point Elevation TPVC (ft. above msl)	Depth to Water (feet below TPVC) Low Tide	Depth to Water (feet below TPVC) High Tide	Groundwater Elevation (ft. above msl) Low Tide	Groundwater Elevation (ft. above msl) High Tide
16MW01S	7.83	8.63	8.62	-0.8	-0.79
16MW02S *	4.91*	2.01	0.90	0.95	2.06
16MW03S	4.92	2.79	2.09	2.13	2.83
16MW04S	4.39	2.92	1.72	1.47	2.67
16MW05S	4.61	3.02	1.84	1.59	2.77
16SG01	4.00	3.68	1.42	0.32	2.58
16SG02	1.69	3.53	NA	-1.84	NA
16SG03	2.47	4.03	+0.65	-1.56	3.12
17MW01S	10.51	11.83	11.83	-1.32	-1.32
17MW02S	7.72	8.19	8.27	-0.47	-0.55
17MW03S	8.83	9.26	9.30	-0.43	-0.47
17MW04S	7.20	7.16	7.34	0.04	-0.14
17SG04	3.72	DRY	0.70	NA	3.02

msl - Mean sea level.
NA – Not applicable (could not be accessed due to high water levels).
TPVC - Top of polyvinyl chloride.

*Surveyed measuring point elevation is *after* 1.95 feet of additional riser was added to prevent flooding of the well at high tide.

TABLE 3-8

WATER-LEVEL MEASUREMENTS
DECEMBER 3, 2001 (LOW TIDE)
DECEMBER 4, 2001 (HIGH TIDE)
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Well Number	Measuring Point Elevation (ft. msl)	Depth to Water (feet below TPVC) Low Tide	Depth to Water (feet below TPVC) High Tide	Groundwater Elevation (ft. msl) Low Tide	Groundwater Elevation (ft. msl) High Tide
16MW01S	7.83	8.77	8.72	-0.94	-0.89
16MW02S*	4.91*	3.92	2.06	0.99	2.85
16MW03S	4.92	2.85	1.57	2.07	3.35
16MW04S	4.39	2.83	1.31	1.56	3.08
16MW05S	4.61	3.04	1.38	1.57	3.23
16SG01	4.00	3.42	0.63	0.58	3.37
16SG02	1.69	3.57	+2.1	-1.88	3.79
16SG03	2.47	3.98	+0.8	-1.51	3.27
17MW01S	10.51	12.36	12.34	-1.85	-1.83
17MW02S	7.72	8.30	8.23	-0.58	-0.51
17MW03S	8.83	9.71	9 .67	-0.88	-0.84
17MW04S	7.20	7.34	7.25	-0.14	-0.05
17SG04	3.72	DRY	0.95	NA	2.77

msl - Mean sea level.
NA – Not applicable (could not be accessed due to high water levels).
TPVC - Top of polyvinyl chloride.

* Surveyed measuring point elevation is *after* 1.95 feet of additional riser was added to prevent flooding of the well at high tide.

TABLE 3-9

WATER-LEVEL MEASUREMENTS
MARCH 1, 2005 (HIGH TIDE)
FEBRUARY 22, 2005 (LOW TIDE)
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

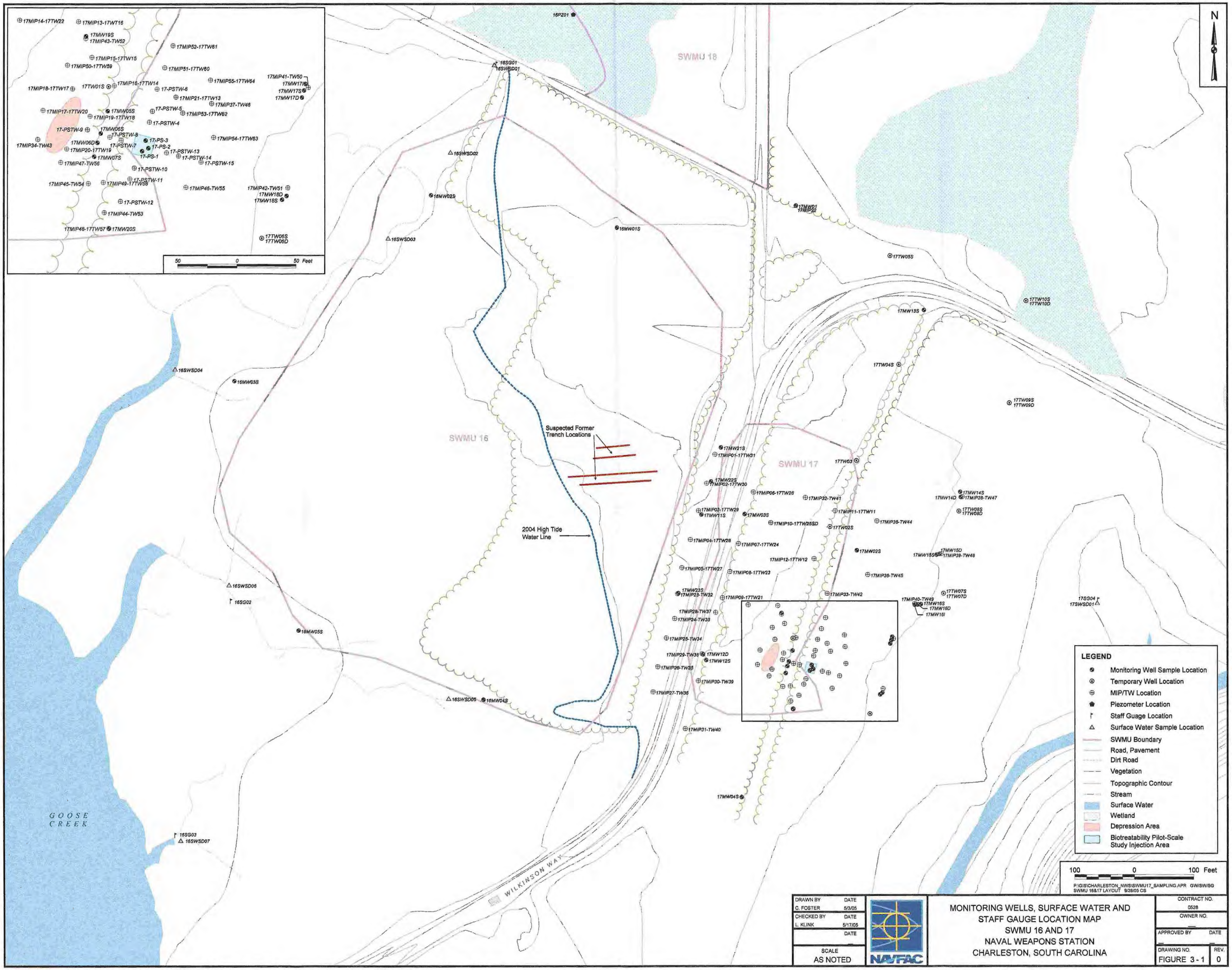
Well/Staff Gauge/ Piezometer Number	Ground Elevation (feet msl)	Top of Riser Elevation (feet msl)	High Tide (03/01/05)		Low Tide (02/22/05)	
			Depth to Water (ft.)	Groundwater Elevation (ft. above msl)	Depth to Water (ft.)	Groundwater Elevation (ft. above msl)
16MW01S	4.89	7.83	3.57	4.26	4.25	3.58
16MW02S	0.65	4.91	3.51	1.40	4.33	0.58
16MW03S	2.08	4.92	2.95	1.97	2.88	2.04
16MW04S	1.51	4.39	2.95	1.44	3.25	1.14
16MW05S	1.63	4.61	2.94	1.67	3.13	1.48
16SG01	NA	4.00	2.80	1.20	4.17	-0.17
16SG02	NA	1.69	NA	NA	NA	NA
16SG03	NA	2.47	NA	NA	NA	NA
17MW01S	7.23	10.51	5.58	4.93	7.20	3.31
17MW02S	4.56	7.72	3.18	4.54	3.37	4.35
17MW03S	5.95	8.83	3.73	5.10	4.59	4.24
17MW04S	4.39	7.20	2.98	4.22	3.34	3.86
17MW05S	5.31	7.83	3.36	4.47	3.99	3.84
17MW06S	5.49	7.95	3.56	4.39	4.35	3.6
17MW07S	5.44	7.99	3.59	4.40	4.36	3.63
17MW06D	5.37	7.69	3.62	4.07	4.23	3.46
17MW11S	7.36	9.78	4.89	4.89	5.74	4.04
17MW12S	5.41	7.48	2.90	4.58	3.40	4.08
17MW12D	5.38	7.30	3.57	3.73	4.33	2.97
17MW13S	5.39	7.56	2.73	4.83	3.07	4.49
17MW14S	3.95	6.27	2.68	3.59	2.88	3.39
17MW14D	4.05	6.66	3.48	3.18	3.98	2.68
17MW15S	3.76	6.01	2.40	3.61	2.73	3.28
17MW15D	3.45	5.92	2.75	3.17	3.19	2.73
17MW16S	3.52	5.83	2.34	3.49	2.45	3.38
17MW16I	3.66	6.05	2.88	3.17	3.31	2.74
17MW16D	3.48	5.92	2.72	3.20	3.19	2.73
17MW17S	3.37	6.19	2.57	3.62	2.66	3.53
17MW17I	3.42	6.07	2.90	3.17	3.42	2.65
17MW17D	3.52	6.00	2.80	3.20	3.27	2.73
17MW18S	3.76	5.41	1.91	3.50	2.00	3.41
17MW18D	3.59	5.48	2.26	3.22	2.71	2.77
17MW19S	5.5	7.81	3.28	4.53	3.70	4.11
17MW20S	4.89	7.38	3.24	4.14	3.90	3.48
17MW21S	7.99	10.47	5.60	4.87	6.64	3.83
17MW22S	7.77	10.28	5.36	4.92	6.34	3.94
17MW23S	4.76	7.18	2.44	4.74	3.08	4.10
17SG04	NA	3.72	NA	NA	NA	NA
17SG05	NA	5.75	4.40	1.35	5.9	-0.15
16PZ01	2.58	4.80	2.56	2.24	2.95	1.85

bgs = Below ground surface.
msl = Mean sea level.
NA = Not Applicable. Location could not be accessed because of high water elevations.

TABLE 3-10

SUMMARY OF HYDRAULIC CONDUCTIVITY TESTING
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Well Number	K (feet/day) Falling	K (feet/day) Rising	Arithmetic Mean feet/day	Arithmetic Mean cm/sec
SWMU 16 SHALLOW WELLS				
16MW01S	--	1.16E+00	1.16	4.09E-04
16MW02S	3.21E-01	1.86E-01	0.2535	8.94E-05
16MW03S	5.11E-01	5.84E-01	0.5475	1.93E-04
16MW04S	2.73E+00	2.73E+00	2.73	9.63E-04
16MW05S	--	7.54E-02	7.54E-02	2.66E-05
Geometric Mean			**0.51**	**1.78E-04**
SWMU 17 SHALLOW WELLS				
17MW01S	--	8.50E-01	8.50E-01	3.00E-04
17MW02S	1.65E+00	6.13E-01	1.1315	3.99E-04
17MW03S	--	2.60E+00	2.6	9.17E-04
17MW04S	1.83E+00	1.95E+00	1.89	6.67E-04
17MW06D	1.73E-01	7.87E-02	0.12585	4.44E-05
17MW11S	2.57E+00	2.49E+00	2.53	8.93E-04
17MW12S	1.95E+00	2.05E+00	2	7.06E-04
17MW13S	1.71E+00	1.84E+00	1.775	6.26E-04
17MW14S	5.87E-01	5.26E-01	0.5565	1.96E-04
17MW15S	7.60E-01	5.20E-01	0.64	2.26E-04
17MW16S	1.52E+00	1.60E+00	1.56	5.50E-04
17MW17S	1.15E+00	9.97E-01	1.0735	3.79E-04
17MW18S	7.10E-01	1.14E+00	0.925	3.26E-04
17MW19S	1.54E+00	2.24E+00	1.89	6.67E-04
17MW20S	1.33E+00	1.84E+00	1.585	5.59E-04
17MW21S	1.75E+00	1.29E+00	1.52	5.36E-04
17MW22S	1.55E+00	1.09E+00	1.32	4.66E-04
17MW23S	2.39E+00	2.82E+00	2.605	9.19E-04
Geometric Mean			**1.24**	**4.36E-04**
SWMU 17 INTERMEDIATE WELLS				
17MW12D	7.85E+00	8.61E+00	8.23	2.90E-03
17MW14D	2.47E+00	2.66E+00	2.565	9.05E-04
17MW16I	3.36E+00	3.55E+00	3.455	1.22E-03
17MW17I	3.80E+00	1.88E+00	2.84	1.00E-03
17MW18D	3.72E+00	3.33E+00	3.525	1.24E-03
Geometric Mean			**3.74**	**1.32E-03**
SWMU 17 DEEP WELLS				
17MW15D	1.91E+01	2.14E+01	20.25	7.14E-03
17MW16D	1.67E+01	2.05E+01	18.6	6.56E-03
17MW17D	1.45E+01	1.60E+01	15.25	5.38E-03
Geometric Mean			**17.91**	**6.32E-03**



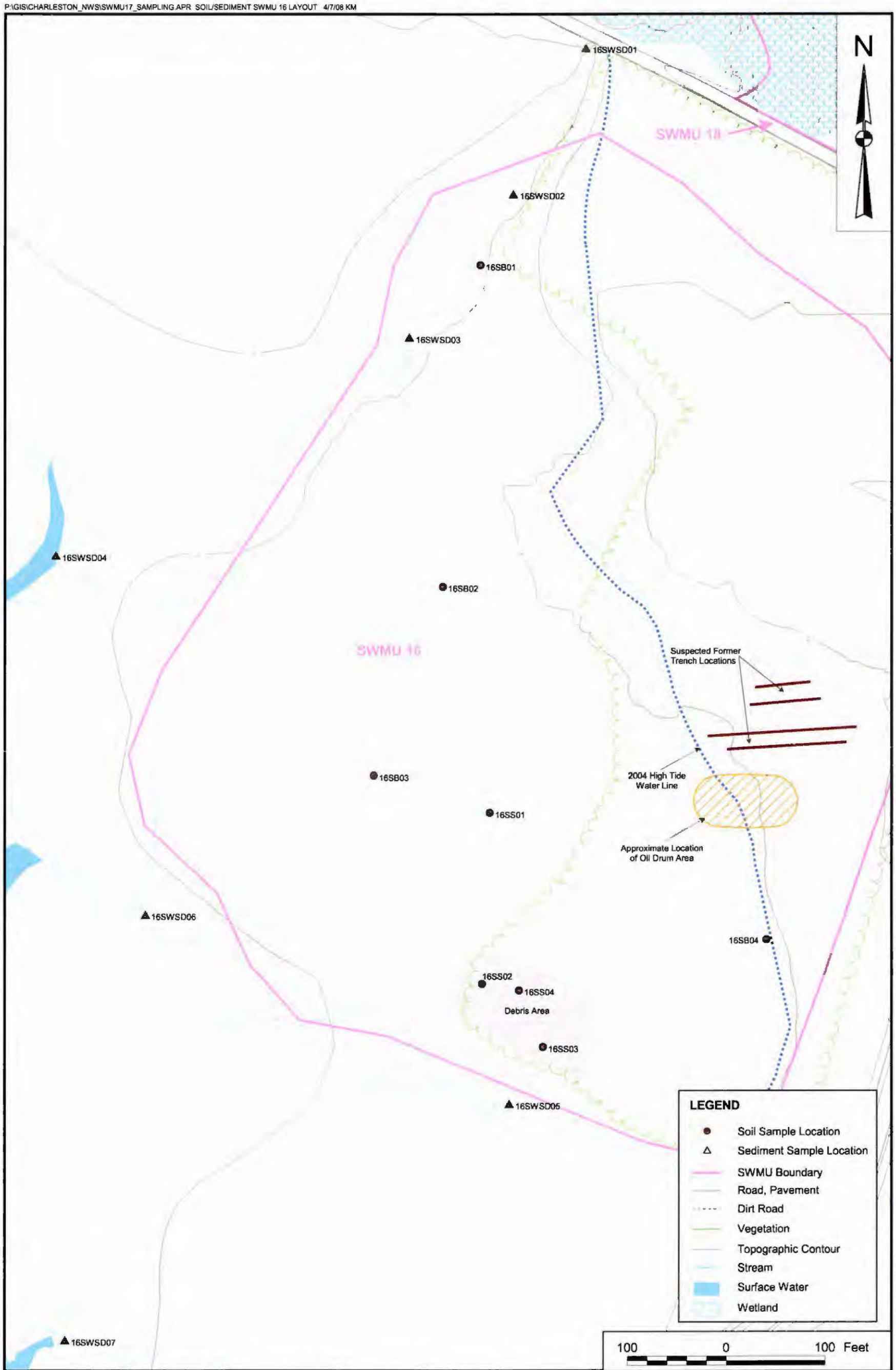
DRAWN BY	DATE
C. FOSTER	5/3/05
CHECKED BY	DATE
L. KLINK	5/17/05
	DATE
SCALE	
AS NOTED	

NAVFAC

MONITORING WELLS, SURFACE WATER AND STAFF GAUGE LOCATION MAP
SWMU 16 AND 17
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA

CONTRACT NO.	
0528	
OWNER NO.	
APPROVED BY	DATE
DRAWING NO.	REV.
FIGURE 3 - 1	0

P:\GIS\CHARLESTON_NWS\SWMU17_SAMPLING APR SOIL/SEDIMENT SWMU 16 LAYOUT 4/7/08 KM



DRAWN BY	DATE			CONTRACT NUMBER
C. FOSTER	5/3/05		SOIL AND SEDIMENT SAMPLE LOCATION MAP	0528
CHECKED BY	DATE		SWMU 16	APPROVED BY / DATE
J. LOGAN	4/7/08		NAVAL WEAPONS STATION	APPROVED BY / DATE
COST/SCHEDULE-AREA			CHARLESTON, SOUTH CAROLINA	DRAWING NO. FIGURE 3 - 2 / REV 0
SCALE AS NOTED		NAVFAC		

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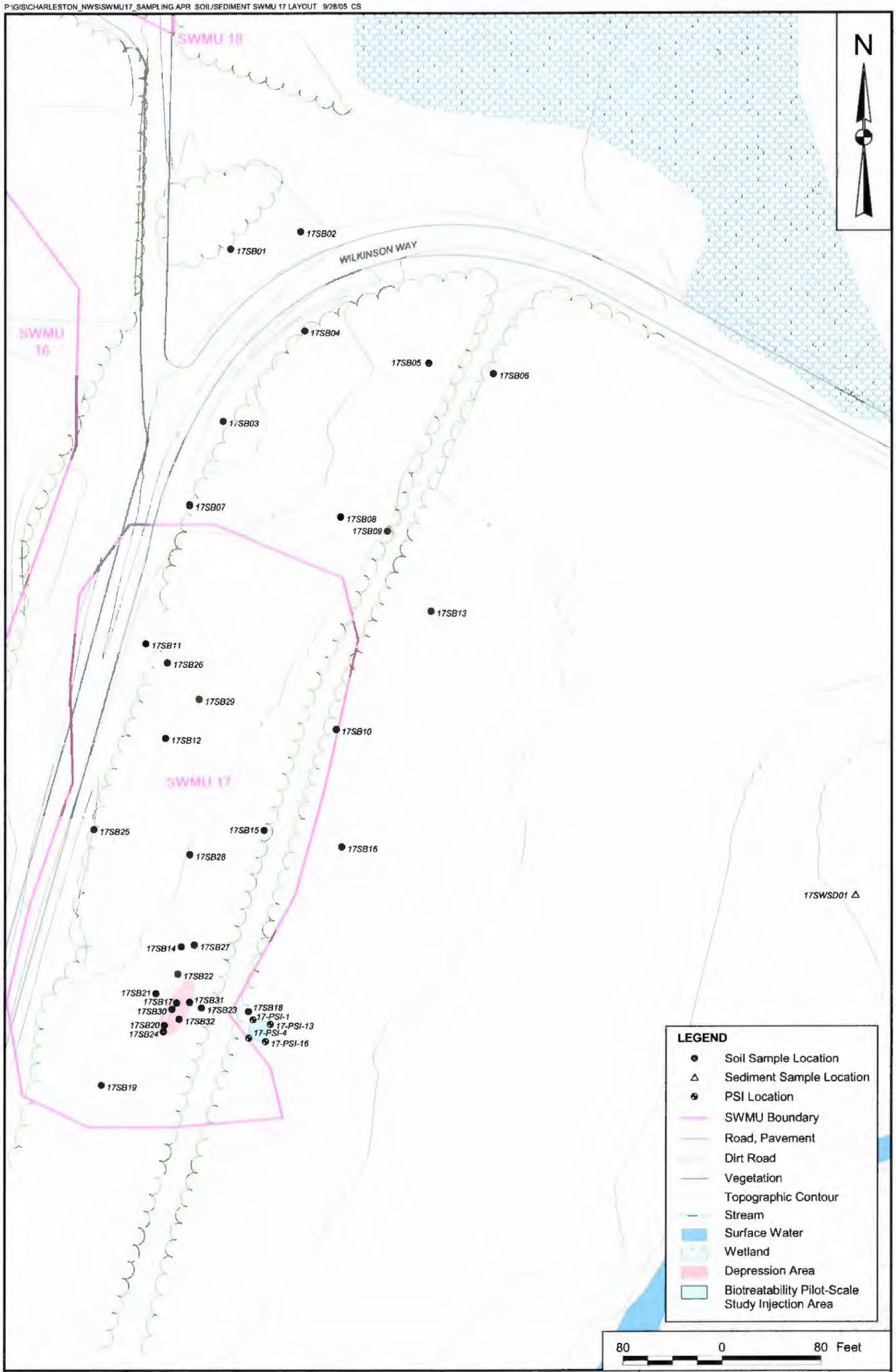
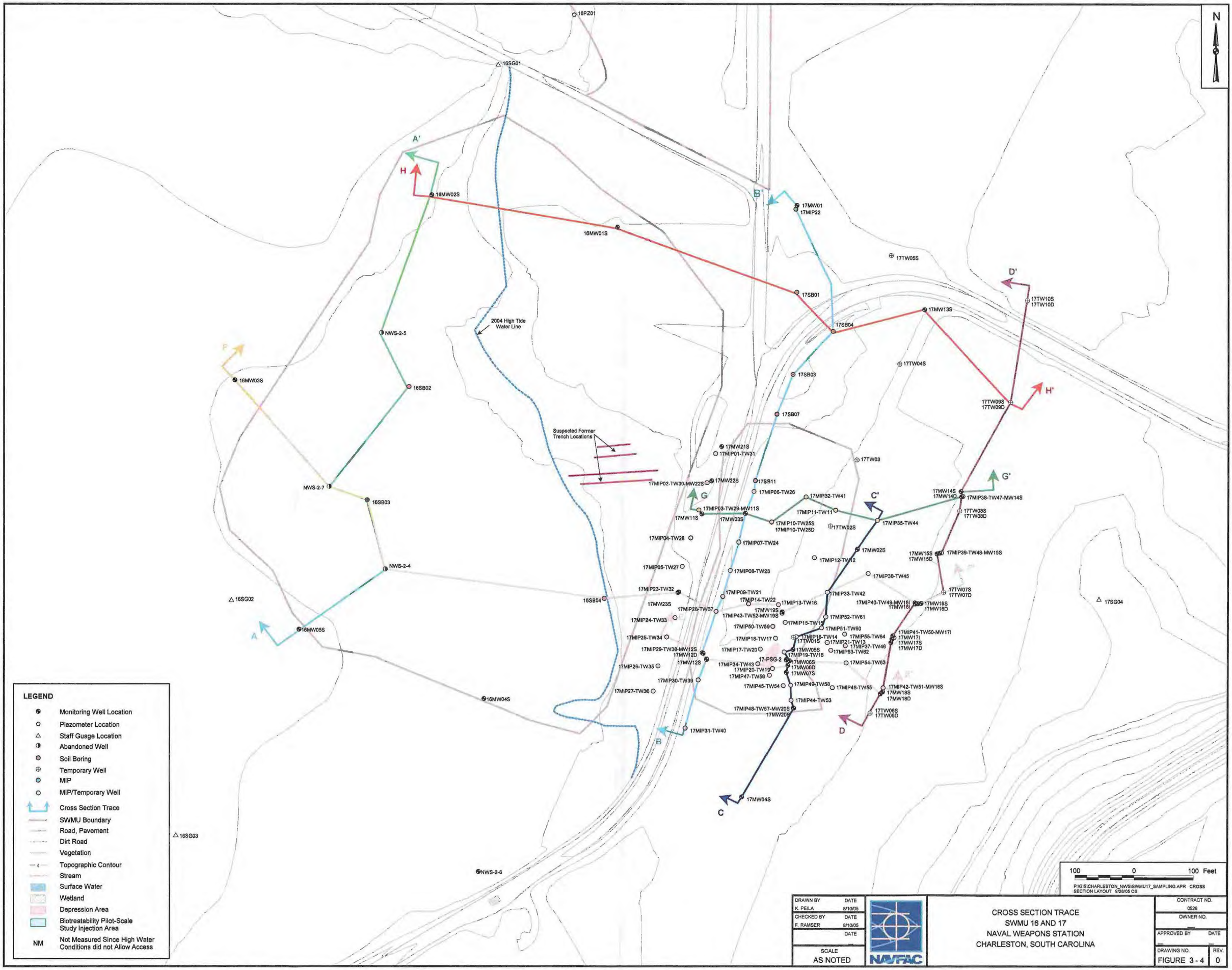


DRAWN BY C. FOSTER	DATE 5/3/05	SOIL AND SEDIMENT SAMPLE LOCATION MAP SWMU 17 NAVAL WEAPONS STATION CHARLESTON, SOUTH CAROLINA	CONTRACT NUMBER 0528
CHECKED BY L. KLINK	DATE 5/17/05		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED	NAVFAC		DRAWING NO. FIGURE 3 - 3 REV 0


N
18PZ01
16SG01
A'
H
16MW02S
16MW01S
B'
17MW01
17MIP22
17TW05S
D'
17TW10S
17TW10D
17SB01
17MW13S
17SB04
2004 High Tide Water Line
NWS-2-5
F
16MW03S
16SB02
17TW04S
17SB03
H'
17TW09S
17TW09D
17SB07
Suspected Former Trench Locations
17MW21S
17MIP01-TW31
17TW03
G'
17MIP02-TW30-MW22S
17MW22S
17SB11
17MIP06-TW26
17MIP32-TW41
C'
17MW14S
17MW14D
17MIP38-TW47-MW14S
NWS-2-7
16SB03
G
17MIP03-TW29-MW11S
17MW11S
17MW03S
17MIP11-TW11
17MIP10-TW25S
17MIP10-TW25D
17TW02S
17MIP35-TW44
17TW08S
17TW08D
17MIP04-TW28
17MIP07-TW24
17MW02S
17MW15S
17MW15D
17MIP39-TW48-MW15S
17MIP05-TW27
17MIP12-TW12
NWS-2-4
17MIP08-TW23
17MIP38-TW45
17MIP23-TW32
17MIP09-TW21
17MIP33-TW42
17TW07S
17TW07D
16SG02
16SB04
17MW23S
17MIP14-TW22
17MIP13-TW16
17MIP40-TW49-MW16I
17MW16S
17MW16D
17SG04
17MIP28-TW37
17MW19S
17MIP43-TW52-MW19S
17MIP24-TW33
17MIP15-TW15
17MIP52-TW61
A
16MW05S
17MIP50-TW59
17MIP51-TW60
17MIP41-TW50-MW17I
17MIP25-TW34
17MIP18-TW17
17MIP16-TW14
17TW01S
17MIP21-TW13
17MIP55-TW64
17MW17I
17MW17S
17MW17D
17MIP29-TW38-MW12S
17MIP17-TW20
17MW05S
17MIP19-TW18
17MIP37-TW46
17MIP53-TW62
17MW12D
17-PSG-2
17MW06S
17MW06D
17MW07S
17MW12S
17MIP34-TW43
17MIP20-TW19
17MIP47-TW56
17MIP54-TW63
17MIP26-TW35
17MIP30-TW39
17MIP45-TW54
17MIP49-TW58
17MIP48-TW55
17MIP42-TW51-MW18S
17MW18S
17MW18D
17MIP27-TW36
16MW04S
17MIP44-TW53
17MIP48-TW57-MW20S
17MW20S
17TW06S
17TW06D
D
17MIP31-TW40
B
C
17MW04S
16SG03
NWS-2-6
LEGEND
Monitoring Well Location
Piezometer Location
Staff Guage Location
Abandoned Well
Soil Boring
Temporary Well
MIP
MIP/Temporary Well
Cross Section Trace
SWMU Boundary
Road, Pavement
Dirt Road
Vegetation
Topographic Contour
Stream
Surface Water
Wetland
Depression Area
Biotreatability Pilot-Scale Study Injection Area
NM
Not Measured Since High Water Conditions did not Allow Access
100 0 100 Feet
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DRAWN BY K. PEILA DATE 8/10/05
CHECKED BY F. RAMSER DATE 8/10/05
DATE
SCALE AS NOTED
NAVFAC
CROSS SECTION TRACE
SWMU 16 AND 17
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA
CONTRACT NO. 0528
OWNER NO.
APPROVED BY DATE
DRAWING NO. FIGURE 3 - 4
REV. 0

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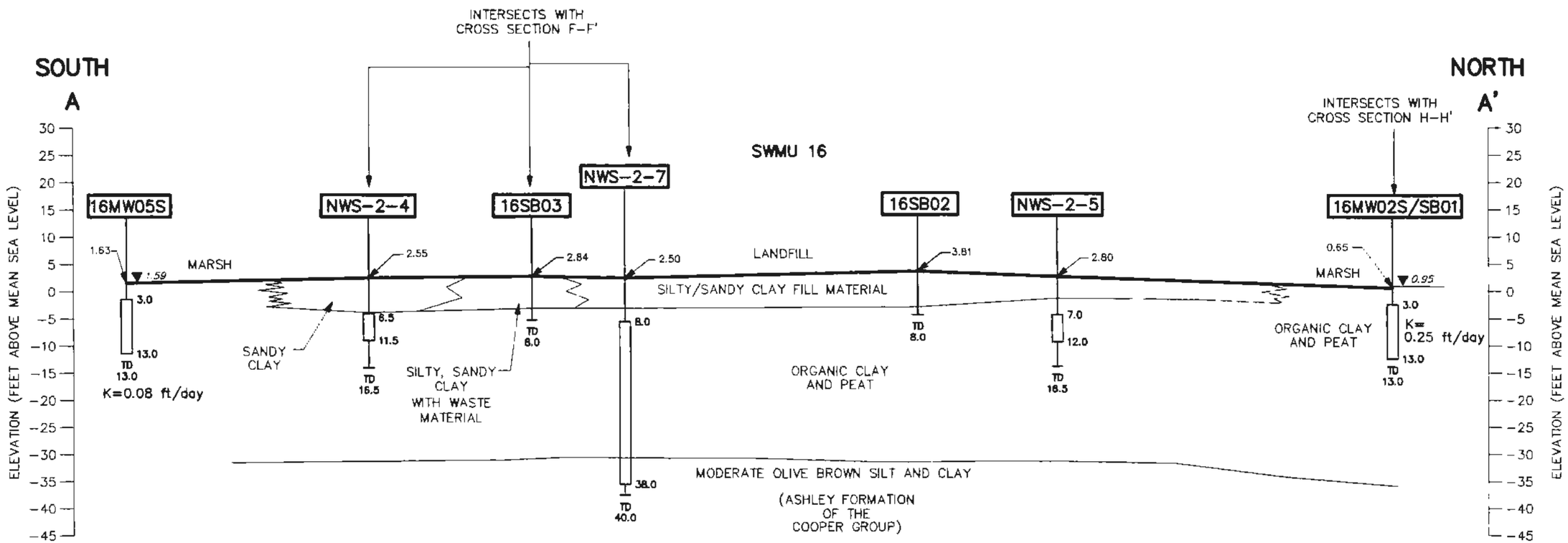

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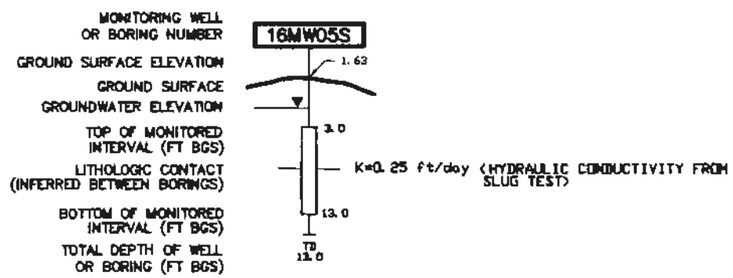
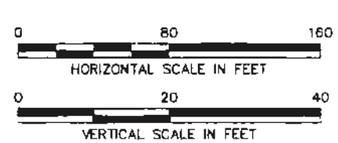


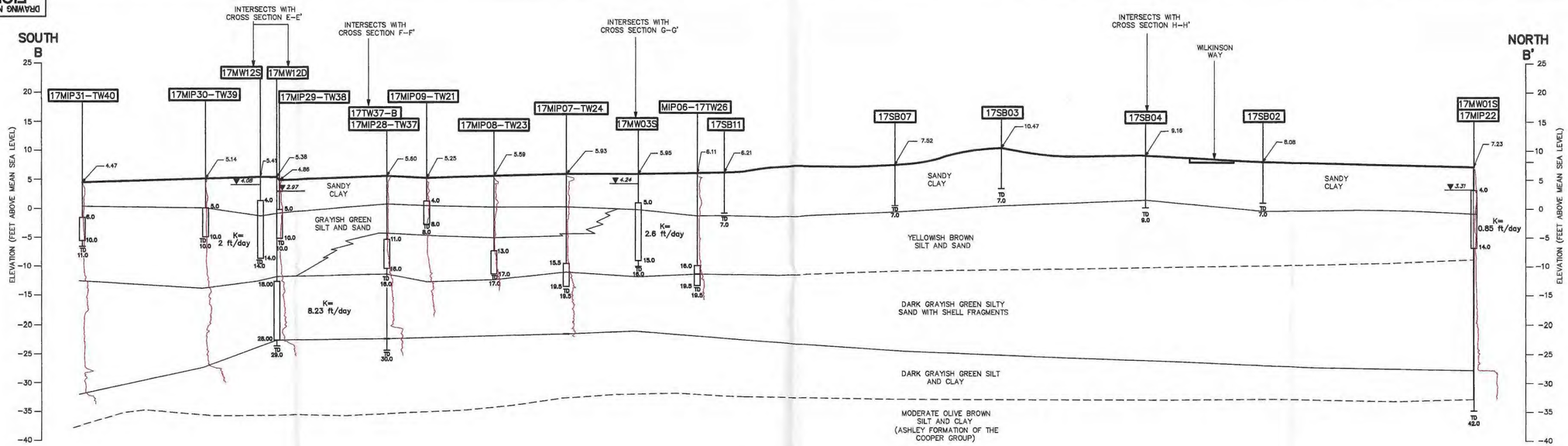


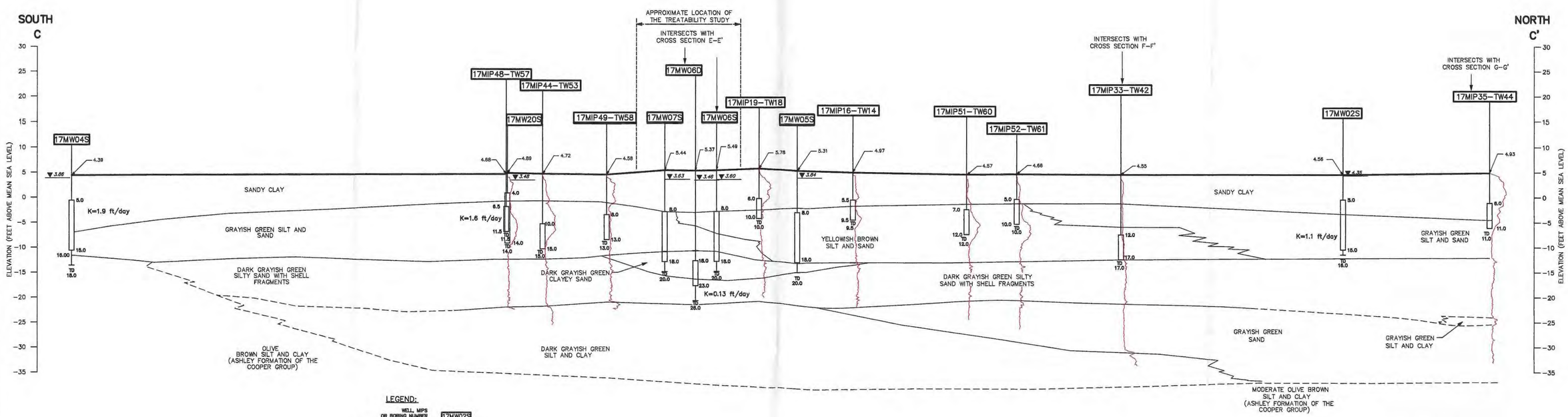
NOTES:

1. LITHOLOGIC CONTACTS ARE INFERRED FROM BORING LOGS. ACTUAL CONDITIONS MAY VARY FROM THOSE DEPICTED.
2. WELLS NWS-2-4, NWS-2-5, AND NWS-2-7 WERE ABANONED DURING 2001 FIELD REPORT.

DRAWN BY DM	DATE 7/22/05	GEOLOGIC CROSS SECTION A-A' SWMU 16 NAVAL WEAPONS STATION CHARLESTON, SOUTH CAROLINA	CONTRACT NO. 0528
CHECKED BY	DATE		OWNER NO. 0000
REVISED BY	DATE		APPROVED BY / DATE
SCALE AS NOTED		NAVFAC	DRAWING NO. FIGURE 3-5 / REV. 0

FORM CADD NO. SDIV-BH.DWG - REV 1 - 9/10/98





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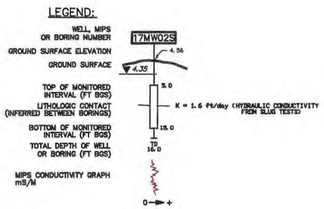

NOTES:

1. LITHOLOGIC CONTACTS ARE INFERRED FROM BORING LOGS. ACTUAL CONDITIONS MAY VARY FROM THOSE DEPICTED.
2. MIPS CONDUCTIVITY GRAPHS ARE NOT TO SCALE, SEE APPENDIX B FOR ACTUAL CONDUCTIVITY MAGNITUDES.

DRAWN BY DM	DATE 6/13/05	GEOLOGIC CROSS SECTIONS B-B' AND C-C' NAVAL WEAPONS STATION CHARLESTON, SOUTH CAROLINA	CONTRACT NO. 0528
CHECKED BY	DATE		OWNER NO. CTO
REVISED BY	DATE		APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 3-6 / REV. 0

NAVFAC

FIGURE 3-6 DRAWING NO. REV. 0

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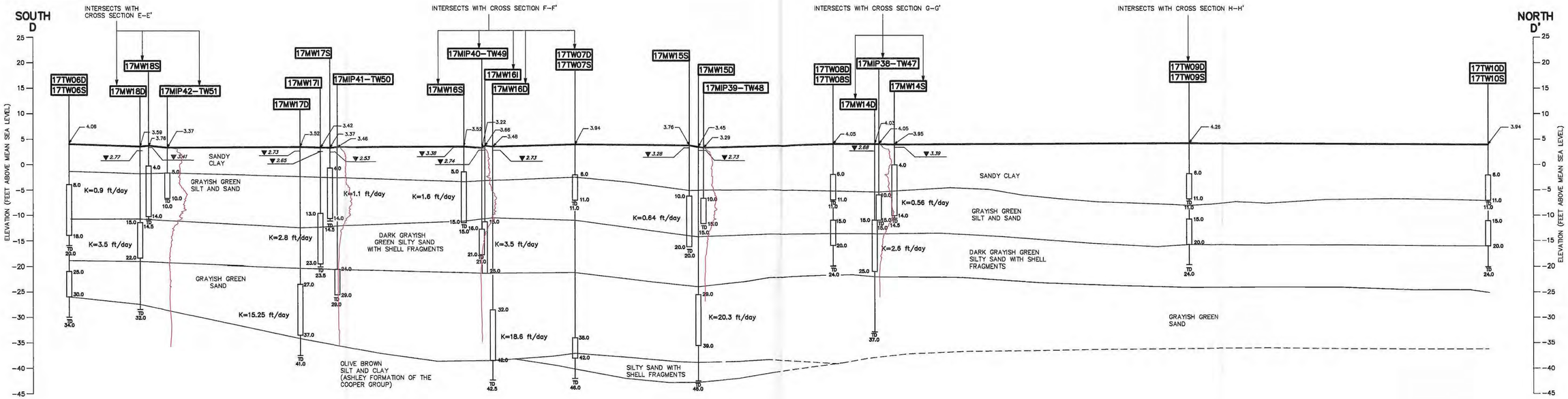

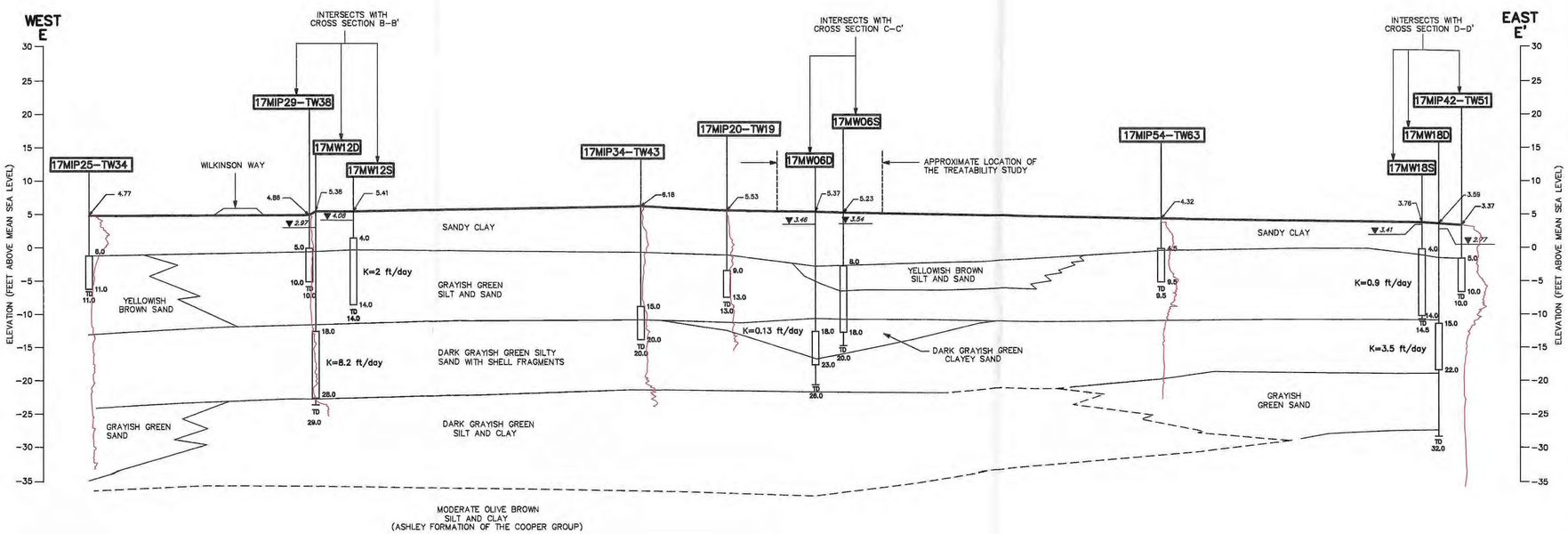

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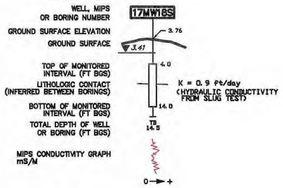


NOTES:

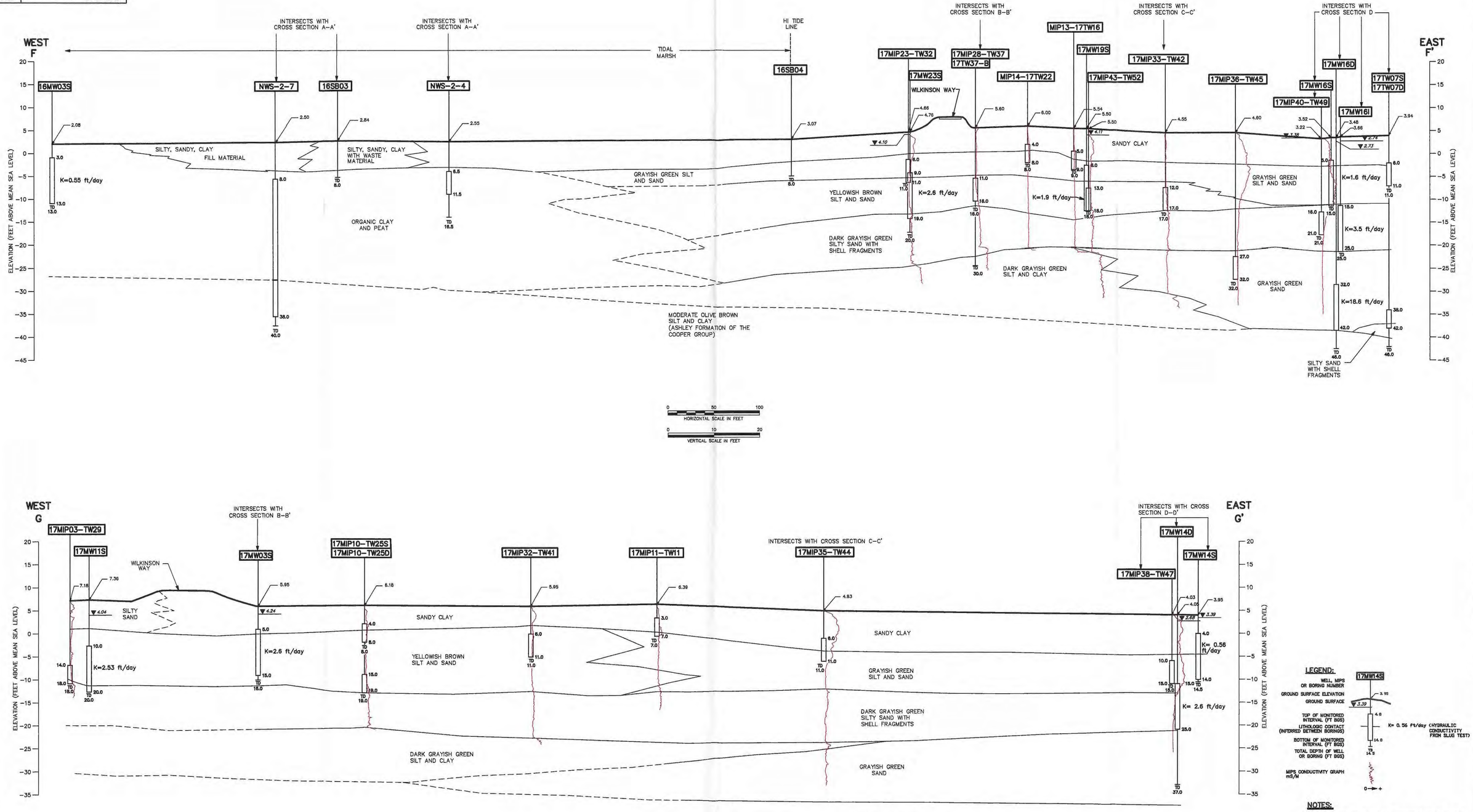
1. LITHOLOGIC CONTACTS ARE INFERRED FROM BORING LOGS. ACTUAL CONDITIONS MAY VARY FROM THOSE DEPICTED.
2. MIPS CONDUCTIVITY GRAPHS ARE NOT TO SCALE, SEE APPENDIX B FOR ACTUAL CONDUCTIVITY MAGNITUDES.

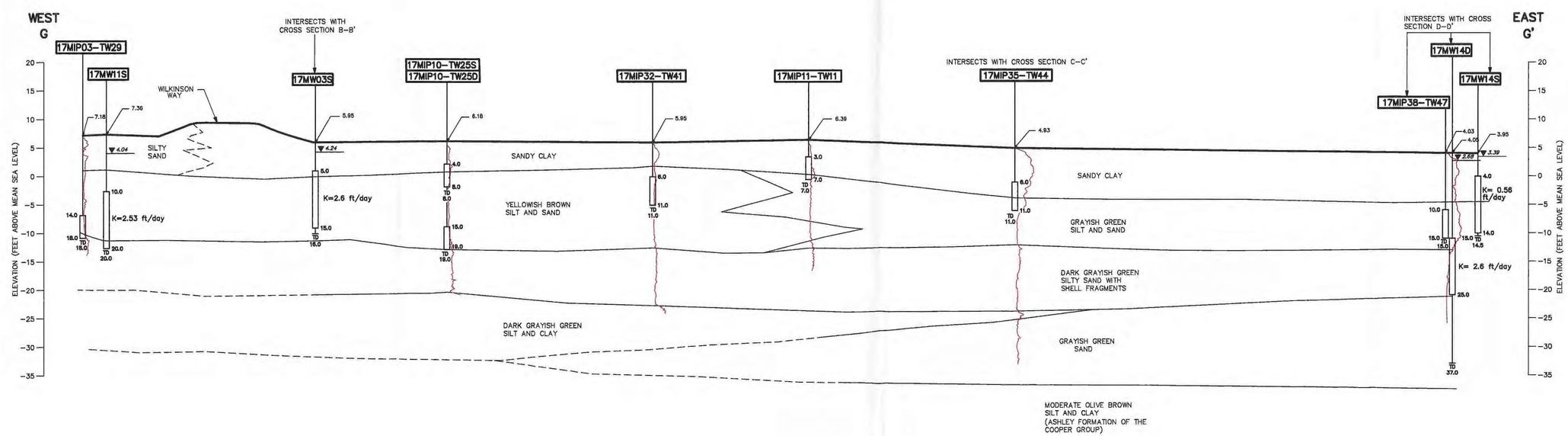
DRAWN BY DM	DATE 6/13/05	GEOLOGIC CROSS SECTIONS D-D' AND E-E' NAVAL WEAPONS STATION CHARLESTON, SOUTH CAROLINA	CONTRACT NO. 0528
CHECKED BY	DATE		OWNER NO. CTO
REVISED BY	DATE		APPROVED BY / DATE
SCALE AS NOTED		NAVFAC	DRAWING NO. FIGURE 3-7 / REV. 0

FORM CADD NO. SSIV-D-STD3VG - REV 1 - 9/14/99

ACAD:0528GX32.dwg 09/27/05 HJB PIT

DRAWING NO. FIGURE 3-7 REV. 0





LEGEND:

NOTES:

1. LITHOLOGIC CONTACTS ARE INFERRED FROM BORING LOGS. ACTUAL CONDITIONS MAY VARY FROM THOSE DEPICTED.
2. MIPS CONDUCTIVITY GRAPHS ARE NOT TO SCALE, SEE APPENDIX B FOR ACTUAL CONDUCTIVITY MAGNETUDES.

DRAWN BY DM	DATE 6/14/05	GEOLOGIC CROSS SECTIONS F-F' AND G-G' NAVAL WEAPONS STATION CHARLESTON, SOUTH CAROLINA	CONTRACT NO. 0528
CHECKED BY	DATE		OWNER NO. CTO
REVISED BY	DATE		APPROVED BY / DATE
SCALE AS NOTED		NAVFAC	DRAWING NO. FIGURE 3-8 / REV. 0

DRAWING NO. FIGURE 3-8 REV. 0

FORM CADD NO. SSIV-2-STD.DWG - REV 1 - 9/14/98

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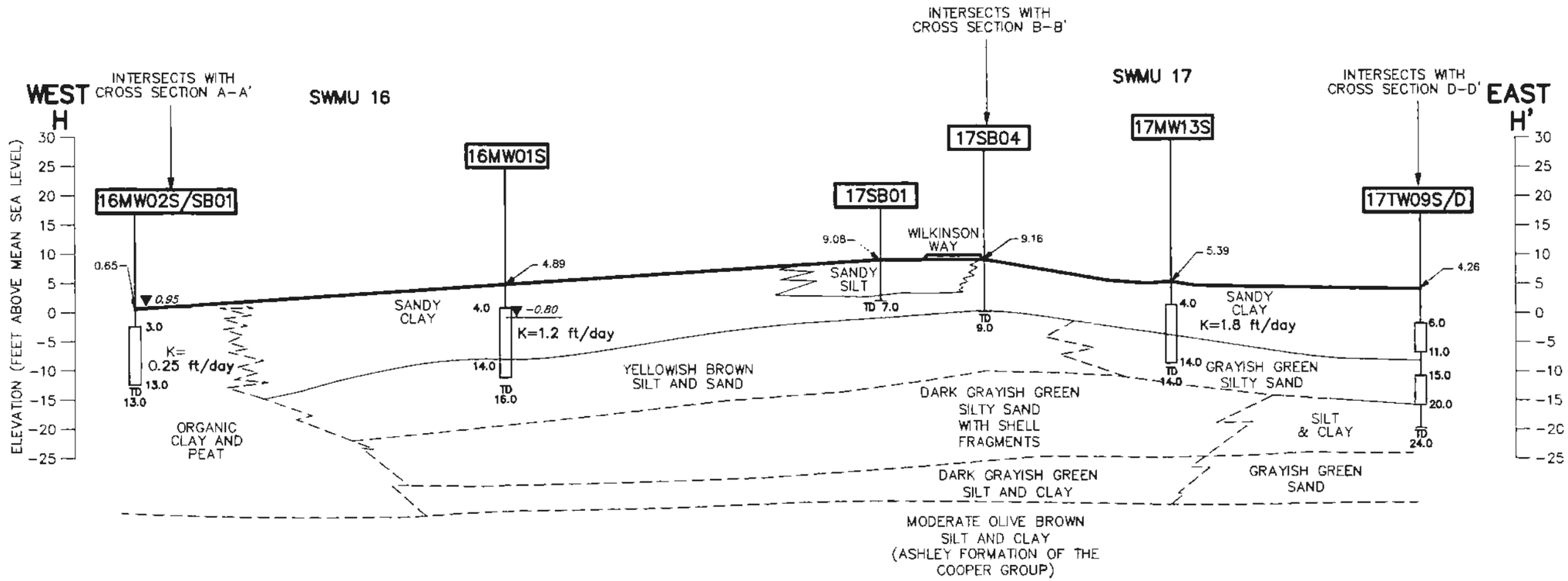

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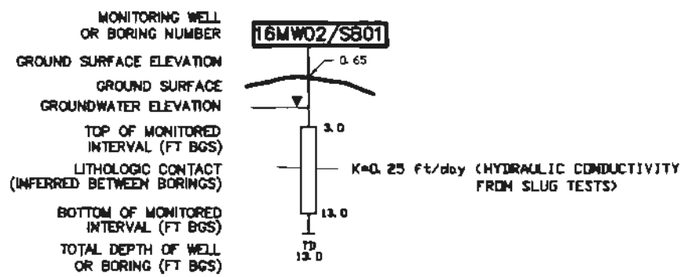

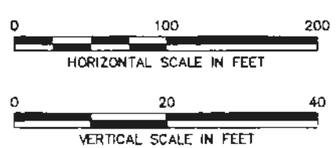

NOTE:

1. LITHOLOGIC CONTACTS ARE INFERRED FROM BORING LOGS. ACTUAL CONDITIONS MAY VARY FROM THOSE DEPICTED.

DRAWN BY DM	DATE 7/22/05	GEOLOGIC CROSS SECTION H-H' SWMUS 16 AND 17 NAVAL WEAPONS STATION CHARLESTON, SOUTH CAROLINA
CHECKED BY	DATE	
REVISED BY	DATE	
SCALE AS NOTED		

NAVFAC

CONTRACT NO. 0000	
OWNER NO. 0000	
APPROVED BY	DATE
DRAWING NO. FIGURE 3-9	REV. 0

FORM CADD NO. SDIV-2H.DWG - REV 1 - 9/10/98

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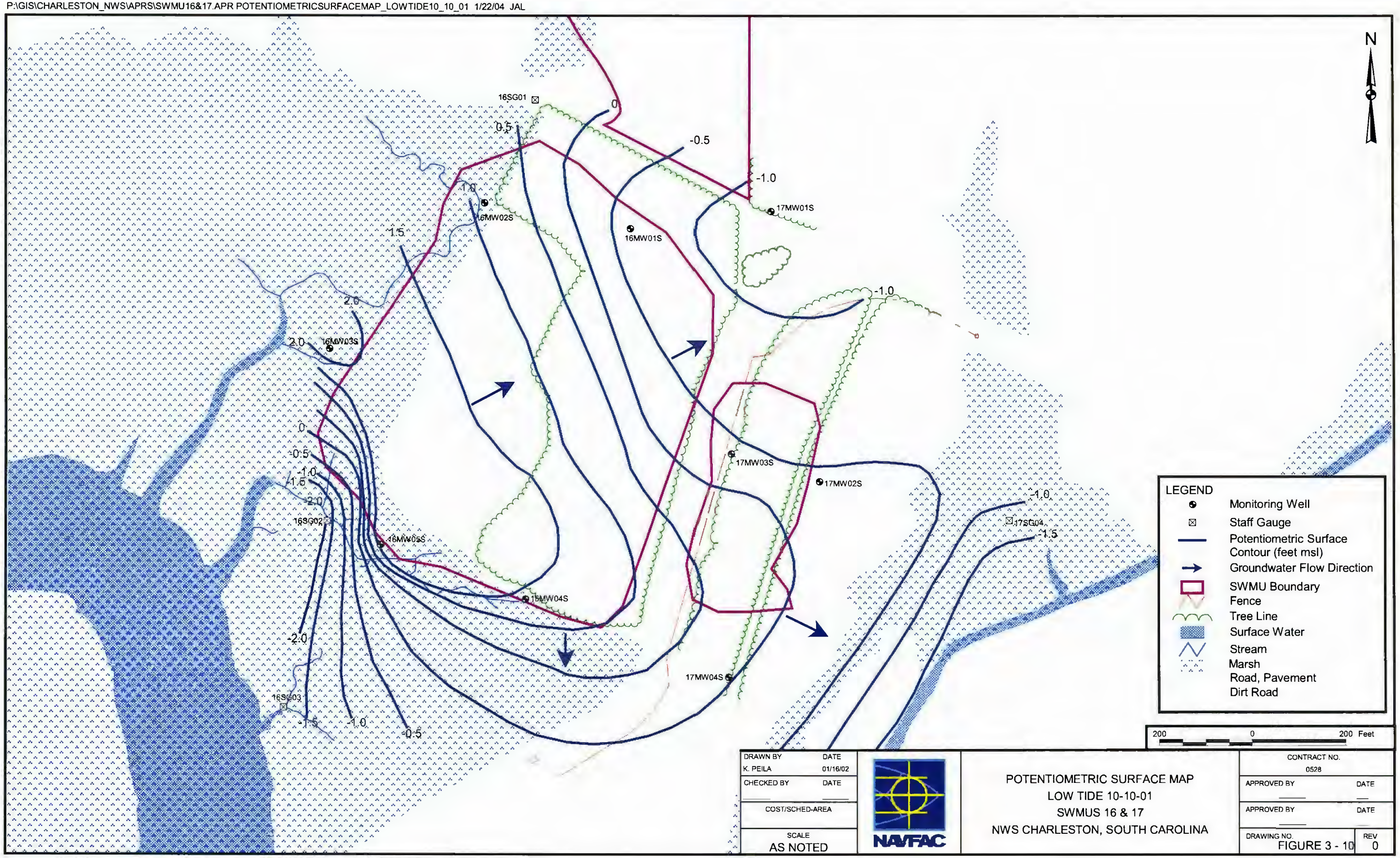

DRAWN BY K. PEILA	DATE 01/16/02	NAVFAC	POTENTIOMETRIC SURFACE MAP LOW TIDE 10-10-01 SWMUS 16 & 17 NWS CHARLESTON, SOUTH CAROLINA	CONTRACT NO. 0528
CHECKED BY	DATE			APPROVED BY / DATE
COST/SCHED-AREA				APPROVED BY / DATE
SCALE AS NOTED				DRAWING NO. FIGURE 3 - 10 / REV 0

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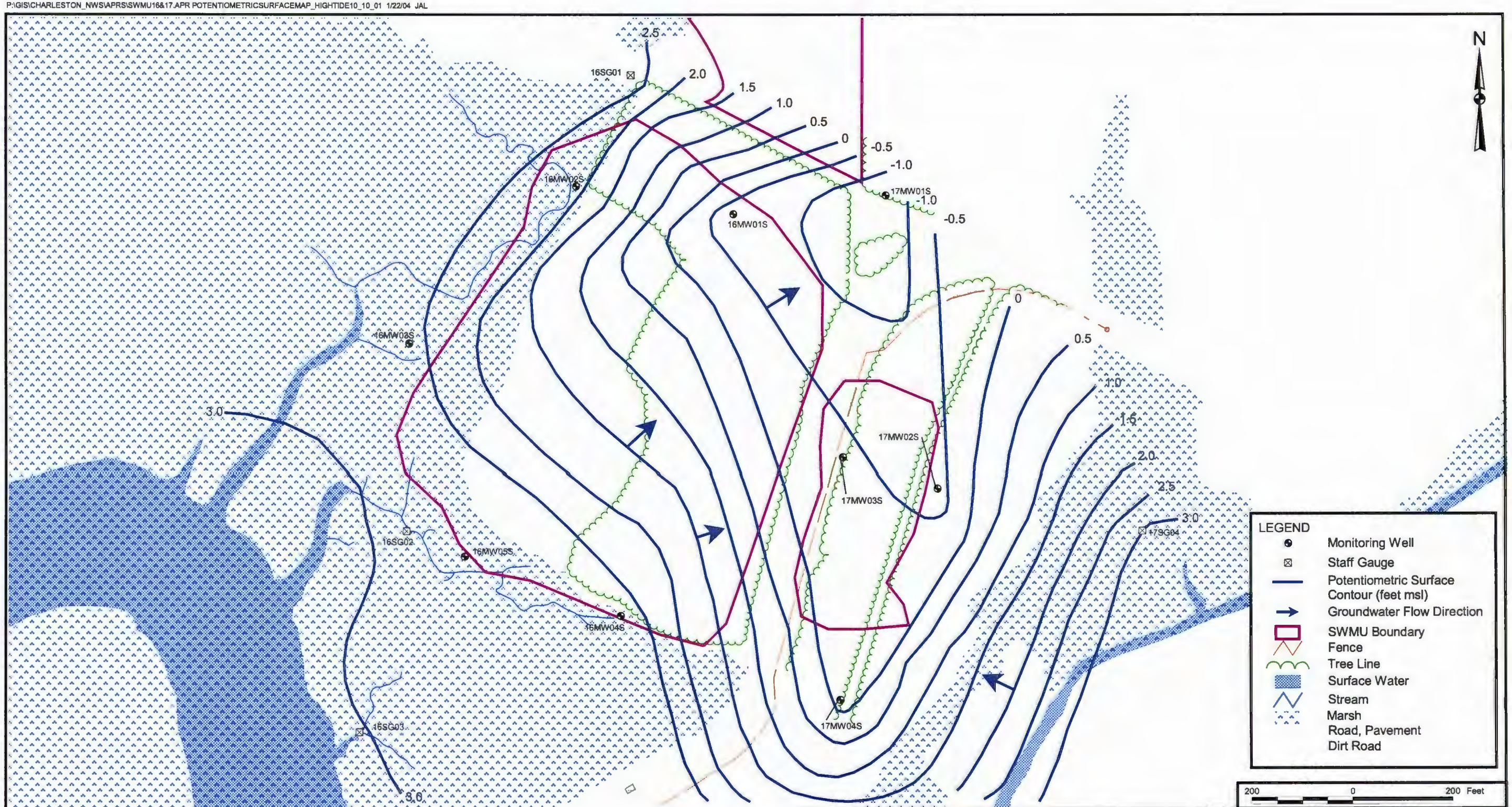

DRAWN BY	DATE
K. PEILA	01/16/02
CHECKED BY	DATE
COST/SCHED-AREA	
SCALE	
AS NOTED	

NAVFAC

POTENTIOMETRIC SURFACE MAP
HIGH TIDE 10-10-01
SWMUS 16 & 17
NWS CHARLESTON, SOUTH CAROLINA

CONTRACT NO.	
0528	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 3 - 11	REV. 0

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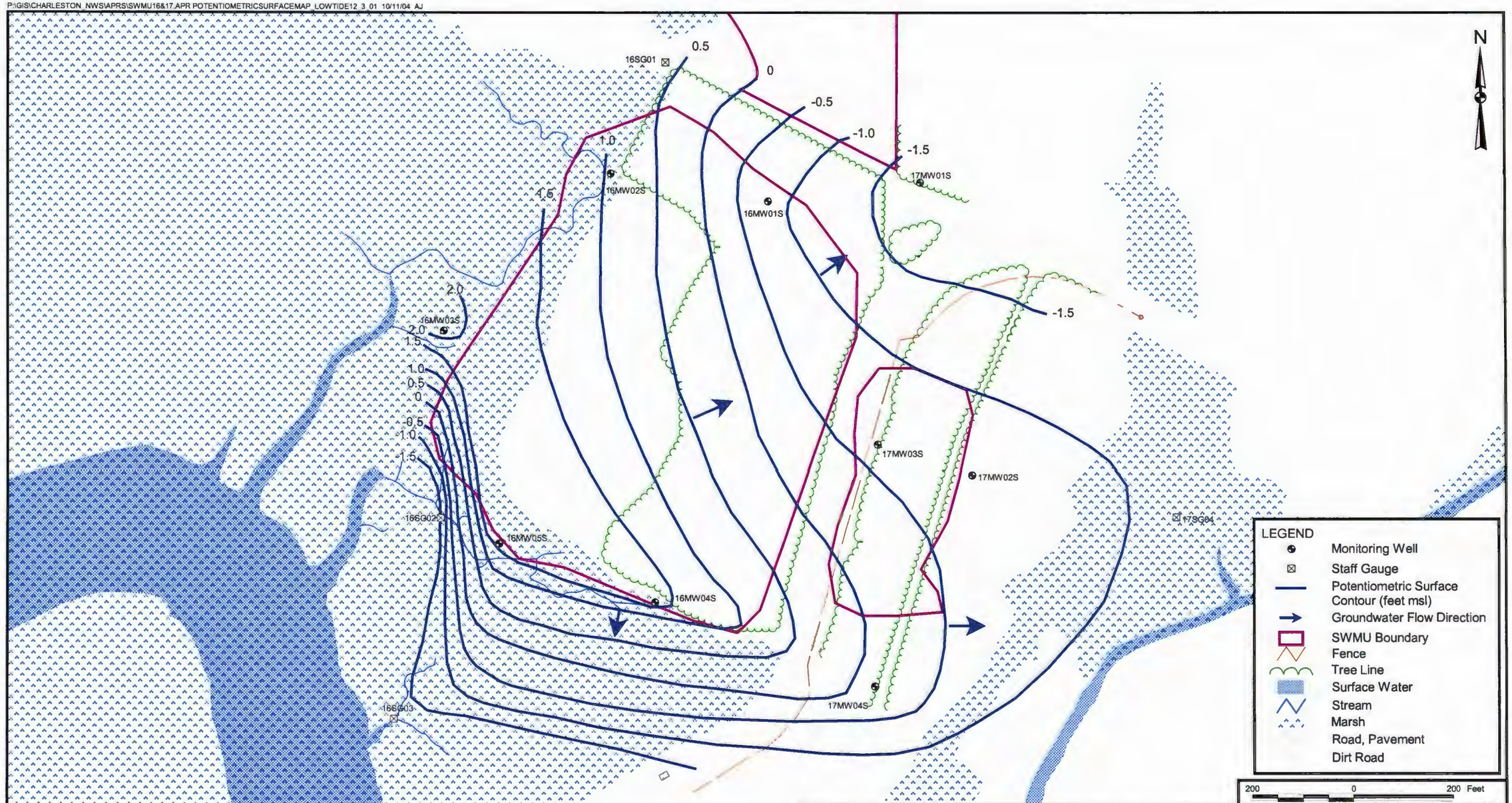

DRAWN BY	DATE
K. PEILA	01/16/02
CHECKED BY	DATE
L. KLINK	10/11/04
COST/SCHED-AREA	
SCALE	
AS NOTED	

NAVFAC

POTENTIOMETRIC SURFACE MAP
LOW TIDE 12-3-01
SWMUS 16 & 17
NWS CHARLESTON, SOUTH CAROLINA

CONTRACT NO.	
0528	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO.	REV.
FIGURE 3 - 12	0

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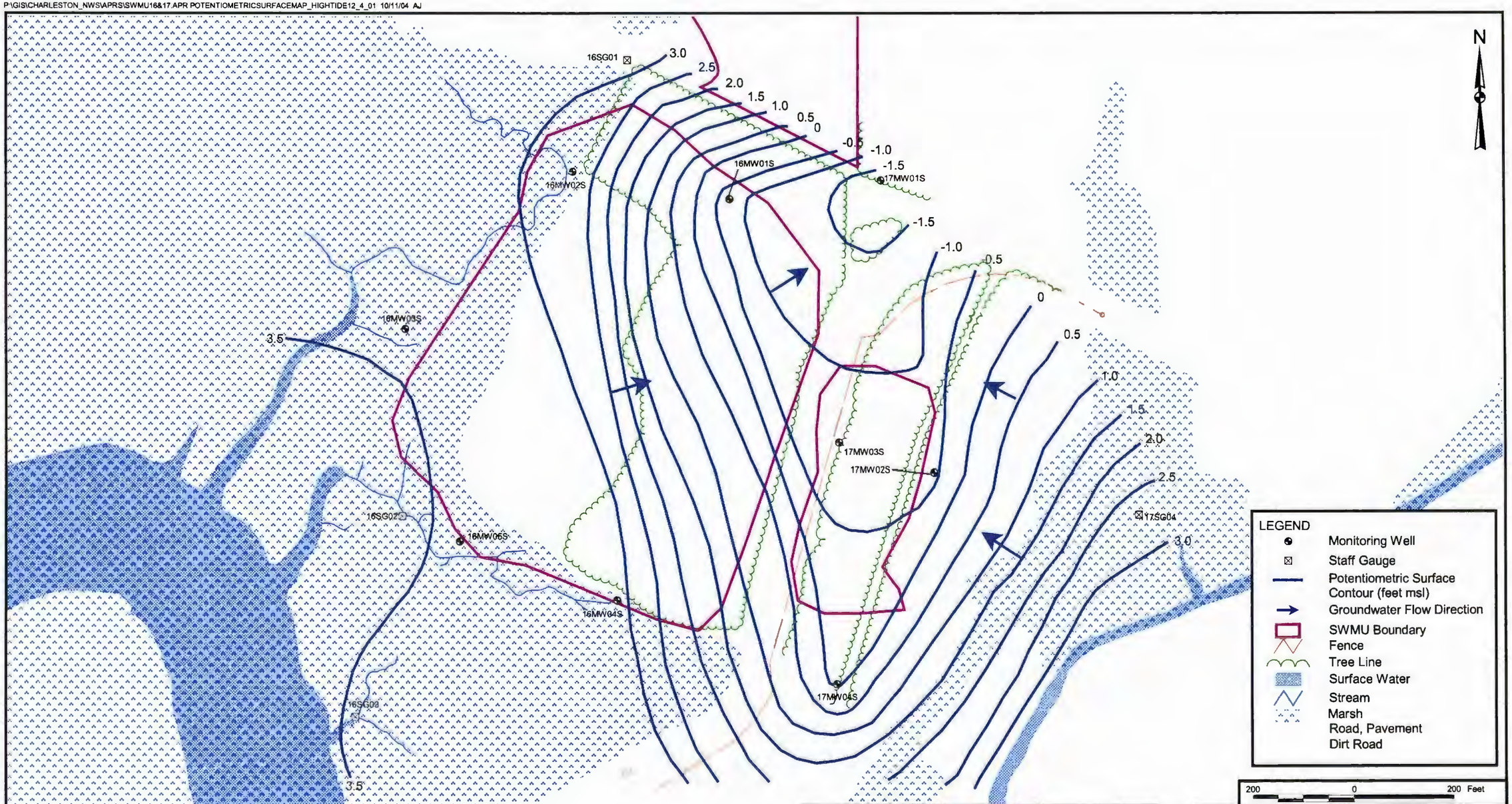
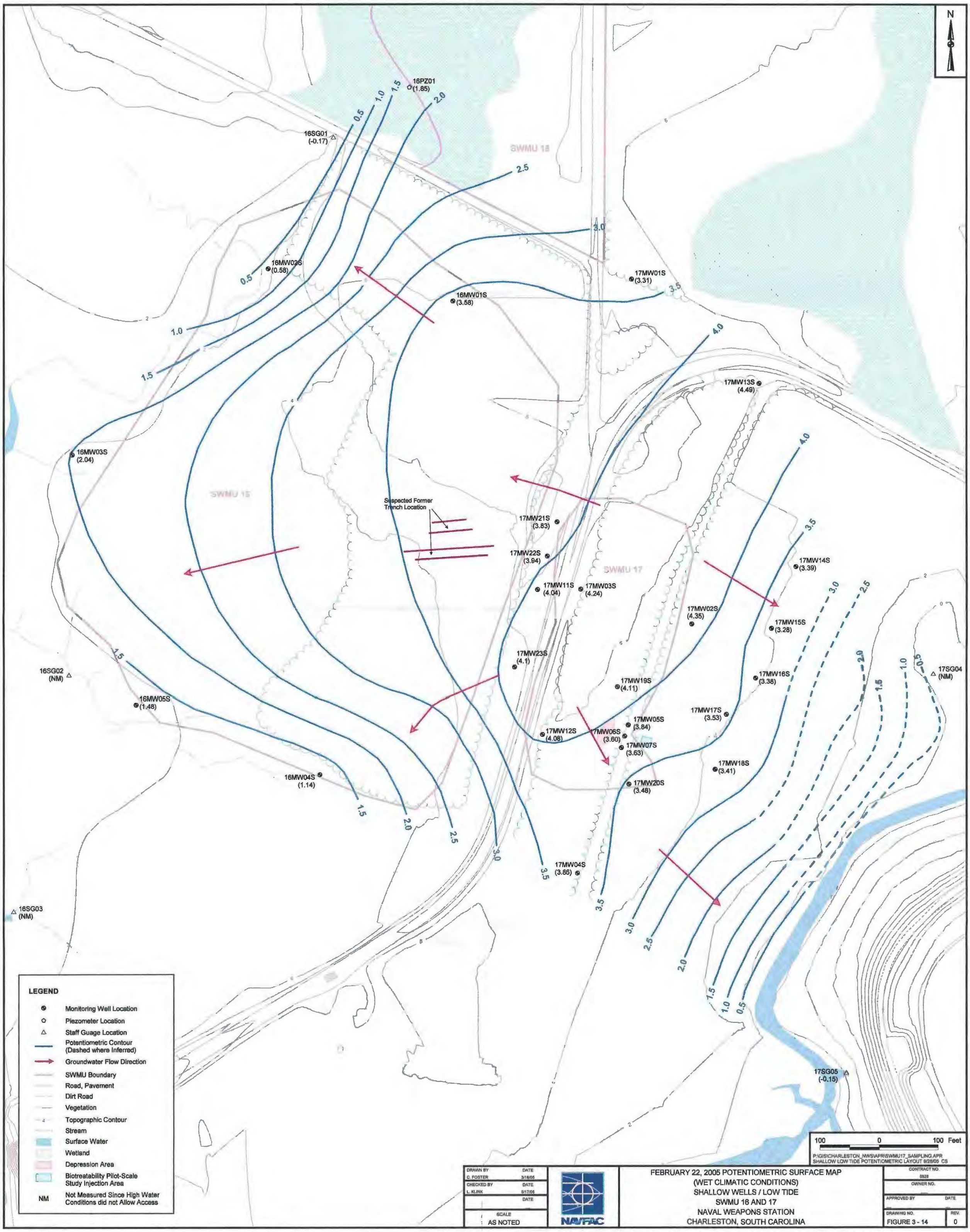


DRAWN BY K. PEILA	DATE 01/16/02	POTENTIOMETRIC SURFACE MAP HIGH TIDE 12-4-01 SWMUS 16 & 17 NWS CHARLESTON, SOUTH CAROLINA	CONTRACT NO. 0528
CHECKED BY L. KLINK	DATE 10/11/04		APPROVED BY ___ DATE ___
COST/SCHED-AREA			APPROVED BY ___ DATE ___
SCALE AS NOTED			DRAWING NO. FIGURE 3 - 13 / REV. 0

NAVFAC


N
16PZ01
(1.85)
16SG01
(-0.17)
SWMU 18
16MW02S
(0.58)
17MW01S
(3.31)
16MW01S
(3.58)
17MW13S
(4.49)
16MW03S
(2.04)
SWMU 15
Suspected Former
Trench Location
17MW21S
(3.83)
17MW22S
(3.94)
SWMU 17
17MW11S
(4.04)
17MW03S
(4.24)
17MW14S
(3.39)
17MW02S
(4.35)
17MW15S
(3.28)
17MW23S
(4.1)
17MW19S
(4.11)
17MW16S
(3.38)
17SG04
(NM)
16SG02
(NM)
16MW05S
(1.48)
17MW17S
(3.53)
17MW05S
(3.84)
17MW12S
(4.08)
17MW06S
(3.60)
17MW07S
(3.63)
17MW18S
(3.41)
16MW04S
(1.14)
17MW20S
(3.48)
17MW04S
(3.86)
16SG03
(NM)
17SG05
(-0.15)
LEGEND
Monitoring Well Location
Piezometer Location
Staff Guage Location
Potentiometric Contour
(Dashed where Inferred)
Groundwater Flow Direction
SWMU Boundary
Road, Pavement
Dirt Road
Vegetation
Topographic Contour
Stream
Surface Water
Wetland
Depression Area
Biotreatability Pilot-Scale
Study Injection Area
NM
Not Measured Since High Water
Conditions did not Allow Access
100 0 100 Feet
P:\GIS\CHARLESTON_NWS\APR\SWMU17_SAMPLING.APR
SHALLOW LOW TIDE POTENTIOMETRIC LAYOUT 9/29/05 CS
DRAWN BY C. FOSTER DATE 3/16/05
CHECKED BY L. KLINK DATE 5/17/05
DATE
SCALE
AS NOTED
NAVFAC
FEBRUARY 22, 2005 POTENTIOMETRIC SURFACE MAP
(WET CLIMATIC CONDITIONS)
SHALLOW WELLS / LOW TIDE
SWMU 16 AND 17
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA
CONTRACT NO.
0528
OWNER NO.
APPROVED BY
DATE
DRAWING NO.
FIGURE 3 - 14
REV.
0

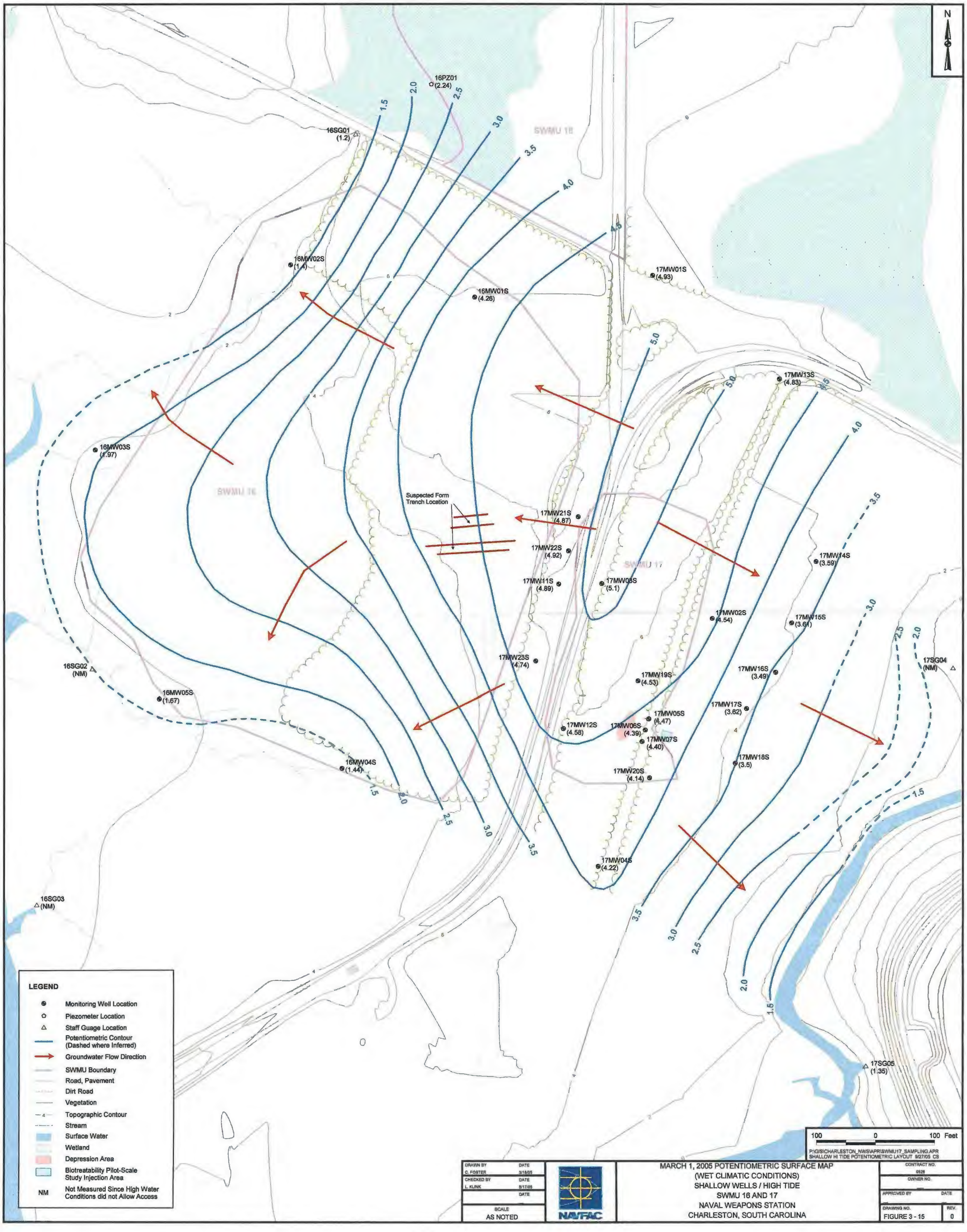
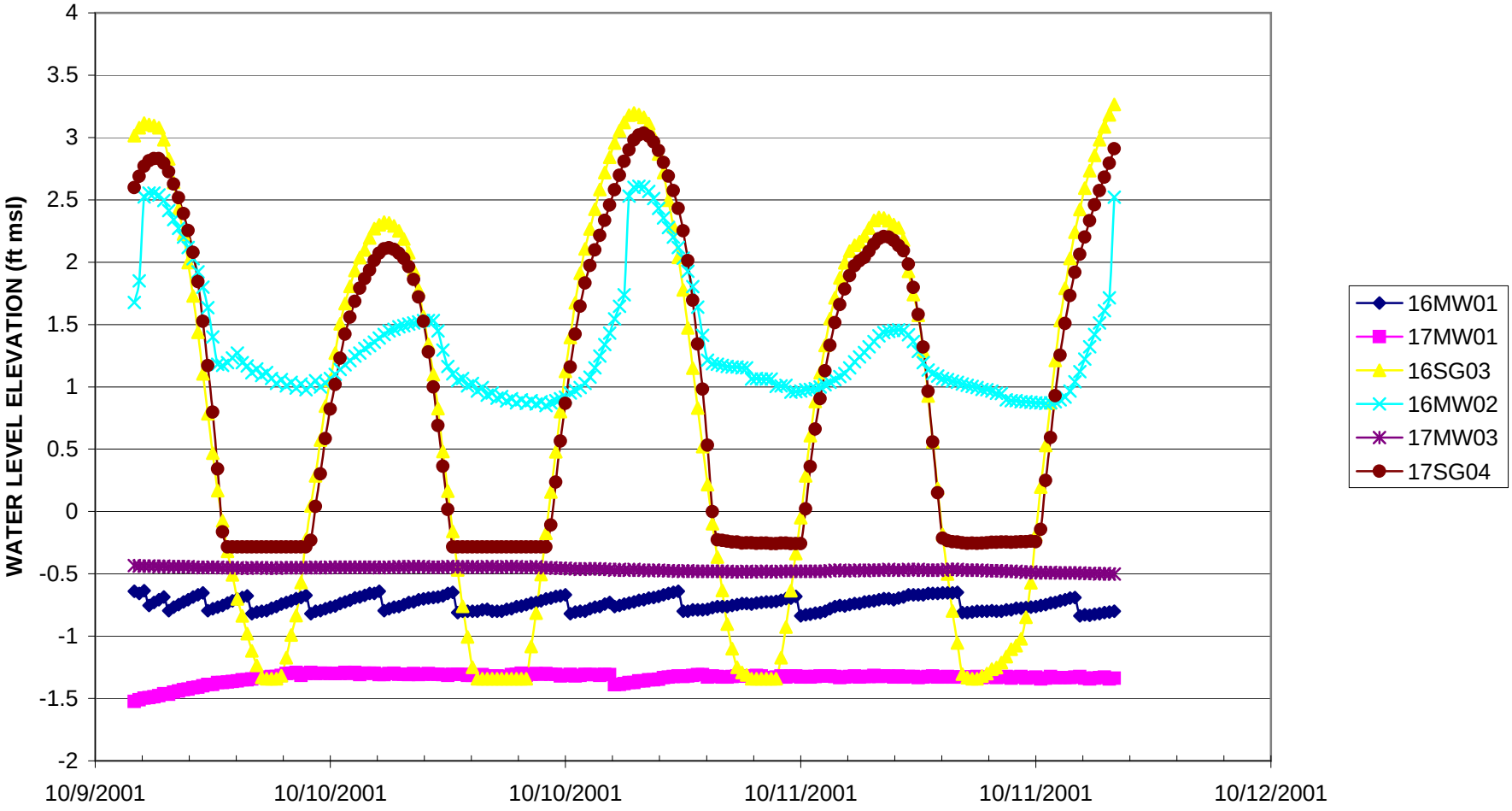
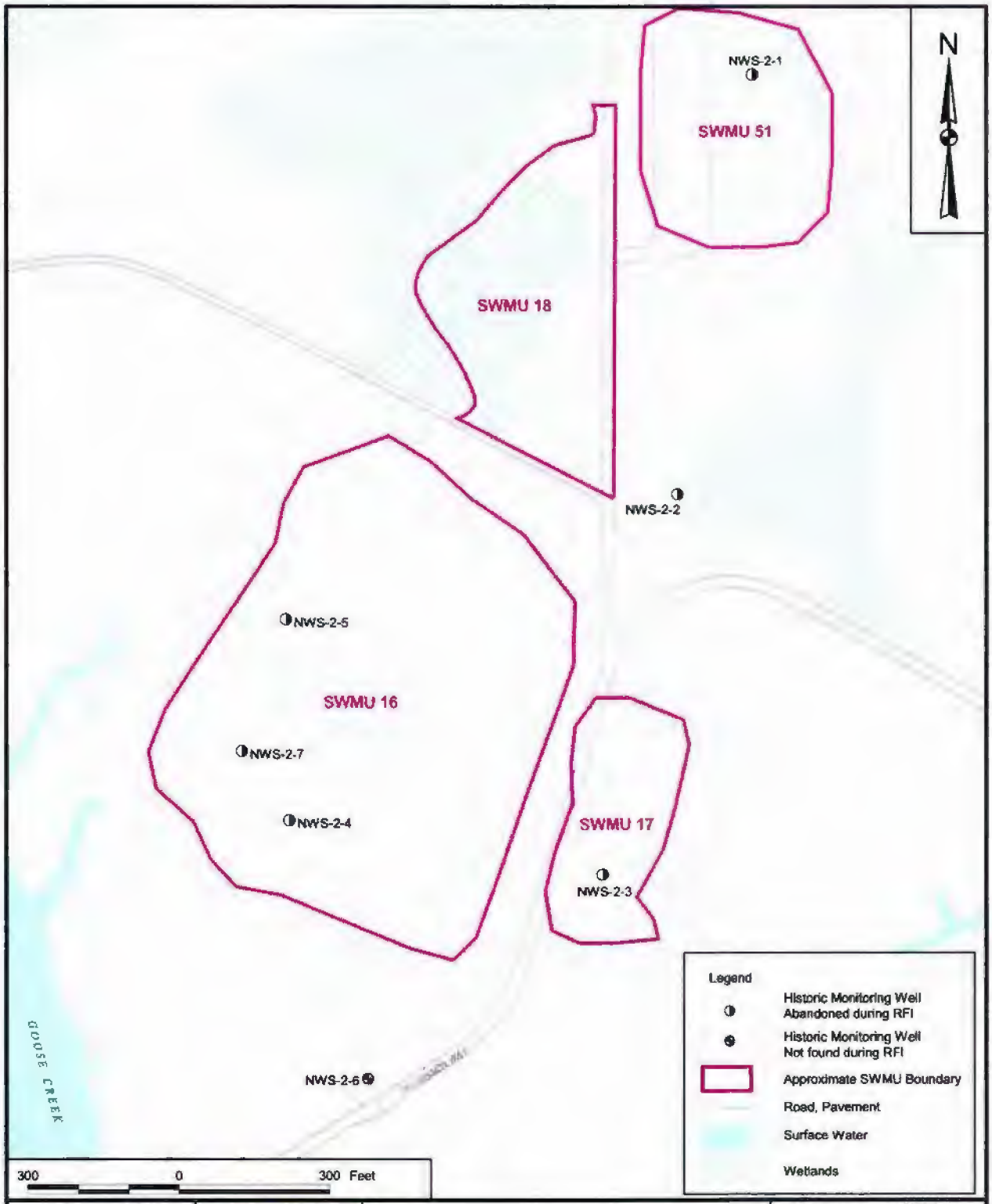

N
16PZ01 (2.24)
16SG01 (1.2)
16MW02S (1.4)
16MW01S (4.26)
17MW01S (4.93)
17MW13S (4.83)
16MW03S (1.97)
Suspected Form Trench Location
17MW21S (4.87)
17MW22S (4.92)
17MW11S (4.89)
17MW08S (5.1)
17MW14S (3.59)
17MW02S (4.54)
17MW15S (3.61)
17MW23S (4.74)
17MW19S (4.53)
17MW16S (3.49)
17SG04 (NM)
16SG02 (NM)
16MW05S (1.67)
17MW17S (3.62)
17MW05S (4.47)
17MW12S (4.58)
17MW06S (4.39)
17MW07S (4.40)
17MW18S (3.5)
16MW04S (1.44)
17MW20S (4.14)
17MW04S (4.22)
16SG03 (NM)
17SG05 (1.35)
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
LEGEND
Monitoring Well Location
Piezometer Location
Staff Guage Location
Potentiometric Contour (Dashed where Inferred)
Groundwater Flow Direction
SWMU Boundary
Road, Pavement
Dirt Road
Vegetation
Topographic Contour
Stream
Surface Water
Wetland
Depression Area
Biotreatability Pilot-Scale Study Injection Area
NM Not Measured Since High Water Conditions did not Allow Access
100 0 100 Feet
P:\GIS\CHARLESTON_NWS\APR\SWMU17_SAMPLING.APR
SHALLOW HI TIDE POTENTIOMETRIC LAYOUT 9/27/05 CS
DRAWN BY C. FOSTER DATE 3/18/05
CHECKED BY L. KLINK DATE 5/17/05
DATE
SCALE AS NOTED
NAVFAC
MARCH 1, 2005 POTENTIOMETRIC SURFACE MAP
(WET CLIMATIC CONDITIONS)
SHALLOW WELLS / HIGH TIDE
SWMU 16 AND 17
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA
CONTRACT NO. 0528
OWNER NO.
APPROVED BY
DATE
DRAWING NO. FIGURE 3 - 15
REV. 0

FIGURE 3-16
SUMMARY OF SWMUs 16 AND 17 TIDAL STUDY
NWS CHARLESTON, SOUTH CAROLINA





DRAWN BY	DATE			CONTRACT NUMBER
C. SPEHAR	01/31/06	NAVFAC	HISTORIC WELL ABANDONMENT NAVAL WEAPONS STATION CHARLESTON, SOUTH CAROLINA	—
CHECKED BY	DATE			APPROVED BY / DATE
L. KLINK	01/31/06			— / —
COST/SCHEDULE-AREA				APPROVED BY / DATE
				— / —
SCALE				DRAWING NO / REV
AS NOTED				FIGURE 3 - 17 / 0

P:\GIS\CHARLESTON_NWS\APRS\SWMU17.APR HISTORIC WELL ABANDONMENT LAYOUT 01/31/05

4.0 NATURE AND EXTENT OF CONTAMINATION

This section presents the analytical results of soil, groundwater, surface water, and sediment sampling at SWMU 16 and SWMU 17. SWMU 16 was the primary landfill used for disposal of solid and liquid waste generated at NWS Charleston between 1941 and 1978. Solid wastes consisted of household waste, construction and demolition materials, empty containers from shop areas, and metal waste. In addition, approximately 500 mercury batteries were disposed of at random locations in the landfill, and 90 mm shells were discarded at the site. Liquid wastes included oily wastes and solvents generated by NWS, POMFLANT, and ships. An estimated 5,000 to 15,000 gallons of waste oil and solvents [i.e. toluene, methylethylketone (MEK), xylene, and acetone] were disposed at the site annually (Harmon Engineering and Testing, 1984). In late 2003, SCDHEC discovered historical aerial photographs of SWMUs 16 and 17 (Appendix C-3) indicating general land disturbances throughout SWMU 16 at various time periods from 1949 to 1979. Refer to Figure 4-1 for an overlay of areas of disturbance. Moreover, the 1963 aerial photograph suggests the presence of two trenches, which have been added to the site maps. SWMU 17 was used primarily for surface disposal of solid waste between 1950 and 1978, but oils and missile components were also disposed at the site. Solid waste observed included rubble, paint cans and buckets, and missile components. An estimated 3,000 to 4,000 gallons of engine oil were disposed at the site between 1965 and 1966 (Harmon Engineering and Testing, 1984). A depression pit-like area was also observed as a suspect source area at SWMU 17 and was subsequently surveyed and shown on site maps.

Results for surface soil, subsurface soil, groundwater, surface water, and sediment are discussed in the following sections. A comparison of site data with facility background concentrations for NWS Charleston (Table 4-1) is also presented. Site-specific upgradient data are not applicable because the origin of the small tributaries lies within SWMU 16, and another site (SWMU 18) is located to the north of SWMU 16.

Analytical results are discussed and compared to the most relevant criteria. For groundwater and surface water, criteria were USEPA federal drinking water standards known as the Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs), which are the same for the State of South Carolina, and facility background concentrations. For soil and sediment, criteria were Region 9 Preliminary Remediation Goals (PRGs) for residential use and facility background concentrations for hydric soil. The screening criteria are generally conservative values, in particular for groundwater and surface water, which are not used as a supply for drinking water. Moreover, much of the water is saline. Similarly, the use of soil PRGs for sediment is conservative because exposure potential for sediment is more limited than for soil. A more detailed evaluation is conducted as part of the human health and ecological risk assessments in Sections 6.0 and 7.0, respectively. The NWS Charleston database was used to develop tables and figures provided in this section. For summary statistics tables, a sample and its duplicate sample were

considered separately when determining the maximum concentration while the average concentration of a sample and its duplicate was used in determining frequency of detection. Tag maps present the average concentrations.

A summary of the analytical program for all samples collected at SWMUs 16 and 17 is provided in Table 3-1. Groundwater and surface water sample locations are shown on Figure 3-1. Soil and sediment sample locations for SWMUs 16 and 17 are provided in Figures 3-2 and 3-3, respectively. Complete analytical results are provided in Appendix E-1 (surface soil), Appendix E-2 (subsurface soil), Appendix E-3 (groundwater, TtNUS), Appendix E-4 (groundwater, Solutions-IES), Appendix E-5 (surface water), and Appendix E-6 (sediment). QA/QC data are provided in Appendix E-7, and IDW results are provided in Appendix E-8. Chain-of-custody (COC) forms are provided as Appendix E-9. Appendix E-4 analytical data was extracted from all Solutions-IES reports available at the time the draft RFI was being prepared, provided for reference purposes as Appendix C-5.

4.1 SOIL

4.1.1 SWMU 16 Surface Soil

Summary statistics for surface soil (i.e., 0 to 1 foot bgs) samples at SWMU 16 are provided in Table 4-2, and positive detections for each sample are provided in Appendix E-1. Exceedances of Region 9 PRGs and facility background concentrations are shown on the Figure 4-2 tag map.

The surface soil sampling program at SWMU 16 was limited because the existing soil cover was not believed to be contaminated. The site was closed in 1980 and covered with approximately 2 feet of local fill soil. According to NWS Charleston plans (Southern Division, 1979), the cover fill was obtained from borrow pits, and there is no reason to suspect the soil to be contaminated as the result of site-related activities because it is from an undisturbed, non-industrial area of the Base. The SWMU was graded before covering.

One surface soil sample location (16SS01) was included in the SWMU 16 sampling program to determine the chemical characteristics of the 2-foot soil cover fill material. There were no exceedances of criteria reported for the sample. In addition, three surface soil samples were collected within an appreciable debris pile area located in the southern area of SWMU 16. It is believed the debris pile originated after soil cover placement in 1980. Results at one location (16SS02) exceeded criteria for several analytes. Moreover, the soil was stained a purple-black color at this location. Two other sample locations (16SS03 and 16SS04) were placed to aid in refining the extent of the debris pile contamination encountered at location 16SS02, and the associated sample results did not exceed criteria.

Acetone was the only VOC detected in surface soil, and concentrations did not exceed its Region 9 PRG.

Semivolatile organic compounds (SVOCs) detected in the surface soil included benzaldehyde and several phthalates. Bis(2-ethylhexyl) phthalate (BEHP) at a concentration of 6,100,000 µg/kg exceeded the PRG by approximately two orders of magnitude, and it was the only SVOC to exceed its PRG. BEHP was detected in three of the four samples collected, and the maximum detection was at location 16SS02, within the debris pile area. The other SVOCs had frequencies of detection of one or two in four samples and all were at least two orders of magnitude less than their corresponding PRGs.

Aroclor-1254 was the only polychlorinated biphenyl (PCB) detected in the surface soil samples, and it was present at 59,000 µg/kg, exceeding its PRG by more than two orders of magnitude.

Three pesticides (DDD, DDE, and DDT) were detected in surface soil at concentrations significantly less than the associated PRGs. Furthermore, pesticides for insect control were used historically and are presently used at the site.

Explosives constituents were not detected.

Of the inorganics detected in surface soil, four exceeded both facility background concentrations and PRGs including antimony (122 mg/kg), cadmium (60.7 mg/kg), chromium (667 mg/kg), and lead (12,400 mg/kg). Each analyte's maximum detection was encountered at location 16SS02. PRG exceedances for antimony, cadmium, and chromium were approximately one order of magnitude or less. However, lead exceeded its PRG (400 mg/kg) by approximately two orders of magnitude and exceeded its facility background concentration (15.5 mg/kg) by three orders of magnitude. Other inorganics, including barium, copper, magnesium, manganese, potassium, and zinc, were detected at levels exceeding the facility background; however, they were not found in excess of PRG values. Of these, only copper (58.1 mg/kg) exceeded its background concentration (3.23 mg/kg) by one order of magnitude. The maximum detection of copper occurred at location 16SS02, where other inorganic PRGs were exceeded.

Cyanide was not detected in surface soil.

4.1.2 SWMU 16 Subsurface Soil

Summary statistics for subsurface soil (i.e., greater than 1 foot bgs) samples at SWMU 16 are provided in Table 4-3, and positive detections for each sample are provided in Appendix E-2. Exceedances of Region 9 PRGs and facility background concentrations are shown on the Figure 4-2 tag map.

Considering that SWMU 16 was an industrial landfill, it would be difficult to adequately characterize its contents with certainty. The purpose of the investigation was to identify "hot spots" of contamination. Four soil borings (16SB01 through 16SB04 with up to three subsurface soil samples per boring) were included in the SWMU 16 field program and were located in anomalous areas based on the geophysical survey. These locations were considered as likely biased high concentration sampling locations and were considered likely waste disposal areas. Additional borings were planned to investigate the suspected former trench locations and to refine contamination at the debris pile area and waste oil tank area. Unfortunately, the work was not conducted because clearance for drilling was not granted because the readings from the magnetometer used for UXO clearance indicated the potential presence of buried metal (possible ordnance). Therefore, this section discusses results from available samples but is otherwise incomplete.

VOCs detected in subsurface soil included relatively low concentrations of 2-butanone, acetone, carbon disulfide, dichlorofluoromethane, and methyl acetate, all with concentrations significantly less than their Region 9 PRGs. Each had frequencies of detection of between one and four of 11 samples.

SVOCs detected in subsurface soil included phthalates, polynuclear aromatic hydrocarbons (PAHs), and dibenzofuran. Two of the SVOCs, benzo(a)pyrene and benzo(b)fluoranthene, were detected at levels greater than Region 9 PRGs. However, the maximum concentrations of 500 and 700 µg/kg, respectively, were within one order of magnitude of the PRG. Frequencies of detection were seven and eight of 11 samples, respectively. The maximum concentrations were encountered at location 16SB03 in the 3- to 5-foot depth range.

Numerous pesticides were detected in subsurface soil although none at concentrations exceeding PRGs. The locations of maximum concentrations were scattered and the frequencies of detection varied from one to six of 11 samples.

Two PCBs were detected in subsurface soil, Aroclor-1254 and Aroclor-1260, with frequencies of detection of two of 11 samples, and both were encountered in the 3- to 5-foot depth range. The PRGs were exceeded at one location (16SB03, sample 16-B-03-03). However, the maximum concentrations of Aroclor-1254 (1,000 µg/kg) and Aroclor-1260 (320 µg/kg) in this sample were less than one order of magnitude greater than the PRG.

Herbicides, organophosphorus pesticides, and explosives constituents were not detected in subsurface soil samples from SWMU 16.

Various inorganic contaminants were detected in subsurface soil at SWMU 16. Arsenic (34 mg/kg), chromium (132 mg/kg), iron (76,000 mg/kg) and vanadium (108 mg/kg) were detected at concentrations

greater than both facility background levels and the Region 9 PRGs. Each was detected in a least 10 of the 11 samples analyzed. The maximum concentrations of arsenic, vanadium, and chromium were detected at location 16SB01 (5 to 7 feet bgs), 16SB01 (3 to 5 feet bgs), and 16SB03 (3 to 5 feet bgs), respectively. There were several locations where arsenic and chromium PRGs were exceeded. For arsenic, the maximum concentration exceeded the facility background concentration (9.45 mg/kg) by less than one order of magnitude but was approximately two orders of magnitude greater than the stringent PRG (0.39 mg/kg). For chromium, the maximum concentration exceeded the PRG and facility background concentration (30 and 42.9 mg/kg, respectively) by less than one order of magnitude. The maximum detected concentrations of iron and vanadium are within two times PRGs and near background concentrations. Furthermore, there was only one instance of a PRG exceedance for iron and vanadium. Other inorganics, including maximum concentrations of antimony (11 mg/kg), cadmium (17.3 mg/kg), copper (992 mg/kg), lead (398 mg/kg), magnesium (9640 mg/kg), potassium (5060 mg/kg), and sodium (15,700 mg/kg), were detected at levels more than one order of magnitude greater than facility background levels, and zinc (15,700 mg/kg) was detected at levels more than two times the facility background levels. However, the corresponding soil PRGs are not as stringent, and there were no exceedances. The maximum detection of zinc occurred at location 16SB04.

Cyanide was not detected in subsurface soil at SWMU 16.

4.1.3 SWMU 17 Surface Soil

Summary statistics for surface soil samples (i.e., 0 to 1 foot bgs) at SWMU 17 are provided in Table 4-4, and positive detections for each sample are provided in Appendix E-1. Exceedances of Region 9 PRGs and facility background concentrations are shown on the Figure 4-3 tag map. An enlargement of the SWMU 17 depression area is shown on Figure 4-3A.

Surface soil samples were collected from 29 of 34 soil borings (17SB01 through 17SB29) at SWMU 17. The soil borings were generally located in a grid pattern across the site, extending past the site perimeter and placed to address geophysical survey anomalies and field observations such as the presence of empty drums at the ground surface. Several of the soil borings were placed in a depression area where dumping of drums was suspected based on elevated soil and groundwater concentrations in that area.

Trichloroethene (TCE) was the only VOC detected in SWMU 17 surface soil samples at concentrations exceeding PRGs. The maximum TCE concentration (3,200 µg/kg) was approximately two orders of magnitude greater than the current PRG (53 µg/kg). However, the frequency of detection was low, four of 29 samples. The location of the maximum detection (17SB17) is in the midst of the depression area, which could explain the elevated concentration in surface soil at that location. However, because other surface soil sample results for sample locations within the depression area did not exceed the TCE PRG,

much of the TCE contamination may have volatilized in the years elapsed since site operations ceased. The only other TCE PRG exceedance was nominal and occurred at 17SB14 located north of the depression area. Other VOCs detected in the SWMU 17 surface soils were reported at concentrations significantly less than their respective PRGs.

SVOCs detected in surface soil included phthalates, PAHs, 4-methylphenol, benzaldehyde, and dibenzofuran. The maximum concentrations of several SVOCs exceeded their respective PRGs, including benzo(a)anthracene (1,000 µg/kg), benzo(a)pyrene (740 µg/kg), benzo(b)fluoranthene (1,100 µg/kg), and dibenzo(a,h)anthracene (130 µg/kg). The maximum concentrations did not exceed their respective PRGs by more than one order of magnitude. Each contaminant with a PRG exceedance had frequencies of detection between two and five of 19 samples, and the maximum detection for each was located at 17SB02 to the far north and outside of the SWMU boundary. The only other location with PRG exceedances of these contaminants was 17SB11 on the western side of the SWMU.

Three PCBs were detected in surface soil samples at SWMU 17, all with at least one exceedance of their respective PRG. Aroclor-1254 had the highest detection (870 µg/kg), followed by Aroclor-1248 (570 µg/kg) and Aroclor-1260 (350 µg/kg). Aroclor-1254 was found at four of the locations, while Aroclor-1248 and Aroclor-1260 were detected at one and two of 19 sample locations, respectively. All three of the maximum detections were found at 17SB11, located in a low-lying area toward the western side of the SWMU and east of Wilkinson Way that is frequently inundated with rainfall.

Numerous pesticides were detected in surface soil although none at concentrations exceeding PRGs. The locations of maximum concentrations were scattered and the frequencies of detection varied from one to eight of 11 samples. Furthermore, pesticides for insect control were used historically and are presently used at the site.

Herbicides, organophosphorus pesticides, and explosives constituents were not detected in surface soil at SWMU 17.

Of the inorganics detected in surface soil, four exceeded both facility background concentrations and PRGs including maximum concentrations of antimony (31.4 mg/kg), arsenic (11.5 mg/kg), chromium (392 mg/kg), and lead (670 mg/kg). The maximum detection of antimony only nominally exceeded its PRG (31 mg/kg), and the maximum detection of arsenic only nominally exceeded its background concentration (9.45 mg/kg). The maximum detections of chromium and lead were at 17SB11 and 17SB12, respectively, located in the low-lying area toward the western side of the SWMU and east of Wilkinson Way. These two locations represented the only area of significant exceedances of chromium and lead; however, PRG exceedances were within one order of magnitude of the PRGs. Other inorganics were detected at levels exceeding the facility background; however, they were not found in excess of their

respective PRGs. Of these inorganics, maximum concentrations of cadmium (12.5 mg/kg), manganese (378 mg/kg), and nickel (348 mg/kg) exceeded facility background by one order of magnitude, and maximum concentrations of copper (1,930 mg/kg) and zinc (1,510 mg/kg) exceeded facility background by approximately two orders of magnitude. The maximum detections copper and zinc were at aforementioned locations 17SB12 and 17SB11.

Cyanide was not detected in surface soil at SWMU 17.

4.1.4 SWMU 17 Subsurface Soil

Summary statistics for subsurface soil samples (i.e., greater than 1 foot bgs) at SWMU 17 are provided in Table 4-5, and positive detections for each sample are provided in Appendix E-2. Exceedances of Region 9 PRGs and facility background concentrations are shown on the Figure 4-3 tag map. An enlargement of the SWMU 17 depression area is shown on Figure 4-3A.

Subsurface soil samples were collected from 34 soil borings at SWMU 17. Of the 34 soil borings, 32 (17SB01 through 17SB32, with up to three subsurface soil samples per boring) were generally located in a grid pattern across the site, extending past the site perimeter and placed to address geophysical survey anomalies and field observations such as the presence of empty drums at the ground surface. Several of the soil borings were placed in a depression area where dumping of drums was suspected because of elevated soil and groundwater concentrations in that area. In addition, two borings (17MIP27-TW36 and 17MW17I) were installed to investigate unsaturated soil contamination suggested by electron capture detector (ECD) readings during drilling in support of the groundwater investigation.

Three VOCs, carbon tetrachloride (5,200 µg/kg), chloroform (9,100 µg/kg), and TCE (910,000 µg/kg), were detected in the subsurface soil at maximum concentrations greater than PRGs. Carbon tetrachloride and chloroform exceeded their respective PRGs at only one boring location and by more than one order of magnitude. Maximum concentrations were detected at sample location 17SB14, near a rusted 55-gallon drum and within a strong anomaly reported by the geophysical survey. The maximum TCE concentration exceeded its PRG by more than four orders of magnitude and was detected at soil boring location 17SB17 in the center of the depression area. The most elevated concentrations at both borings 17SB14 and 17SB17 were reported for samples from the 3- to 5-foot depth interval. Numerous other exceedances of the TCE PRG occurred within the depression area. In addition, there were TCE PRG exceedances north and east of the depression area. Considering the shallow groundwater table elevation, these exceedances should be assessed with caution when identifying potential source area soils because the contamination instead may be attributable to the underlying highly contaminated groundwater plume. Numerous other chlorinated aliphatics and substituted benzene compounds were

also present, primarily at the depression area, but were detected at concentrations less than their respective PRGs.

All SVOCs in subsurface soil at SWMU 17 were detected at levels less than PRGs.

Similarly, several pesticides and PCBs were detected in subsurface soil but at concentrations less than PRGs. The locations of maximum concentrations were scattered, and the frequencies of detections varied from one to eight of 62 samples. Furthermore, pesticides for insect control were used historically and are presently used at the site.

Herbicides and organophosphorus pesticides were not detected in subsurface soil at SWMU 17.

Explosives constituents including 2,4-dinitrotoluene (DNT) and 2,4,6-trinitrotoluene (TNT) were detected in only one subsurface soil sample collected from boring location 17SB08 (the 1- to 3-foot depth interval). The concentrations were low (less than 1 mg/kg) and significantly less than their respective PRGs. Soil boring 17SB08 is located north of the site.

Of the inorganics detected in subsurface soil, arsenic and chromium were present at concentrations (13.2 and 62.7 mg/kg, respectively) greater than their respective background concentrations and PRGs, although the exceedances were nominal considering the maximum detections were the same order of magnitude as background levels. The elevated concentrations of lead and chromium encountered in the surface soil were restricted to surface soil and did not extend vertically to any appreciable extent. The other inorganics were detected at scattered sampling locations, most in the depression area or within several feet of Wilkinson Way. Other inorganics were detected at levels exceeding facility background levels; however, they were not found in excess of their respective PRGs. Of these inorganics, maximum concentrations of aluminum (52,500 mg/kg), barium (359 mg/kg), beryllium (1.1 mg/kg), cadmium (0.56 mg/kg), cobalt (5.9 mg/kg), copper (39.7 mg/kg), lead (77.1 mg/kg), magnesium (3,900 mg/kg), manganese (71.5 mg/kg), nickel (16 mg/kg), potassium (1,270 mg/kg), sodium (981 mg/kg), and vanadium (68.9 mg/kg) exceeded facility background levels although generally by less than one order of magnitude. However, zinc (1,240 mg/kg) was found at a concentration 50 times greater than its background level (although still less than its PRG) at location 17SB14 north of the depression area.

Cyanide was detected in subsurface soil at SWMU 17 albeit at low concentrations significantly less than its PRG.

4.2 GROUNDWATER

4.2.1 SWMU 16 Groundwater

Summary statistics for groundwater samples at SWMU 16 (2005 data) are provided in Table 4-6, and positive detections for each sample are provided in Appendix E-3 (both 2001 and 2005 data). For the most recent round of data (2005), exceedances of federal MCLs and facility background concentrations are shown on the Figure 4-4 tag map.

Five permanent monitoring wells were installed and sampled during the SWMU 16 RFI. Additionally, monitoring well 17MW01 serves as the upgradient location for both SWMUs 16 and 17. The wells intercept groundwater flowing to Goose Creek and were placed as far outward as site conditions allowed to serve as perimeter wells. Considering that SWMU 16 was an industrial landfill, it would be difficult to adequately characterize its contents with certainty. Moreover, additional temporary wells and permanent monitoring wells were to be installed in and around the suspected former trench locations and the waste oil tank area. Unfortunately, the work was not conducted; clearance for drilling was not granted because the readings from the magnetometer used for UXO clearance indicated the potential presence of buried metal (possible ordnance). Therefore, this section discusses results from available samples but is otherwise incomplete. As further discussed for SWMU 17 groundwater (Section 4.2.2), at least some contamination, in particular tetrachloroethene (PCE) and TCE, has migrated from SWMU 16 to SWMU 17. The contaminant source appears to be the suspected former waste disposal trenches located immediately west of SWMU 17.

The only VOC detected in the groundwater at SWMU 16 was TCE (32 µg/L), and it exceeded its MCL of 5 µg/L. It was found at one location, 16MW02S, which is located in the northern portion of the site.

BEHP and di-n-butyl phthalate were the only SVOCs detected in groundwater. Only the maximum concentration of BEHP (11 µg/L, monitoring well 16MW04S) exceeded the SDWA MCL (6 µg/L). Monitoring well 16MW04S is located near the southern boundary of the site. The maximum BEHP concentration reported for soil samples collected at SWMU 16 exceeded 6,000 mg/kg.

Herbicides, pesticides, and PCBs were not detected in groundwater at SWMU 16.

Inorganics detected in groundwater were relatively close to or less than their respective background concentrations. Exceptions (magnesium, potassium, and sodium) were of little consequence and may reflect surface water intrusion into the shallow groundwater. Inorganics were not detected in SWMU 16 groundwater samples at concentrations exceeding SDWA MCLs.

Cyanide was not detected in groundwater at SWMU 16.

Groundwater data were collected from the five SWMU 16 permanent monitoring wells first in October 2001 and again in 2005. Correlations and trends in groundwater concentrations were not evident as shown in Table 4-7. The most significant observation is that exceedances of MCLs for TCE (16MW02S) and BEHP (16MW04S) in 2005 represent an increase from the non-detect concentrations of 2001.

4.2.2 SWMU 17 Groundwater

Summary statistics for groundwater samples at SWMU 17 (2005 data) are provided in Table 4-8, and positive detections for each sample are provided in Appendix E-3 (both 2001 and 2005 data). For the most recent round of data (2005), exceedances of federal MCLs and facility background concentrations are shown on the Figure 4-4 tag map.

Numerous VOCs were detected in groundwater at SWMU 17 at concentrations greater than federal MCLs (or tap water PRGs where MCLs were not available) or facility background levels. The RFI was able to bound the southern plume as shown in the isoconcentration contouring of Figure 4-5. Results from select groundwater samples collected by Solutions-IES are included in the evaluation. Specifically, those samples collected before the injection as a baseline are useable, as are samples collected outside of the treatment area. Samples within the treatment area are not reflective of natural conditions since they have been compromised by injection of emulsified oil and concentrations have changed from baseline conditions.

TCE was detected more frequently (62 detections in 104 samples analyzed) and at higher concentrations than any other VOC found in the groundwater samples. The maximum detection (130,000 µg/L) exceeded the SDWA MCL (5 µg/L) by more than four orders of magnitude and was reported for monitoring well 17MW07S installed immediately downgradient of the depression area. The next highest VOC detections were cis-1,2-dichloroethene (DCE) (2,500 µg/L compared to the MCL of 70 µg/L) and chloroform (770 µg/L compared to the MCL of 80 µg/L) reported for samples from wells 17MW06S and 17MW07S, respectively, also installed immediately downgradient of the depression area. The depression area is the apparent source of the VOC plume. Vertical profiles of the plume emanating from the depression area are provided in Figure 4-6. Cross section E-E' (Figure 3-7) is parallel to the path of the plume from west to east, and cross section C-C' (Figure 3-6) is perpendicular to the path of the plume from south to north (the cross section location map is provided in Figure 2-4).

Another VOC plume of lesser concentration is evident further to the north, and the former trench area at SWMU 16 is the apparent source. The primary contaminants in this plume were PCE (maximum concentration of 330 µg/L compared to the MCL of 5 µg/L) at location 17MW22S and its degradation

product TCE (maximum concentration of 180 µg/L at location 17TW28). 1,1,2-Trichlorotrifluoroethane (maximum concentration of 2,500 µg/L at location 17TW28) was also detected at notable concentrations; however, an MCL is not available for this contaminant, and the USEPA Region 9 screening value for tap water (59,000 µg/L) is not stringent compared to the MCLs published for TCE and PCE. The RFI was able to bound the downgradient area of the plume as shown in the isoconcentration contours of Figure 4-5. However, the upgradient area of the plume could not be established because additional temporary wells and permanent monitoring wells planned in and around the suspected former trench locations and the waste oil tank area were not installed due to UXO concerns. Therefore, this section discusses results from available samples but is otherwise incomplete in that concentrations could be more elevated closer to the source area(s) had it been investigated. Vertical profiles of the northern plume, emanating from SWMU 16, are provided in Figures 4-7 and 4-8. Cross sections F-F' and G-G' (Figure 3-8) are parallel to the path of the plume from west to east, and cross section B-B' (Figure 3-6) is perpendicular to the path of the plume from south to north (the cross section location map is provided in Figure 2-4).

Other VOCs detected at levels greater than MCLs included 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane (TCA), 1,1-dichloroethene, 1,2-dichloroethane (DCA), benzene, carbon tetrachloride, methylene chloride, and vinyl chloride. All VOCs greater than 1 µg/L are encompassed by the total VOC isoconcentration contour of Figure 4-5.

Four SVOCs were detected in groundwater, including three phthalates and one low-level detection of caprolactam (5 µg/L). The only SVOC to exceed its MCL (or tap water PRG where MCLs were not available) was BEHP (maximum concentration of 54 µg/L compared to the MCL of 6 µg/L). BEHP was detected infrequently, 3 of 42 samples, with the maximum detection at location 17MW14S, well northeast of the SWMU 17 site boundary. BEHP, a common blank contaminant, was detected at concentrations up to 23 µg/L in field blanks and up to 10 µg/L in rinsate blanks.

One explosives constituent, RDX, was detected in 2 of 43 groundwater samples at a maximum concentration of 2.1 µg/L. An MCL for RDX does not exist; however, the maximum site concentration does exceed the USEPA Region 9 screening PRG value for tap water (0.61 µg/L) albeit by less than one order of magnitude. RDX was detected in samples from monitoring well 17MW05S (location of the maximum detection) and from monitoring well 17MW07S; both wells are located immediately downgradient of the depression area.

Herbicides, pesticides, and PCBs were not detected in groundwater at SWMU 17.

Two inorganics, arsenic and beryllium, were detected at maximum concentrations (22.7 and 43.6 µg/L, respectively) exceeding their respective MCLs (10 µg/L and 4 µg/L). These two inorganics were frequently detected (11 and 14 detections for 43 samples, respectively), and the exceedances of MCLs

were, for the most part, reported for samples from monitoring wells installed in the marshy area well beyond the eastern site boundary. Two other inorganics, cobalt and manganese, should be noted because, although MCLs do not exist for these metals, the maximum site concentrations (988 and 4850 µg/L, respectively) exceed the USEPA Region 9 PRG for tap water albeit by less than one order of magnitude. The maximum detections of these metals were also reported for samples from wells in the eastern marshy area (locations 17MW14S and 17MW17S).

Cyanide was not detected in groundwater at SWMU 17.

Groundwater data were collected from the four of the SWMU 17 permanent monitoring wells (17MW01 through 17MW04S) first in October 2001 and again in 2005. Correlations and trends in groundwater concentrations are shown in Table 4-9. The most significant observation is that PCE concentrations reported for samples from wells 17MW02S and 17MW03S decreased significantly over time. In contrast, an increase in concentrations of inorganics was observed in groundwater samples collected from well 7MW04S from 2001 to 2005; the increases generally correlated with an increase in sample salinity and consequently may be related to differences in fresh water versus salt water rather than to changes in site contamination levels.

A review of analytical data for samples from 10 locations where temporary and permanent monitoring wells were co-located indicates that VOC concentrations reported for temporary monitoring well samples generally exceed VOC concentrations reported for permanent monitoring well samples (Table 4-10). Each permanent well screen was 10 feet in length whereas the temporary well screens were shorter, ranging from 4 to 5 feet. The temporary wells were screened at the most highly contaminated interval identified by the MIP logs. As a result, the temporary wells targeted the more contaminated depths more precisely and therefore VOC concentrations in temporary wells exceeded VOC concentrations in permanent monitoring wells. An exception to this trend was noted for permanent well location 17MIP48-TW57-MW20S, where groundwater concentrations were greater than or equal to those from the co-located temporary well. Also, 1,1,2-trichlorotrifluoroethane was present in groundwater from the permanent well at location 17MIP29-TW38-MW12S, at a concentration of 25.5 µg/L, but was nondetect in groundwater from the co-located temporary well. These results indicate that the maximum contamination is outside, either above or below, of the screened interval of the smaller temporary well.

The delineation of the VOC plumes was aided by an innovative screening technique, tree coring, conducted by the United States Geological Survey (USGS) and NAVFAC EFD SOUTH in September 2002. The tree coring investigation was limited to areas with trees of substance (larger than saplings) and so did not completely define the plumes, although the results did confirm existing groundwater RFI data at the time and further refined plume boundaries. Using the tree coring information in hand, the latter phases of the groundwater investigation were planned. The resulting groundwater data collected

correlated well with the tree coring screening results for PCE, TCE, and cis-1,2-DCE. Results are summarized in Table 4-11 and illustrated on Figure 4-9. Note that larger circles on Figure 4-9 correlate with more elevated concentrations quantified on Table 4-11 and, if more than one contaminant is present, the circles are apportioned by color accordingly. An anomaly occurred at Tree 102, where concentrations were much less than expected when compared with the groundwater concentration from the nearest corresponding MIP point (17MIP20). Of note, Tree 2 located nearby does correlate with this MIP point. It was speculated that, because 17MIP20 is on the edge of the plume, the side of the tree selected for coring may have been an important factor. Additional collection of samples on all four sides of the tree should be collected to further investigate the anomaly for tree coring research purposes; otherwise, the tree coring screening results were superseded by actual groundwater data and so the anomaly is not a data gap for the SWMU 17 groundwater investigation.

Because there were data gaps for the tree coring effort where there trees were not present, another innovative screening technique for VOCs, Color-Tec, was implemented by TtNUS in April 2003. Color-Tec is an experimental, field-based analytical method for low-level detection of chlorinated solvents. Results, presented in Table 4-12, generally showed good correlation with groundwater data and so the Color-Tec method was successful in guiding the subsequent phase of groundwater investigation.

4.3 SURFACE WATER

4.3.1 SWMU 16 Surface Water

Summary statistics for surface water samples at SWMU 16 are provided in Table 4-13, and positive detections for each sample are provided in Appendix E-5. Exceedances of federal MCLs and facility background concentrations are shown on the Figure 4-4 tag map. Six surface water samples were collected from tributaries leading to Goose Creek, and the seventh was an upgradient sample collected from a culvert north of the site. Because this sample location is downstream from SWMU 18, it may not be representative of overall local conditions for SWMU 16 and SWMU 17.

PCE (0.7 µg/L) and isobutanol were the only VOCs detected in surface water. Each was detected in infrequently (1 of 7 samples), and MCLs were not exceeded in either instance.

No SVOCs, pesticides, PCBs, or herbicides were detected in surface water at SWMU 16.

The explosives constituents 2,4-DNT, 2,6-DNT, and 2,4,6-TNT were each detected once in SWMU 16 surface water samples at maximum concentrations not exceeding 1 µg/L. The DNT isomers were detected at upgradient location 16SW01, and TNT was detected at location 16SW07 near Goose Creek. The maximum concentrations were significantly less than their respective PRGs for tap water.

Antimony (maximum concentration of 11.8 µg/L) was the only inorganic detected at levels exceeding both MCLs (or tap water PRGs where MCLs were not available) and facility background; the MCL for antimony is 6 µg/L. Other inorganics were detected at levels exceeding facility background levels; however, they were not detected in excess of their respective MCLs (or tap water PRGs where MCLs were not available). Of these inorganics, maximum concentrations of arsenic (4.5 µg/L), copper (12.8 µg/L), magnesium (512,000 µg/L), mercury (0.09 µg/L), potassium (160,000 µg/L), silver (1.2 µg/L), and sodium (4,270,000 µg/L) exceeded facility background levels, although generally by one order of magnitude or less.

Cyanide was not detected in surface water at SWMU 16.

4.3.2 SWMU 17 Surface Water

Summary statistics for surface water samples at SWMU 17 are provided in Table 4-14, and positive detections for each sample are provided in Appendix E-5. Exceedances of federal MCLs and facility background concentrations are shown on the Figure 4-4 tag map. One surface water sample was collected from the marshy area east (and downgradient) of the site.

No VOCs, SVOCs, pesticides, or PCBs were detected.

No inorganics were detected at levels exceeding available MCLs (or tap water PRGs where MCLs were not available). Some inorganics were detected at levels exceeding facility background levels. Of these inorganics, maximum concentrations of antimony (5.5 µg/), magnesium (488,000 µg/L), potassium (143,000 µg/L), silver (1.3 µg/L), and sodium (4,100,000 µg/L) exceeded facility background levels, generally by one order of magnitude or less.

Cyanide was not detected in surface water at SWMU 17.

4.4 SEDIMENT

4.4.1 SWMU 16 Sediment

Summary statistics for sediment samples at SWMU 16 are provided in Table 4-15, and positive detections for each sample are provided in Appendix E-6. Exceedances of Region 9 PRGs and facility background concentrations are shown on the Figure 4-2 tag map. Seven sediment samples, co-located with surface water samples, were collected.

Carbon disulfide was the only VOC detected in sediment samples, and the maximum concentration was significantly less than its PRG.

SVOCs detected in sediment included numerous PAHs; two exceeded their respective PRGs. The maximum concentrations of benzo(a)pyrene (160 µg/kg) and benzo(b)fluoranthene (1,100 µg/kg) were reported for locations 16SW/SD03 and 16SW/SD02, respectively. Both locations are near the northwestern boundary of SWMU 16. The maximum concentrations exceeded PRGs by less than one order of magnitude. Frequencies of detection were seven and eight of 11 samples, respectively, and the locations were scattered.

Several pesticides and PCBs were detected in sediment, but concentrations did not exceed their respective PRGs.

Explosives constituents, herbicides, and organophosphorus pesticides were not detected in sediment samples from SWMU 16.

Maximum concentrations of three inorganics, arsenic (20.6 mg/kg), chromium (71.6 mg/kg), and vanadium (79.4J mg/kg) exceeded both facility background levels and associated PRGs. However, the PRGs were exceeded by less than one order of magnitude. The maximum concentration of arsenic was reported at location 16SD05, and the maximum concentrations of chromium (71.6 mg/kg) and vanadium (79.4 mg/kg) were reported at location 16SW/SD04. Various other inorganics exceeded facility background concentrations but only by one order of magnitude or less; maximum concentrations did not exceed respective PRGs. These inorganics (maximum concentrations) included aluminum (45,100 mg/kg), beryllium (1.8 mg/kg), cobalt (14.1 mg/kg), copper (100 mg/kg), lead (46.5 mg/kg), magnesium (7,960 mg/kg), manganese (234 mg/kg), mercury (0.29 mg/kg), nickel (29.1 mg/kg), potassium (3,980 mg/kg), vanadium (79.4 mg/kg), and zinc (158 mg/kg). The maximum concentration of sodium (18,500 mg/kg) exceeded its facility background concentration by several orders of magnitude, which is not unexpected considering the saline nature of Goose Creek.

Cyanide was not detected in sediment at SWMU 16.

4.4.2 SWMU 17 Sediment

Summary statistics for sediment samples at SWMU 17 are provided in Table 4-16, and positive detections for each sample are provided in Appendix E-6. Exceedances of Region 9 PRGs and facility background concentrations are shown on the Figure 4-3 tag map. One sediment sample, co-located with a surface water sample, was collected.

Carbon disulfide was the only VOC detected in the sediment sample; the concentration was significantly less than its PRG.

SVOCs were not detected in sediment samples from SWMU 17.

Three pesticides, 4,4-DDE, endosulfan sulfate, and heptachlor, were detected in sediment; maximum concentrations of all were significantly less than respective PRGs.

Explosives constituents and PCBs were not detected in sediment.

No inorganics were detected in exceedance of both facility background levels and associated PRGs. Some inorganics exceeded facility background concentrations but only by one order of magnitude or less and did not exceed their respective PRGs. These inorganics include aluminum (20,900 mg/kg), beryllium (1.3 mg/kg), cobalt (10.5 mg/kg), copper (18.4 mg/kg), lead (35.2 mg/kg), magnesium (5,070 mg/kg), manganese (256 mg/kg), mercury (0.39 mg/kg), potassium (2,480 mg/kg), and zinc (73.4 mg/kg). Sodium (18,500 mg/kg) exceeded its facility background concentration by almost two orders of magnitude, which is not unexpected considering the saline nature of Goose Creek and its tributaries.

Cyanide was not detected in sediment at SWMU 17.

4.5 SUMMARY

4.5.1 SWMUs 16 and 17 Surface and Subsurface Soil

SWMU 16 was a landfill containing industrial waste, and SWMU 17 was likely subjected to the sporadic draining of drums. Specifically for soil samples, this leads to variability in types and concentrations of contaminants and locations of detections and also leads to uncertainties in the evaluation of sample analytical results. Although many of the detections were erratic and relatively low level compared to screening criteria (generally one order of magnitude or less), four source areas of more elevated contamination were identified as follows:

- At SWMU 16 (surface soil sample location 16SS02), there is a debris area with elevated levels of PCBs, phthalates and inorganics (primarily lead and chromium). This area can be considered a "hot spot" with exceedances more than two orders of magnitude in excess of PRGs. Subsurface samples could not be collected in this area because of UXO clearance issues.

- At SWMU 17, the center of the depression area (soil boring 17SB17) was contaminated primarily with TCE. This area can be considered a "hot spot" with PRG exceedances of more than two orders of

magnitude in surface soil and more than four orders of magnitude in subsurface soil. Also, corresponding TCE impacts to groundwater from this source area are evident.

- At SWMU 17, north of the depression area (location 17SB14), an area near an empty rusted drum had subsurface soil concentrations of carbon tetrachloride and chloroform in excess of their respective PRGs by more than one order of magnitude. These two VOCs have several exceedances throughout SWMU 17, although the maximum detections do not correlate with the drum location so additional source areas are likely.

- At SWMU 17, one final source location of lesser significance was identified in the unvegetated area (soil borings 17SB11 and 17SB12) near Wilkinson Way toward the western site boundary. Of most significance were lead, chromium, and PCB exceedances of PRGs and copper and zinc exceedances of facility background levels in surface soil. The contamination did not extend to subsurface soil or groundwater.

4.5.2 SWMUs 16 and 17 Groundwater

Groundwater results indicated chlorinated VOC plumes migrating outwardly from two source areas. One plume originates in the area of SWMU 16 where former landfill trenches were located, and another originates in the depression area of SWMU 17. Numerous VOCs were detected with concentrations radiating from the SWMU 17 depression areas; TCE was the primary groundwater contaminant. Vinyl chloride and 1,2-DCE were also detected at multiple locations in this area. The only SVOC exceedance of an SWDA MCL in groundwater was BEHP, which was also detected at elevated concentration in the debris area of SWMU 16. Several inorganics were detected at the sites; arsenic and beryllium were detected at levels exceeding federal MCLs at locations east of the SWMU 17 border. Data collected from permanent monitoring wells in 2001 compared to data collected in 2005 showed varied relationships. Several of the permanent wells displayed a decrease in concentrations of inorganics, while others increased dramatically. At SWMU 16, concentrations of VOCs (particularly TCE) increased, and at SWMU 17 concentrations were varied, with a large decrease in PCE.

4.5.3 SWMUs 16 and 17 Surface Water and Sediment

Several contaminants were detected in SWMU 16 surface water and sediment samples at concentrations exceeding screening levels established for this RFI. However, the exceedances were nominal (one order of magnitude or less), and there was no correlation between chemical concentrations in surface water versus sediment. Antimony was the only chemical detected in surface water at concentrations exceeding an SDWA MCL, yet there was no correlation of contaminants between surface water and groundwater. Benzo(a)pyrene, benzo(b)fluoranthene, arsenic, chromium, and vanadium were detected in SWMU 16

sediments at concentrations exceeding Region 9 PRGs. For groundwater, arsenic also exceeded criteria (MCL) but the exceedances were in the marshy area well beyond the SWMU 17 site boundary. SWMU 17 surface water and sediment samples had detections primarily limited to inorganics, and there were no exceedances of note.

TABLE 4-1

FACILITY BACKGROUND CONCENTRATION SUMMARY
HYDRIC SOIL, NONHYDRIC SOIL, AND GROUNDWATER
NWS CHARLESTON, SOUTH CAROLINA

Analyte	Background Concentration Hydric Soil	Background Concentration Nonhydric Soil	Background Concentration Groundwater
Polynuclear Aromatic Hydrocarbons (µg/kg for soil)/(µg/L for groundwater) [a]			
Anthracene	NA	253	NA
Benzo(a)anthracene	NA	430	NA
Benzo(a)pyrene	NA	480	NA
Benzo(b)fluoranthene	NA	600	NA
Benzo(g,h,i)perylene	NA	310	NA
Benzo(k)fluoranthene	NA	270	NA
Carbazole	NA	110	NA
Chrysene	NA	470	NA
Fluoranthene	NA	1300	NA
Fluorene	NA	55	NA
Indeno(1,2,3-cd)pyrene	NA	310	NA
Phenanthrene	NA	750	NA
Pyrene	NA	850	NA
Pesticides (µg/kg for soil)/(µg/L for groundwater) [a]			
4,4'-DDD	NA	100	NA
4,4'-DDE	21	72.7	NA
4,4'-DDT	NA	59.1	NA
Alpha-chlordane	NA	1880	NA
Dieldrin	NA	59.4	NA
Gamma-chlordane	NA	14.5	NA
Inorganics (mg/kg for soil)/(µg/L for groundwater) [b]			
Aluminum	16900	28900	1150000
Antimony	0.33	2.1	NA
Arsenic	9.45	14.2	4.4
Barium	64.5	63.2	300
Beryllium	0.58	1.00	2.3
Cadmium	0.12	0.05	1.5
Calcium	6120	2700	583000
Chromium	42.9	39.4	44.5
Cobalt	2.71	5.49	16
Copper	3.23	7.9	7
Iron	67900	37100	521000
Lead	15.5	45.0	19.0
Magnesium	746	1460	11700

TABLE 4-1

FACILITY BACKGROUND CONCENTRATION SUMMARY
HYDRIC SOIL, NONHYDRIC SOIL, AND GROUNDWATER
NWS CHARLESTON, SOUTH CAROLINA

Analyte	Background Concentration Hydric Soil	Background Concentration Nonhydric Soil	Background Concentration Groundwater
Manganese	25.1	83.2	2580
Mercury	0.21	0.06	NA
Nickel	12.1	5.0	24.7
Potassium	225	833	5200
Selenium	2.84	2.1	NA
Silver	3.20	0.22	NA
Sodium	370	618	208000
Thallium	1.63	0.3	5.3
Tin	3.5	NA	NA
Vanadium	66.3	63.9	78.8
Zinc	20.5	57.1	153
Cyanide	NA	2.28	NA

NA - Not applicable (either not detected or a facility background concentration is not proposed)

a Organic facility background concentrations are to be used only during the uncertainty analysis of either a human health risk assessment or an ecological risk assessment for a given site to aid in risk management decisions. They are not to be used for eliminating analytes during the development of chemicals of potential concern (COPCs). Similarly, they can be considered in conducting Interim Measures (IMs) or in developing Remedial Goal Objectives (RGOs) during the Corrective Measures Study (CMS) process, provided that the analytes are expected to be present based on site conditions (e.g., roadways, routine pesticide application).

b Inorganic facility background concentrations can be used for eliminating analytes during the development of COPCs for the human health risk assessment but not for the ecological risk assessment for a given site. They can also be used for confirmation purposes for Interim Measures (IMs) remediation efforts. Additionally, they can be considered in establishing Preliminary Remediation Goals (PRGs) during preparation of the Corrective Measures Study (CMS) process.

TABLE 4-2

SWMU 16 SURFACE SOIL SUMMARY STATISTICS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Detection	Maximum Detection	Sample Number of Maximum Detection	Sample Location of Maximum Detection	Soil Facility Background Concentration[1]	Soil Region 9 PRG[2]
Volatile Organics (ug/kg)							
ACETONE	2/4	1,300 J	1,700 J	16-S-04-00	16SS04	NA	14,000,000
Semivolatile Organics (ug/kg)							
BENZALDEHYDE	2/4	450	460	16-S-03-00	16SS03	NA	6,100,000
BIS(2-ETHYLHEXYL)PHTHALATE	3/4	240 J	6,100,000	16-S-02-00-D	16SS02	NA	35,000
BUTYL BENZYL PHTHALATE	1/4	9,400	16,000	16-S-02-00-D	16SS02	NA	12,000,000
DIETHYL PHTHALATE	1/4	870 J	1,900 J	16-S-02-00-D	16SS02	NA	49,000,000
DI-N-BUTYL PHTHALATE	1/4	14,000	26,000	16-S-02-00-D	16SS02	NA	6,100,000
DI-N-OCTYL PHTHALATE	1/4	34,000 J	70,000 J	16-S-02-00-D	16SS02	NA	2,400,000
Pesticides/PCBs (ug/kg)							
4,4'-DDD	1/4	1.4 J	1.4 J	16-S-03-00	16SS03	NA	2,400
4,4'-DDE	2/4	3.1 J	4.6	16-S-04-00	16SS04	21	1,700
4,4'-DDT	1/4	4.8	4.8	16-S-04-00	16SS04	NA	1,700
AROCLOR-1254	1/4	40,000	59,000	16-S-02-00	16SS02	NA	220
Inorganics (mg/kg)							
ALUMINUM	4/4	3030	14,200	16-S-01-00	16SS01	16,900	76000
ANTIMONY	1/4	98.3	122	16-S-02-00-D	16SS02	0.33	31
ARSENIC	4/4	1.1	3.9	16-S-01-00 16-S-04-00 16-S-03-00	16SS01 16SS04 16SS03	9.45	0.39
BARIUM	4/4	13.5	207	16-S-02-00-D	16SS02	64.5	5,400
CADMIUM	3/4	0.16	60.7	16-S-02-00	16SS02	0.12	37
CALCIUM	4/4	274	1,440	16-S-02-00	16SS02	3,120	NA
CHROMIUM	4/4	11	667	16-S-02-00-D	16SS02	42.9	30
COBALT	3/4	0.52	1.1	16-S-01-00	16SS01	2.71	900
COPPER	4/4	2.4	58.1	16-S-02-00-D	16SS02	3.23	3,100
IRON	4/4	1,520 J	15,800 J	16-S-01-00	16SS01	67,900	23,000
LEAD	4/4	7.8	12,400	16-S-02-00-D	16SS02	15.5	400
MAGNESIUM	4/4	626	1,230	16-S-01-00	16SS01	746	NA
MANGANESE	4/4	9.4	41.4 J	16-S-04-00	16SS04	25.1	1,800
MERCURY	4/4	0.02	0.11	16-S-02-00-D	16SS02	0.21	23
NICKEL	4/4	1.6	4.7	16-S-04-00	16SS04	12.1	1,600
POTASSIUM	4/4	236	641	16-S-01-00	16SS01	225	NA
SELENIUM	2/4	0.67	0.69	16-S-04-00	16SS04	2.84	390
SODIUM	4/4	1,590	4,160	16-S-01-00	16SS01	370	NA
VANADIUM	4/4	3.8	34.1	16-S-01-00	16SS01	66.3	78
ZINC	4/4	5.4	157	16-S-02-00	16SS02	20.5	23,000
Miscellaneous Parameters (mg/kg)							
TOTAL ORGANIC CARBON	2/2	19,000	25,000	16-S-04-00	16SS04	NA	NA
TOTAL SOLIDS	4/4	43	84	16-S-01-00	16SS01	NA	NA

J = Estimated
NA = Not applicable (either not detected or a facility background concentration is not available).

1. NWS Charleston Facility Baseline Background Report for hydric soil (TtNUS, March 2002).
2. Region 9 Preliminary Remediation Goals (PRGs) for residential soil, (USEPA, 2004).

For duplicates, frequency of detection considers the average concentration of a sample and its duplicate while location of maximum concentration considers a sample and its duplicate as separate samples.

Associated Samples:
16-S-01-00,NORMAL
16-S-02-00,DUP
16-S-02-00,AVG
16-S-02-00-D,DUP
16-S-03-00,NORMAL
16-S-04-00,NORMAL

TABLE 4-3

SWMU 16 SUBSURFACE SOIL SUMMARY STATISTICS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Detection	Maximum Detection	Sample Number of Maximum Detection	Sample Location of Maximum Detection	Soil Facility Background Concentration[1]	Soil Region 9 PRG[2]
Volatile Organics (ug/kg)							
2-BUTANONE	1/11	4 J	4 J	16-B-03-01-D	16SB03	NA	22,000,000
ACETONE	2/11	100 J	120 J	16-B-04-03-D	16SB04	NA	14,000,000
CARBON DISULFIDE	4/11	1 J	50	16-B-02-05	16SB02	NA	360,000
DICHLORODIFLUOROMETHANE	1/11	2 J	2 J	16-B-04-05	16SB04	NA	94,000
METHYL ACETATE	4/9	330	2,300 J	16-B-01-05	16SB01	NA	22,000,000
Semivolatile Organics (ug/kg)							
2-METHYLNAPHTHALENE	2/11	200 J	300 J	16-B-02-05	16SB02	NA	56,000
ACENAPHTHENE	2/11	300 J	1,200	16-B-02-05	16SB02	NA	3,700,000
ANTHRACENE	3/11	80 J	400 J	16-B-02-05	16SB02	NA	22,000,000
BENZO(A)ANTHRACENE	9/11	20 J	400 J	16-B-02-05 16-B-03-03	16SB02 16SB03	NA	620
BENZO(A)PYRENE	7/11	50 J	500 J	16-B-03-03	16SB03	NA	62
BENZO(B)FLUORANTHENE	8/11	60 J	700 J	16-B-03-03	16SB03	NA	620
BENZO(G,H,I)PERYLENE	6/11	30 J	300 J	16-B-03-03	16SB03	NA	2,300,000
BENZO(K)FLUORANTHENE	3/11	40 J	300 J	16-B-03-03	16SB03	NA	6,200
BIS(2-ETHYLHEXYL)PHTHALATE	4/11	500 J	900 J	16-B-03-03	16SB03	NA	35,000
CARBAZOLE	2/9	70 J	200 J	16-B-02-05	16SB02	NA	24,000
CHRYSENE	6/11	70 J	500 J	16-B-03-03	16SB03	NA	62,000
DI-N-BUTYL PHTHALATE	2/11	200 J	200 J	16-B-02-01	16SB02	NA	6,100,000
DI-N-BUTYL PHTHALATE	2/11	200 J	200 J	16-B-03-03	16SB03	NA	6,100,000
DI-N-OCTYL PHTHALATE	1/11	200 J	200 J	16-B-01-05	16SB01	NA	2,400,000
DIBENZOFURAN	2/11	100 J	500 J	16-B-02-05	16SB02	NA	150,000
FLUORANTHENE	8/11	80 J	2,000	16-B-02-05	16SB02	NA	2,300,000
FLUORENE	2/11	200 J	700 J	16-B-02-05	16SB02	NA	2,700,000
INDENO(1,2,3-CD)PYRENE	6/11	40 J	300 J	16-B-03-03	16SB03	NA	620
NAPHTHALENE	2/11	460	700 J	16-B-02-05	16SB02	NA	56,000
PHENANTHRENE	5/11	50 J	2,700	16-B-02-05	16SB02	NA	2,300,000
PYRENE	9/11	80 J	1,300	16-B-02-05	16SB02	NA	2,300,000
Pesticides/PCBs (ug/kg)							
4,4'-DDD	5/11	0.42 J	380	16-B-03-05	16SB03	NA	2,400
4,4'-DDE	6/11	0.14 J	29 J	16-B-03-03	16SB03	21	1,700
4,4'-DDT	5/11	0.17 J	220	16-B-03-03	16SB03	NA	1,700
ALPHA-BHC	2/11	0.7 J	3.3 J	16-B-02-05	16SB02	NA	90
ALPHA-CHLORDANE	1/11	1.5 J	1.5 J	16-B-02-01	16SB02	NA	1,600
AROCLOR-1254	2/11	66 J	1,000	16-B-03-03	16SB03	NA	220
AROCLOR-1260	2/11	36 J	320	16-B-03-03	16SB03	NA	220
ENDOSULFAN I	1/11	12 J	12 J	16-B-03-03	16SB03	NA	370,000
ENDOSULFAN II	1/11	2.5 J	2.5 J	16-B-03-03	16SB03	NA	370,000
ENDOSULFAN SULFATE	3/11	1.8 J	3.3 J	16-B-01-05	16SB01	NA	370,000
ENDRIN ALDEHYDE	1/11	4 J	4 J	16-B-03-03	16SB03	NA	18,000
ENDRIN KETONE	3/11	1.1 J	3.9 J	16-B-03-03	16SB03	NA	18,000
GAMMA-BHC (LINDANE)	1/11	2 J	2 J	16-B-04-05	16SB04	NA	440
GAMMA-CHLORDANE	2/11	0.14 J	11 J	16-B-03-03	16SB03	NA	1,600
HEPTACHLOR	1/11	0.58 J	0.58 J	16-B-02-01	16SB02	NA	110
HEPTACHLOR EPOXIDE	2/11	1.5 J	12 J	16-B-03-05	16SB03	NA	53
METHOXYCHLOR	1/11	2.9 J	2.9 J	16-B-04-03-D	16SB04	NA	310,000

TABLE 4-3

SWMU 16 SUBSURFACE SOIL SUMMARY STATISTICS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Detection	Maximum Detection	Sample Number of Maximum Detection	Sample Location of Maximum Detection	Soil Facility Background Concentration[1]	Soil Region 9 PRG[2]
Inorganics (mg/kg)							
ALUMINUM	11/11	8,820	55,800 J	16-B-01-03	16SB01	16,900	76,000
ANTIMONY	2/11	2.2	11	16-B-04-05	16SB04	0.33	31
ARSENIC	10/11	4.8	34 J	16-B-01-05	16SB01	9.45	0.39
BARIUM	11/11	20.4	580	16-B-04-05	16SB04	64.5	5,400
BERYLLIUM	9/11	0.32	2.4 J	16-B-01-03	16SB01	0.58	150
CADMIUM	2/11	1.1	17.3	16-B-04-05	16SB04	0.12	37
CALCIUM	11/11	632	15,900	16-B-02-01	16SB02	6120	NA
CHROMIUM	11/11	23.2	132	16-B-03-03	16SB03	42.9	30
COBALT	11/11	1.8	17	16-B-03-03	16SB03	2.71	900
COPPER	11/11	2	992	16-B-04-05	16SB04	3.23	3,100
IRON	11/11	10,900	76,000	16-B-04-05	16SB04	67,900	23,000
LEAD	11/11	6.4	398	16-B-04-05	16SB04	15.5	400
MAGNESIUM	11/11	1,540	9,640 J	16-B-01-05	16SB01	746	NA
MANGANESE	11/11	19.1	494	16-B-03-03	16SB03	25.1	1,800
MERCURY	11/11	0.02	0.32	16-B-04-05	16SB04	0.21	23
NICKEL	11/11	3.6	114	16-B-03-03	16SB03	12.1	1,600
POTASSIUM	11/11	530	5,060 J	16-B-01-05	16SB01	225	NA
SILVER	1/11	14.8	14.8	16-B-04-05	16SB04	3.2	390
SODIUM	11/11	1,010	15,700 J	16-B-01-05	16SB01	370	NA
THALLIUM	6/11	0.68	2.6	16-B-02-05	16SB02	1.63	5.2
VANADIUM	11/11	15.4	106 J	16-B-01-03	16SB01	66.3	78
ZINC	11/11	10.5	15700	16-B-04-05	16SB04	20.5	23,000

J = Estimated
NA = Not applicable (either not detected or a facility background concentration is not available).

1. NWS Charleston Facility Baseline Background Report for hydric soil (TtNUS, March 2002).
2. Region 9 Preliminary Remediation Goals (PRGs) for residential soil, (USEPA, 2004).

For duplicates, frequency of detection considers the average concentration of a sample and its duplicate while location of maximum concentration considers a sample and its duplicate as separate samples.

Associated Samples:
16-B-01-01,NORMAL
16-B-01-03,NORMAL
16-B-01-05,NORMAL
16-B-02-01,NORMAL
16-B-02-05,NORMAL
16-B-03-01,DUP
16-B-03-01,AVG
16-B-03-01-D,DUP
16-B-03-03,NORMAL
16-B-03-05,NORMAL
16-B-04-01,NORMAL
16-B-04-03,DUP
16-B-04-03,AVG
16-B-04-03-D,DUP
16-B-04-05,NORMAL

TABLE 4-4

SWMU 17 SURFACE SOIL SUMMARY STATISTICS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Detection	Maximum Detection	Sample Number of Maximum Detection	Sample Location of Maximum Detection	Soil Facility Background Concentration[1]	Soil Region 9 PRG[2]
Volatile Organics (ug/kg)							
2-BUTANONE	3/29	4 J	6 J	17-B-06-00	17SB06	NA	22,000,000
ACETONE	3/29	21 J	65	17-B-15-00-D	17SB15	NA	14,000,000
BROMOMETHANE	1/29	3 J	3 J	17-B-26-00	17SB26	NA	3,900
CHLOROETHANE	1/29	2 J	2 J	17-B-19-00	17SB19	NA	3,000
CHLOROFORM	2/29	3 J	23	17-B-14-00	17SB14	NA	220
METHYL ACETATE	1/27	16	16	17-B-07-00	17SB07	NA	22,000,000
METHYLENE CHLORIDE	4/29	11 J	14 J	17-B-26-00	17SB26	NA	9,100
STYRENE	1/29	2 J	2 J	17-B-06-00	17SB06	NA	1,700,000
TRICHLOROETHENE	4/29	5	3,200	17-B-17-00 17-B-17-00-D	17SB17	NA	53
TRICHLOROFLUOROMETHANE	10/29	6	47	17-B-26-00	17SB26	NA	390,000
CIS-1,2-DICHLOROETHENE	1/29	7	25	17-B-17-00	17SB17	NA	43,000
Semivolatile Organics (ug/kg)							
4-METHYLPHENOL	1/17	42 J	42 J	17-B-11-00	17SB11	NA	310,000
ACENAPHTHENE	1/19	170 J	170 J	17-B-02-00	17SB02	NA	3,700,000
ACENAPHTHYLENE	1/19	52 J	52 J	17-B-11-00	17SB11	NA	3,700,000
ANTHRACENE	2/19	66 J	450 J	17-B-02-00	17SB02	NA	22,000,000
BENZALDEHYDE	1/17	460	460	17-B-05-00	17SB05	NA	6,100,000
BENZO(A)ANTHRACENE	4/19	28 J	1,000 J	17-B-02-00	17SB02	NA	620
BENZO(A)PYRENE	4/19	20 J	740 J	17-B-02-00	17SB02	NA	62
BENZO(B)FLUORANTHENE	5/19	36 J	1,100 J	17-B-02-00	17SB02	NA	620
BENZO(G,H,I)PERYLENE	3/19	23 J	370 J	17-B-02-00	17SB02	NA	2,300,000
BENZO(K)FLUORANTHENE	3/19	33 J	340 J	17-B-02-00	17SB02	NA	6,200
BIS(2-ETHYLHEXYL)PHTHALATE	1/19	1,100 J	1,100 J	17-B-02-00	17SB02	NA	35,000
BUTYL BENZYL PHTHALATE	1/19	80 J	80 J	17-B-11-00	17SB11	NA	12,000,000
CARBAZOLE	1/17	450 J	450 J	17-B-02-00	17SB02	NA	24,000
CHRYSENE	4/19	26 J	910 J	17-B-02-00	17SB02	NA	62,000
DIBENZO(A,H)ANTHRACENE	2/19	90 J	130 J	17-B-02-00	17SB02	NA	62
DIBENZOFURAN	1/19	74 J	74 J	17-B-02-00	17SB02	NA	150,000
FLUORANTHENE	4/19	26 J	1,700 J	17-B-02-00	17SB02	NA	2,300,000
FLUORENE	1/19	170 J	170 J	17-B-02-00	17SB02	NA	2,700,000
INDENO(1,2,3-CD)PYRENE	3/19	23 J	410 J	17-B-02-00	17SB02	NA	620
NAPHTHALENE	1/19	92 J	92 J	17-B-02-00	17SB02	NA	56,000
PHENANTHRENE	3/19	19 J	1,400 J	17-B-02-00	17SB02	NA	2,300,000
PYRENE	5/19	41 J	1,700 J	17-B-02-00	17SB02	NA	2,300,000
Pesticides/PCBs (ug/kg)							
4,4'-DDD	2/18	3.6 J	37	17-B-12-00	17SB12	NA	2,400
4,4'-DDE	5/18	0.54 J	9.2	17-B-14-00	17SB14	21	1,700
4,4'-DDT	8/19	0.65 J	20	17-B-14-00	17SB14	NA	1,700
ALDRIN	1/19	2.2 J	2.2 J	17-B-12-00	17SB12	NA	29
ALPHA-CHLORDANE	1/19	0.55 J	0.55 J	17-B-07-00	17SB07	NA	1,600
AROCLOR-1248	1/19	570	570	17-B-11-00	17SB11	NA	220
AROCLOR-1254	4/19	5.1 J	870	17-B-11-00	17SB11	NA	220
AROCLOR-1260	2/19	170	350	17-B-11-00	17SB11	NA	220
ENDRIN ALDEHYDE	1/19	1.3 J	1.3 J	17-B-01-00	17SB01	NA	18,000
ENDRIN KETONE	4/18	0.26 J	5.4	17-B-12-00	17SB12	NA	18,000
HEPTACHLOR	2/19	0.48 J	2.6 J	17-B-11-00	17SB11	NA	110
ALPHA-BHC	1/19	0.67 J	0.67 J	17-B-13-00	17SB13	NA	90
BETA-BHC	1/19	0.9 J	0.9 J	17-B-04-00	17SB04	NA	320
DELTA-BHC	1/19	1.8 J	1.8 J	17-B-16-00-D	17SB16	NA	90
GAMMA-BHC (LINDANE)	1/19	0.87 J	0.87 J	17-B-13-00	17SB13	NA	440

TABLE 4-4

SWMU 17 SURFACE SOIL SUMMARY STATISTICS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Detection	Maximum Detection	Sample Number of Maximum Detection	Sample Location of Maximum Detection	Soil Facility Background Concentration[1]	Soil Region 9 PRG[2]
Inorganics (mg/kg)							
ALUMINUM	19/19	3,370	31,800	17-B-07-00	17SB07	16,900	76,000
ANTIMONY	2/19	26.6	31.4	17-B-11-00	17SB11	0.33	31
ARSENIC	15/19	1.5	11.5	17-B-07-00	17SB07	9.45	0.39
BARIUM	19/19	19	244	17-B-11-00	17SB11	64.5	5,400
BERYLLIUM	12/19	0.47	1.7	17-B-16-00	17SB16	0.58	150
CADMIUM	4/19	0.96	12.5	17-B-12-00	17SB12	0.12	37
CALCIUM	19/19	171	4,840	17-B-02-00-D	17SB02	6,120	NA
CHROMIUM	19/19	4.5	392	17-B-11-00	17SB11	42.9	30
COBALT	15/19	0.9	12.8	17-B-11-00	17SB11	2.71	900
COPPER	19/19	2.1	1,930	17-B-12-00	17SB12	3.23	3,100
IRON	19/19	2,810	45,500	17-B-12-00	17SB12	67,900	23,000
LEAD	19/19	10.3	670	17-B-12-00	17SB12	15.5	400
MAGNESIUM	19/19	226	1,920	17-B-17-00	17SB17	746	NA
MANGANESE	19/19	22.6 J	378	17-B-11-00	17SB11	25.1	1,800
MERCURY	13/19	0.04	1.8	17-B-17-00-D	17SB17	0.21	23
NICKEL	18/19	2.4	348	17-B-11-00	17SB11	12.1	1,600
POTASSIUM	19/19	160	1,110	17-B-07-00	17SB07	225	NA
SODIUM	3/19	25.1	343	17-B-11-00	17SB11	370	NA
VANADIUM	19/19	6.9	51.8	17-B-07-00	17SB07	66.3	78
ZINC	18/19	9.2	1,510	17-B-11-00	17SB11	20.5	23,000
Miscellaneous Parameters							
TOTAL SOLIDS (%)	10/10	75	88	17-B-22-00	17SB22	NA	NA

J = Estimated
NA = Not applicable (either not detected or a facility background concentration is not available).

1. NWS Charleston Facility Baseline Background Report for hydric soil (TtNUS, March 2002).
2. Region 9 Preliminary Remediation Goals (PRGs) for residential soil (USEPA, 2004).

For duplicates, frequency of detection considers the average concentration of a sample and its duplicate while location of maximum concentration considers a sample and its duplicate as separate samples.

Associated Samples:

17-B-01-00,NORMAL	17-B-11-00,NORMAL	17-B-19-00,NORMAL
17-B-02-00,DUP	17-B-12-00,NORMAL	17-B-20-00,NORMAL
17-B-02-00,AVG	17-B-13-00,NORMAL	17-B-21-00,NORMAL
17-B-02-00-D,DUP	17-B-14-00,NORMAL	17-B-22-00,NORMAL
17-B-03-00,NORMAL	17-B-15-00,DUP	17-B-23-00,NORMAL
17-B-04-00,NORMAL	17-B-15-00,AVG	17-B-24-00,DUP
17-B-05-00,NORMAL	17-B-15-00-D,DUP	17-B-24-00,AVG
17-B-06-00,NORMAL	17-B-16-00,DUP	17-B-24-00-D,DUP
17-B-07-00,NORMAL	17-B-16-00,AVG	17-B-25-00,NORMAL
17-B-08-00,NORMAL	17-B-16-00-D,DUP	17-B-26-00,NORMAL
17-B-09-00,DUP	17-B-17-00,DUP	17-B-27-00,NORMAL
17-B-09-00,AVG	17-B-17-00,AVG	17-B-28-00,NORMAL
17-B-09-00-D,DUP	17-B-17-00-D,DUP	17-B-29-00,NORMAL
17-B-10-00,NORMAL	17-B-18-00,NORMAL	

TABLE 4-5

SWMU 17 SUBSURFACE SOIL SUMMARY STATISTICS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Detection	Maximum Detection	Sample Number of Maximum Detection	Sample Location of Maximum Detection	Soil Facility Background Concentration[1]	Soil Region 9 PRG[2]
Volatile Organics (ug/kg)							
1,1,2,2-TETRACHLOROETHANE	6/81	2 J	210	17-B-14-03	17SB14	NA	410
1,1,2-TRICHLOROETHANE	12/82	1 J	270 J	17-B-17-05	17SB17	NA	730
1,2,4-TRICHLOROBENZENE	1/76	2 J	2 J	17-B-17-05	17SB17	NA	62,000
1,2,4-TRIMETHYLBENZENE	1/20	5 J	5 J	17-B-25-03	17SB25	NA	52,000
1,2-DICHLOROBENZENE	1/76	2 J	2 J	17-B-17-05	17SB17	NA	600,000
1,2-DICHLOROPROPANE	1/82	4 J	4 J	17-B-17-05	17SB17	NA	340
1,3-DICHLOROBENZENE	1/76	3 J	3 J	17-B-17-05	17SB17	NA	530,000
1,4-DICHLOROBENZENE	1/76	2 J	2 J	17-B-17-05	17SB17	NA	3,400
2-BUTANONE	1/82	13 J	13 J	17-B-33-03	17SB33	NA	22,000,000
ACETONE	42/82	12 J	16,000	17-B-14-01	17SB14	NA	14,000,000
BENZENE	2/82	2 J	2 J	17-B-17-05 17-B-18-05	17SB17 17SB18	NA	640
BROMODICHLOROMETHANE	3/82	4 J	160 J	17-B-14-03	17SB14	NA	820
BROMOMETHANE	1/82	1 J	1 J	17-B-29-01	17SB29	NA	3,900
CARBON DISULFIDE	1/82	2 J	2 J	17-B-17-05	17SB17	NA	360,000
CARBON TETRACHLORIDE	3/82	18	5,200	17-B-14-03	17SB14	NA	250
CHLOROETHANE	3/82	2 J	2 J	17-B-08-01 17-B-11-01 17-B-16-05	17SB08 17SB11 17SB16	NA	3,000
CHLOROFORM	10/82	2 J	9,100	17-B-14-03	17SB14	NA	220
CHLOROMETHANE	2/82	55 J	88 J	17-B-14-03	17SB14	NA	47,000
DICHLORODIFLUOROMETHANE	2/82	2 J	2 J	17-B-18-05 17-B-19-05	17SB18 17SB19	NA	94,000
METHYL ACETATE	6/75	10	490	17-B-14-03	17SB14	NA	22,000,000
METHYLENE CHLORIDE	9/82	8 J	14 J	17-B-26-03 17-B-28-01	17SB26 17SB28	NA	9,100
TETRACHLOROETHENE	4/82	2 J	56 J	17-B-14-03	17SB14	NA	480
TOLUENE	2/82	0.7 J	3 J	17-B-17-05	17SB17	NA	520,000
TOTAL 1,2-DICHLOROETHENE	7/24	5 J	210	17-B-30-02	17SB30	NA	43,000
TRANS-1,2-DICHLOROETHENE	5/82	1 J	30	17-B-21-03	17SB21	NA	69,000
TRICHLOROETHENE	24/82	1 J	910,000	17-B-17-03	17SB17	NA	53
TRICHLOROFLUOROMETHANE	21/82	3 J	46	17-B-27-03	17SB27	NA	390,000
VINYL CHLORIDE	1/82	5 J	5 J	17-B-17-03	17SB17	NA	79
CIS-1,2-DICHLOROETHENE	15/82	3 J	1,300	17-B-17-03	17SB17	NA	43,000
Semivolatile Organics (ug/kg)							
2-METHYLNAPHTHALENE	1/62	53 J	53 J	17-B-17-05	17SB17	NA	56,000
BENZALDEHYDE	2/55	470	810	17-B-33-03	17MIP27/TW36	NA	6,100,000
BENZO(A)ANTHRACENE	1/62	24 J	24 J	17-B-17-03	17SB17	NA	620
BENZO(B)FLUORANTHENE	1/61	29 J	29 J	17-B-12-05	17SB12	NA	620
BIS(2-ETHYLHEXYL)PHTHALATE	6/62	290 J	5,200	17-B-08-03	17SB08	NA	35,000
BUTYL BENZYL PHTHALATE	2/62	24 J	33 J	17-B-17-05	17SB17	NA	12,000,000
DI-N-BUTYL PHTHALATE	4/62	40 J	1,000	17-B-33-03	17MIP27/TW36	NA	6,100,000
DI-N-OCTYL PHTHALATE	1/61	370	370	17-B-14-01	17SB14	NA	2,400,000
FLUORANTHENE	2/62	35 J	210 J	17-B-33-03	17MIP27/TW36	NA	2,300,000
NAPHTHALENE	1/62	73 J	73 J	17-B-17-05	17SB17	NA	56,000
PENTACHLOROPHENOL	1/61	380 J	380 J	17-B-17-05	17SB17	NA	3,000
PHENANTHRENE	2/62	25 J	160 J	17-B-33-03	17MIP27/TW36	NA	2,300,000
PYRENE	3/62	33 J	170 J	17-B-33-03	17MIP27/TW36	NA	2,300,000

TABLE 4-5

SWMU 17 SUBSURFACE SOIL SUMMARY STATISTICS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Detection	Maximum Detection	Sample Number of Maximum Detection	Sample Location of Maximum Detection	Soil Facility Background Concentration[1]	Soil Region 9 PRG[2]
Pesticides/PCBs (ug/kg)							
4,4'-DDD	1/62	7.3	7.3	17-B-33-03	17MIP27/TW36	NA	2,400
4,4'-DDE	2/62	0.8 J	6	17-B-33-03	17MIP27/TW36	21	1,700
4,4'-DDT	8/62	0.17 J	3.9 J	17-B-10-03	17SB10	NA	1,700
ALDRIN	1/62	0.75 J	0.75 J	17-B-18-01	17SB18	NA	29
AROCLOR-1254	2/62	14 J	30	17-B-17-05	17SB17	NA	220
DIELDRIN	1/62	0.14 J	0.21 J	17-B-11-01	17SB11	NA	30
ENDRIN ALDEHYDE	3/62	0.72 J	1.3 J	17-B-07-05-D	17SB07	NA	18,000
ENDRIN KETONE	2/62	0.79 J	1.2 J	17-B-15-01	17SB15	NA	18,000
GAMMA-CHLORDANE	1/62	67 J	67 J	17-B-14-03	17SB14	NA	1,600
DELTA-BHC	2/62	1.4 J	73 J	17-B-14-03	17SB14	NA	90
Inorganics (mg/kg)							
ALUMINUM	62/62	6,100	52,500	17-B-18-05	17SB18	16,900	76,000
ARSENIC	55/62	1.8	13.2	17-B-19-03	17SB19	9.45	0.39
BARIUM	62/62	8.9	359	17-B-18-05	17SB18	64.5	5,400
BERYLLIUM	31/62	0.21	1.1	17-B-13-03 17-B-18-05	17SB13 17SB18	0.58	150
CADMIUM	3/62	0.18	0.56	17-B-33-03	17MIP27/TW36	0.12	37
CALCIUM	62/62	155	3,420	17-B-03-01	17SB03	6,120	NA
CHROMIUM	62/62	9.9	62.7	17-B-18-05	17SB18	42.9	30
COBALT	62/62	1.1	5.9	17-B-06-03	17SB06	2.71	900
COPPER	37/62	0.95	39.7	17-B-33-03	17MIP27/TW36	3.23	3,100
IRON	62/62	4,620	66,500	17-B-16-03	17SB16	67,900	23,000
LEAD	62/62	4.1	77.1	17-B-33-03	17MIP27/TW36	15.5	400
MAGNESIUM	62/62	385	3,900	17-B-18-05	17SB18	746	NA
MANGANESE	62/62	12.2	71.5 J	17-B-31-02-D	17SB31	25.1	1,800
MERCURY	11/62	0.01	0.14	17-B-03-01 17-B-10-01	17SB03 17SB10	0.21	23
NICKEL	62/62	2.4	16	17-B-18-05	17SB18	12.1	1,600
POTASSIUM	62/62	270	1,270	17-B-03-05	17SB03	225	NA
SILVER	1/62	0.2	0.2	17-B-33-03	17MIP27/TW36	3.2	390
SODIUM	21/62	22.6	981	17-B-34-06	17MIP41/TW50/MW17S	370	NA
THALLIUM	3/62	0.44	1	17-B-11-01-D	17SB11	1.63	5.2
VANADIUM	62/62	12.7	68.9	17-B-18-05	17SB18	66.3	78
ZINC	57/62	5.8	1,240	17-B-14-03	17SB14	20.5	23,000
Explosives (ug/kg)							
2,4-DINITROTOLUENE	1/124	510	510	17-B-08-01	17SB08	NA	120,000
2,4,6-TRINITROTOLUENE	1/62	350	350	17-B-08-01	17SB08	NA	16,000
Miscellaneous Parameters (mg/kg)							
CYANIDE	8/62	0.21 J	5	17-B-17-05	17SB17	NA	1,200
TOTAL ORGANIC CARBON	5/5	720	26,000	17-B-33-03	17MIP27/TW36	NA	NA
TOTAL SOLIDS (%)	25/25	72	87	17-B-26-01	17SB26	NA	NA

J = Estimated
NA = Not applicable (either not detected or a facility background concentration is not available).

1. NWS Charleston Facility Baseline Background Report for hydric soil (TtNUS, March 2002).
2. Region 9 Preliminary Remediation Goals (PRGs) for residential soil, (USEPA, 2004).

For duplicates, frequency of detection considers the average concentration of a sample and its duplicate while location of maximum concentration considers a sample and its duplicate as separate samples.

TABLE 4-5

SWMU 17 SUBSURFACE SOIL SUMMARY STATISTICS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Detection	Maximum Detection	Sample Number of Maximum Detection	Sample Location of Maximum Detection	Soil Facility Background Concentration[1]	Soil Region 9 PRG[4]
Associated Samples:							
17-B-01-01,NORMAL	17-B-09-05,NORMAL	17-B-19-01,NORMAL	1-02-D,DUP				
17-B-01-03,NORMAL	17-B-10-01,NORMAL	17-B-19-03,NORMAL	)3,NORMAL				
17-B-01-05,NORMAL	17-B-10-03,NORMAL	17-B-19-05,NORMAL	)3,NORMAL				
17-B-02-01,NORMAL	17-B-10-05,NORMAL	17-B-20-01,NORMAL	)6,NORMAL				
17-B-02-03,NORMAL	17-B-11-01,DUP	17-B-20-03,NORMAL					
17-B-02-05,NORMAL	17-B-11-01,AVG	17-B-21-01,NORMAL					
17-B-03-01,NORMAL	17-B-11-01-D,DUP	17-B-21-03,NORMAL					
17-B-03-03,NORMAL	17-B-11-03,NORMAL	17-B-22-01,DUP					
17-B-03-05,NORMAL	17-B-11-05,NORMAL	17-B-22-01,AVG					
17-B-04-01,NORMAL	17-B-12-01,NORMAL	17-B-22-01-D,DUP					
17-B-04-03,NORMAL	17-B-12-03,NORMAL	17-B-22-03,NORMAL					
17-B-04-05,DUP	17-B-12-05,NORMAL	17-B-23-01,NORMAL					
17-B-04-05,AVG	17-B-13-01,NORMAL	17-B-23-03,NORMAL					
17-B-04-05-D,DUP	17-B-13-03,NORMAL	17-B-24-01,NORMAL					
17-B-05-01,NORMAL	17-B-13-05,NORMAL	17-B-24-03,NORMAL					
17-B-05-03,NORMAL	17-B-14-01,NORMAL	17-B-25-01,NORMAL					
17-B-05-05,NORMAL	17-B-14-03,NORMAL	17-B-25-03,NORMAL					
17-B-06-01,NORMAL	17-B-14-05,NORMAL	17-B-26-01,NORMAL					
17-B-06-03,NORMAL	17-B-15-01,NORMAL	17-B-26-03,DUP					
17-B-06-05,NORMAL	17-B-15-03,NORMAL	17-B-26-03-AVG,AVG					
17-B-07-01,NORMAL	17-B-15-05,NORMAL	17-B-26-03-D,DUP					
17-B-07-03,NORMAL	17-B-16-01,NORMAL	17-B-27-01,NORMAL					
17-B-07-05,DUP	17-B-16-03,NORMAL	17-B-27-03,NORMAL					
17-B-07-05,AVG	17-B-16-05,NORMAL	17-B-28-01,NORMAL					
17-B-07-05-D,DUP	17-B-17-01,NORMAL	17-B-28-03,NORMAL					
17-B-08-01,NORMAL	17-B-17-03,NORMAL	17-B-29-01,NORMAL					
17-B-08-03,NORMAL	17-B-17-05,NORMAL	17-B-29-03,NORMAL					
17-B-08-05,NORMAL	17-B-18-01,NORMAL	17-B-30-02,NORMAL					
17-B-09-01,NORMAL	17-B-18-03,NORMAL	17-B-31-02,DUP					
17-B-09-03,NORMAL	17-B-18-05,NORMAL	17-B-31-02,AVG					

TABLE 4-6

SWMU 16 GROUNDWATER SUMMARY STATISTICS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Detection	Maximum Detection	Sample Number of Maximum Detection	Sample Location of Maximum Detection	Background Concentration	Federal MCL
Volatile Organics (ug/L)							
TRICHLOROETHENE	1/5	32	32	16-G-02S-0205	16MW02S	NA	5
Semivolatile Organics (ug/L)							
BIS(2-ETHYLHEXYL) PHTHALATE	1/5	11	11	16-G-04S-0205	16MW04S	NA	6
DI-N-BUTYL PHTHALATE	1/5	3 J	3 J	16-G-05S-0205	16MW05S	NA	3,600[1]
Inorganics (ug/L)							
ALUMINUM	1/5	657	657	16-G-01S-0305	16MW01S	1,150,000	36,000[1]
BARIUM	5/5	30.9	294	16-G-01S-0305	16MW01S	300	2,000
BERYLLIUM	2/5	0.45	0.47	16-G-03S-0205	16MW03S	2.3	4
CALCIUM	5/5	23,600	228,000	16-G-02S-0205	16MW02S	583,000	NA
COBALT	1/5	17.9	17.9	16-G-01S-0305	16MW01S	16	730[1]
COPPER	1/5	2.8	2.8	16-G-01S-0305	16MW01S	7	1,300
IRON	1/5	376	376	16-G-01S-0305	16MW01S	521,000	11,000[1]
MAGNESIUM	5/5	15,800	588,000	16-G-03S-0205	16MW03S	11,700	NA
MANGANESE	5/5	130	722	16-G-03S-0205	16MW03S	2,580	880[1]
POTASSIUM	5/5	4,820	178,000	16-G-02S-0205	16MW02S	5,200	NA
SODIUM	5/5	56,000	4,720,000	16-G-02S-0205	16MW02S	208,000	NA
ZINC	1/5	22	22	16-G-01S-0305	16MW01S	20.5	11,000[1]
Miscellaneous Parameters (ug/L)							
CYANIDE	1/5	3.8 J	3.8 J	16-G-03S-0205	16MW03S	NA	200

J = Estimated.

1. No Maximum Contaminant Level (MCL) available. Value shown is Region 9 Tap Water Preliminary Remediation Goal (PRG).

Associated Samples:

16-G-01S-0305,NORMAL,20050310
16-G-02S-0205,NORMAL,20050225
16-G-03S-0205,NORMAL,20050223
16-G-04S-0205,NORMAL,20050225
16-G-05S-0205,NORMAL,20050223

TABLE 4-7

SWMU 16 MONITORING WELL 2001 AND 2005 DATA COMPARISON
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Sample Location	16MW01S		16MW02S		16MW03S		16MW04S			16MW05S	
Sample Number	16-G-01S-1001	16-G-01S-0305	16-G-02S-1001	16-G-02S-0205	16-G-03S-1001	16-G-03S-0205	16-G-04S-1001	16-G-04S-1001-D	16-G-04S-0205	16-G-05S-1001	16-G-05S-0205
Sample Date	10/16/01	03/10/05	10/16/01	02/25/05	10/20/01	02/23/05	10/19/01	10/19/01	02/25/05	10/20/01	02/23/05
Volatile Organics (ug/L)											
CARBON DISULFIDE			0.7 J	5 U							
CHLOROMETHANE							5 U	1 J	5 U		
TOLUENE										6	5 U
TRICHLOROETHENE			5 U	32			0.7 J	5 U	5 U		
Semivolatile Organics (ug/L)											
BIS(2-ETHYLHEXYL)PHTHALATE							10 U	10 U	11		
PHENOL			2 J	10 U							
Inorganics (ug/L)											
ALUMINUM	950	657									
BARIUM	524	294	101	93	35.9	40.4	82.9	80.2	86.2	35.4	30.9
BERYLLIUM			0.54 U	0.45	0.26 U	0.47					
CALCIUM	43,600	23,600	202,000	228,000	179,000	215000	178,000	182,000	170,000	166,000	186,000
COBALT	24.7	17.9									
COPPER	0.84 U	2.8									
IRON	2,160	376	285	21.5 U							
LEAD	2	2.07 U									
MAGNESIUM	27,500	15,800	472,000	571,000	504,000	588000	445,000	461,000	475,000	472,000	509,000
MANGANESE	171	130	285	249	552	722	315	324	251	340	335
MERCURY					0.05	0.02 U	0.03 U	0.04	0.02 U		
POTASSIUM	8,460	4,820	140,000	178,000	154000	165000	134,000	137,000	134,000	154,000	158,000
SELENIUM							3.04 U	4.1	4.08 U		
SODIUM	63,800	56,000	4,120,000	4,720,000	3820000	4580000	3,930,000	3,830,000	3,660,000	3,590,000	4,120,000
VANADIUM			2.4	5.07 U	3.1	5.07 U	2.8	3.1	5.07 U	2.2	5.07 U
ZINC	37.2	22			9	1.42 U	7.7	5.1	2.2 U	6.2	1.8 U
Miscellaneous Parameters (ug/L)											
CYANIDE					10	3.8 J					

D = Duplicate.

J = Estimated.

U = Not detected at detection limit shown.

TABLE 4-8

SWMU 17 GROUNDWATER SUMMARY STATISTICS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Detection	Maximum Detection	Sample Number of Maximum Detection	Sample Location of Maximum Detection	Background Concentration	Federal MCL
Volatile Organics (ug/L)							
1,1,2,2-TETRACHLOROETHANE	15/92	0.6 J	140	17-Q-13-0403	17MIP21/TW13	NA	0.055[1]
1,1,2-TRICHLOROETHANE	19/92	0.5 J	93	17-G-07S-0205	17MW07S	NA	5
1,1,2-TRICHLOROTRIFLUOROETHANE	38/84	0.3 J	2,500 J	17-Q-28-0403	17MIP04/TW28	NA	59,000[1]
1,1-DICHLOROETHANE	12/88	0.2 J	5 J	17-G-07S-0205	17MW07S	NA	810[1]
1,1-DICHLOROETHENE	27/92	0.4 J	11 J	17-G-07S-0205	17MW07S	NA	7
1,2-DICHLOROETHANE	8/88	0.6 J	14	17-Q-56-0105	17MIP47/TW56	NA	5
1,2-DICHLOROPROPANE	2/88	1 J	2 J	17-Q-25D-0403	17MIP10/TW25SD	NA	5
ACETONE	6/33	2 J	20 J	17-Q-41-0105	17MIP32/TW41	NA	5,500[1]
BENZENE	24/92	0.2 J	35	17-G-05S-0205-D	17MW05S	NA	5
BROMODICHLOROMETHANE	1/88	4 J	4 J	17-G-05S-0205	17MW05S	NA	80
CARBON DISULFIDE	3/88	0.3 J	0.3 J	17-Q-25D-0403 17-Q-17-0403 17-Q-26-0403	17MIP10/TW25D 17MIP18/TW17 17MIP06/TW26	NA	1,000[1]
CARBON TETRACHLORIDE	5/88	1 J	68	17-Q-56-0105	17MIP47/TW56	NA	5
CHLOROFORM	28/104	0.4 J	770	17-G-07S-0205	17MW07S	NA	80
CIS-1,2-DICHLOROETHENE	54/104	0.5 J	2,500	17MW6S	17MW06S	NA	70
DICHLORODIFLUOROMETHANE	20/92	2 J	380 J	17-Q-19-0403	17MIP20/TW19	NA	390[1]
ETHYLBENZENE	1/88	0.2 J	0.2 J	17-Q-19-0403	17MIP20/TW19	NA	700
M+P-XYLENES	3/73	0.2 J	0.4 J	17-Q-19-0403	17MIP20/TW19	NA	10,000
METHYL CYCLOHEXANE	2/84	0.8 J	95	17-Q-19-0403	17MIP20/TW19	NA	5,200[1]
METHYLENE CHLORIDE	2/92	7	19	17-Q-19-0403	17MIP20/TW19	NA	5
NAPHTHALENE	1/46	3 J	3 J	17-G-07S-0205	17MW07S	NA	6.2[1]
O-XYLENE	5/73	0.2 J	0.8 J	17-Q-19-0403	17MIP20/TW19	NA	10,000
TETRACHLOROETHENE	28/92	0.5 J	330	17-G-22S-0205	17MIP02/TW30/MW22S	NA	5
TOLUENE	17/92	0.2 J	98	17-Q-10S-0302	17TW10S	NA	1,000
TOTAL 1,2-DICHLOROETHENE	36/69	0.6 J	1,000	17-G-07S-0205	17MW07S	NA	61[1]
TOTAL XYLENES	6/92	0.3 J	1 J	17-Q-19-0403	17MIP20/TW19	NA	10,000
TRANS-1,2-DICHLOROETHENE	21/104	0.3 J	25	17-PSTW-13	17PSTW-13	NA	100
TRICHLOROETHENE	62/104	0.3 J	130,000	17-G-07S-0205	17MW07S	NA	5
TRICHLOROFLUOROMETHANE	10/88	0.5 J	14	17-Q-28-0403	17MIP04/TW28	NA	1,300[1]
VINYL CHLORIDE	18/92	0.4 J	21 J	17-G-07S-0205	17MW07S	NA	2
Semivolatile Organics (ug/L)							
BIS(2-ETHYLHEXYL)PHTHALATE	3/42	8 J	54	17-G-14S-0305	17MIP38/TW47/MW14S	NA	6
CAPROLACTAM	1/38	5 J	5 J	17-Q-35-0105	17MIP26/TW35	NA	18,000[1]
DI-N-BUTYL PHTHALATE	7/42	2 J	8 J	17-G-12S-0205-D	17MIP29/TW38/MW12S	NA	3,600[1]
DIETHYL PHTHALATE	1/42	2 J	2 J	17-G-07S-0205	17MW07S	NA	29,000[1]
Explosives (ug/L)							
RDX	2/43	0.92	2.1	17-G-05S-0205-D	17MW05S	NA	0.61[1]
Inorganics (ug/L)							
ALUMINUM	18/43	117	39,000	17-G-16S-0305	17MW16S	1,150,000	36,000[1]
ANTIMONY	2/43	3.9	5.6	17-G-18S-0205	17MIP42/TW51/MW18S	NA	6
ARSENIC	11/43	3.8	22.7	17-G-12D-0205	17MW12D	4.4	10
BARIUM	43/43	3.4	1,920	17-G-14S-0305	17MIP38/TW47/MW14S	300	2,000
BERYLLIUM	14/43	0.42	43.6	17-G-14S-0305	17MIP38/TW47/MW14S	2.3	4
CALCIUM	43/43	663	929,000	17-G-14D-0305	17MW14D	583,000	NA
CHROMIUM	4/43	10.3	19.7	17-Q-42-0105	17MIP33/TW42	44.5	100
COBALT	29/43	0.78	988	17-G-14S-0305	17MIP38/TW47/MW14S	16	730[1]
COPPER	7/43	6.7	24.9	17-G-03S-0205-D	17MW03S	7	1,300
IRON	40/43	84	360,000	17-G-18S-0205	17MIP42/TW51/MW18S	521,000	11,000[1]
LEAD	6/43	2.3	4.2	17-G-16S-0305	17MW16S	19	15
MAGNESIUM	43/43	825	270,000	17-G-16S-0305	17MW16S	11,700	NA
MANGANESE	43/43	9.7	4,850	17-G-17S-0205	17MW17S	2,580	880[1]

TABLE 4-9

SWMU 17 GROUNDWATER SUMMARY STATISTICS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Detection	Maximum Detection	Sample Number of Maximum Detection	Sample Location of Maximum Detection	Background Concentration	Federal MCL
MERCURY	11/43	0.01	0.03	17-G-04S-0205	17MW04S	NA	2
NICKEL	15/43	10.8	508	17-G-14S-0305	17MIP38/TW47/MW14S	24.7	730[1]
POTASSIUM	35/43	257	12,700	17-G-18D-0205 17-Q-35-0105	17MW18D 17MIP26/TW35	5,200	NA
SELENIUM	1/43	3.8	3.8	17-Q-42-0105	17MIP33/TW42	NA	50
SODIUM	43/43	18,600	2,800,000	17-G-16S-0305	17MW16S	208,000	NA
VANADIUM	13/43	1	30	17-Q-42-0105	17MIP33/TW42	78.8	36[1]
ZINC	29/43	7.9	590	17-G-14S-0305	17MIP38/TW47/MW14S	20.5	11,000[1]
Miscellaneous Parameters (ug/L)							
BROMIDE	12/12	500	7,900	17-PSTW-15	17PSTW-15	NA	NA
CHLORIDE	12/12	51,000	2,800,000	17-PSTW-15	17PSTW-15	NA	NA
CYANIDE (ug/L)	1/43	4.2 J	4.2 J	17-G-20S-0205	17MIP48/TW57/MW20S	NA	200
SULFATE	12/12	34,000	320,000	17-PSTW-15	17PSTW-15	NA	NA

1. No Maximum Contaminant Level (MCL) available. Value shown is Region 9 Tap Water Preliminary Remediation Goal (PRG).

Associated Samples:

17-G-01S-0205,17MW01,20050224
17-G-02S-0205,17MW02S,20050227
17-G-03S-0205,17MW03S,20050214
17-G-03S-0205-AVG,17MW03S,20050214
17-G-03S-0205-D,17MW03S,20050214
17-G-04S-0205,17MW04S,20050227
17-G-05S-0205,17MW05S,20050225
17-G-05S-0205-AVG,17MW05S,20050225
17-G-05S-0205-D,17MW05S,20050225
17-G-06D-0205,17MW06D,20050224
17-G-07S-0205,17MW07S,20050228
17-G-11S-0205,17MIP03-TW29-MW11S,20050223
17-G-12D-0205,17MW12D,20050228
17-G-12D-0205-AVG,17MW12D,20050228
17-G-12D-0205-D,17MW12D,20050228
17-G-12S-0205,17MIP29-TW38-MW12S,20050225
17-G-12S-0205-AVG,17MIP29-TW38-MW12S,20050225
17-G-12S-0205-D,17MIP29-TW38-MW12S,20050225
17-G-13S-0205,17MW13S,20050227
17-G-14D-0305,17MW14D,20050309
17-G-14S-0305,17MIP38-TW47-MW14S,20050309
17-G-15D-0305,17MW15D,20050309
17-G-15S-0305,17MIP39-TW48-MW15S,20050309
17-G-16D-0305,17MW16D,20050308
17-G-16I-0305,17MIP40-TW49-MW16I,20050308
17-G-16S-0305,17MW16S,20050308
17-G-17D-0305,17MW17D,20050308
17-G-17I-0205,17MIP41-TW50-MW17I,20050228
17-G-17S-0205,17MW17S,20050226
17-G-18D-0205,17MW18D,20050226
17-G-18S-0205,17MIP42-TW51-MW18S,20050226
17-G-19S-0205,17MIP43-TW52-MW19S,20050224
17-G-20S-0205,17MIP48-TW57-MW20S,20050227
17-G-21S-0205,17MW21S,20050215
17-G-22S-0205,17MIP02-TW30-MW22S,20050223
17-G-22S-0205-AVG,17MIP02-TW30-MW22S,20050223
17-PSTW-8,17-PSTW-8,20041110
17-PSTW-9,17-PSTW-9,20041110
17-Q-01-0302,17TW01S,20020307
17-Q-02-0302,17TW02S,20020307
17-Q-03-0302,17TW03,20020307
17-Q-04-0302,17TW04S,20020307
17-Q-05-0302,17TW05S,20020308
17-Q-06D-0302,17TW06D,20020308
17-Q-06S-0302,17TW06S,20020308
17-Q-07D0302,17TW07D,20020308
17-Q-07S-0302,17TW07S,20020307
17-Q-08D-0302,17TW08D,20020308
17-Q-08S-0302,17TW08S,20020308
17-Q-09D-0302,17TW09D,20020309
17-Q-09S-0302,17TW09S,20020309
17-Q-10D-0302,17TW10D,20020308
17-Q-10S-0302,17TW10S,20020308
17-Q-11-0403,17MIP11-TW11,20030426
17-Q-12-0403,17MIP12-TW12,20030426
17-Q-13-0403,17MIP21-TW13,20030426
17-Q-14-0403,17MIP16-TW14,20030426
17-Q-15-0403,17MIP15-TW15,20030426
17-Q-15-0403-AVG,17MIP15-TW15,20030426
17-Q-15-0403-D,17MIP15-TW15,20030426
17-Q-16-0403,17MIP13-TW16,20030426
17-Q-17-0403,17MIP18-TW17,20030426
17-Q-18-0403,17MIP19-TW18,20030426
17-Q-19-0403,17MIP20-TW19,20030427
17-Q-20-0403,17MIP17-TW20,20030427
17-Q-21-0403,17MIP09-TW21,20030427
17-Q-22-0403,17MIP14-TW22,20030427
17-Q-23-0403,17MIP08-TW23,20030427
17-Q-24-0403,17MIP07-TW24,20030427
17-Q-25D-0403,17MIP10-TW25SD,20030427
17-Q-25S-0403,17MIP10-TW25SD,20030427
17-Q-26-0403,17MIP06-TW26,20030427
17-Q-37-0105,17MIP28-TW37,20050116
17-Q-39-0105,17MIP30-TW39,20050116
17-Q-39-0105-AVG,17MIP30-TW39,20050116
17-Q-39-0105-D,17MIP30-TW39,20050116
17-Q-40-0105,17MIP31-TW40,20050116
17-Q-41-0105,17MIP32-TW41,20050117
17-Q-42-0105,17MIP33-TW42,20050117
17-Q-43-0105,17MIP34-TW43,20050116
17-Q-44-0105,17MIP35-TW44,20050117
17-Q-45-0105,17MIP36-TW45,20050117
17-Q-46-0105,17MIP37-TW46,20050116
17-Q-53-0105,17MIP44-TW53,20050115
17-Q-54-0105,17MIP45-TW54,20050115
17-Q-54-0105-AVG,17MIP45-TW54,20050115
17-Q-54-0105-D,17MIP45-TW54,20050115
17-Q-55-0105,17MIP46-TW55,20050117
17-Q-56-0105,17MIP47-TW56,20050115
17-Q-56-0105-AVG,17MIP47-TW56,20050115
17-Q-56-0105-D,17MIP47-TW56,20050115
17-Q-58-0105,17MIP49-TW58,20050116
17-Q-59-0105,17MIP50-TW59,20050115
17-Q-60-0105,17MIP51-TW60,20050117
17-Q-61-0105,17MIP52-TW61,20050117
17-Q-62-0105,17MIP53-TW62,20050116
17-Q-63-0105,17MIP54-TW63,20050116
17-Q-64-0105,17MIP55-TW64,20050116
17MW08S,17MW08S,20041116
17PS-01,17-PS-1,20040401
17PS-02,17-PS-2,20040401
17PS-03,17-PS-3,20040401

TABLE 4-8

SWMU 17 GROUNDWATER SUMMARY STATISTICS
SWMU 18 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Detection	Maximum Detection	Sample Number of Maximum Detection	Sample Location of Maximum Detection	Background Concentration	Federal MCL
17-G-22S-0205-D,17MIP02-TW30-MW22S,20050223	17-Q-26-0403-AVG,17MIP06-TW26,20030427						
17-G-23S-0205,17MW23S,20050224	17-Q-26-0403-D,17MIP06-TW26,20030427						
17-PSTW-10,17-PSTW-10,20041110	17-Q-27-0403,17MIP05-TW27,20030427						
17-PSTW-11,17-PSTW-11,20041110	17-Q-28-0403,17MIP04-TW28,20030427						
17-PSTW-12,17-PSTW-12,20041110	17-Q-31-0403,17MIP01-TW31,20030427						
17-PSTW-13,17-PSTW-13,20041110	17-Q-32-0105,17MIP23-TW32,20050115						
17-PSTW-14,17-PSTW-14,20041110	17-Q-32-0105-AVG,17MIP23-TW32,20050115						
17-PSTW-15,17-PSTW-15,20041110	17-Q-32-0105-D,17MIP23-TW32,20050115						
17-PSTW-4,17-PSTW-4,20041109	17-Q-33-0105,17MIP24-TW33,20050117						
17-PSTW-5,17-PSTW-5,20041109	17-Q-34-0105,17MIP25-TW34,20050115						
17-PSTW-6,17-PSTW-6,20041109	17-Q-35-0105,17MIP26-TW35,20050117						
17-PSTW-7,17-PSTW-7,20041110	17-Q-36-0105,17MIP27-TW36,20050117						

TABLE 4-9

SWMU 17 MONITORING WELL 2001 AND 2005 DATA COMPARISON
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Sample Location	17MW01		17MW02S		17MW03S			17MW04S	
Sample Number	17-G-01S-1001	17-G-01S-0205	17-G-02S-1001	17-G-02S-0205	17-G-03S-1001	17-G-03S-0205	17-G-03S-0205-D	17-G-04S-1001	17-G-04S-0205
Sample Date	10/16/01	02/24/05	10/17/01	02/27/05	10/17/01	02/14/05	02/14/05	10/17/01	02/27/05
Volatile Organics (ug/L)									
1,1,2-TRICHLOROTRIFLUOROETHANE	5 U	2 J	170	180		2 J	2 J	5 U	1 J
1,2-DICHLOROPROPANE			2 J	1 J					
ACETONE			3 J	5 UR					
CIS-1,2-DICHLOROETHENE			3 J	2 J	3 J	0.6 J	0.6 J		
CIS-1,3-DICHLOROPROPENE					0.6 J	5 U	5 U		
ISOBUTANOL					7 J				
TETRACHLOROETHENE			61	33	190	15	15		
TOLUENE			3 J	5 U					
TOTAL 1,2-DICHLOROETHENE				2 J		0.6 J	0.6 J		
TRICHLOROETHENE			2 J	6					
TRICHLOROFLUOROMETHANE			2 J	0.5 J					
Semivolatile Organics (ug/L)									
DI-N-BUTYL PHTHALATE	10 U	2 J	10 U	2 J					
Pesticides/PCBs (ug/L)									
GAMMA-BHC (LINDANE)			0.028 J	0.05 U					
Herbicides (ug/L)									
2,4-D					2.8 J				
Explosives (ug/L)									
2,4,6-TRINITROTOLUENE								0.53	0.16 U
Inorganics (ug/L)									
ALUMINUM			2,260	7,060					
ANTIMONY	3.9	3.54 U			3.7	3.54 U	3.54 U		
ARSENIC			3.6	2.81 U	2.9	2.81 U	2.81 U	6.7	3.9 U
BARIUM	58.3	53.4	440	797	39.5	49.1	49.8	38.4	96.6
BERYLLIUM			4.7 U	7.7	1.6 U	0.40 U	0.43		
CALCIUM	25,800	17,700	125,000	323,000	19,100	11,000	11,100	22,900	126,000
COBALT	2.8	4.3 U	16.5	34.3	2	4.3 U	4.3 U	4.4	46.7
COPPER					0.84 U	24.1	24.9		
IRON	408	283	8,950	4,980	1,660	1,130 J	2,200 J	7,960	56,400
MAGNESIUM	4,370	3,440	17,300	42,300	2,720	2,580	2,560	7,070	53,500
MANGANESE	68.3	44.8	247	456	143	73.3	74.3	43.5	300
MERCURY								0.04 U	0.03
NICKEL			17.5 U	18.5				5.1 U	34.9
POTASSIUM	7,040	6,980	2,050	3,170	2,270	2,290	2,410	1,630	2,680
SODIUM	23,900	24,600	142,000	412,000	24,200	25,500	25,400	120,000	331,000
VANADIUM			2.7	5.07 U	0.89	5.07 U	5.07 U		
ZINC			25.6	51.2	41.1	37.8	39.6	4.9	47

D = Duplicate.
J = Estimated.
U = Nondetected at detection limit shown.

TABLE 4-10

SWMU 17 COMPARISON OF VOC DATA FROM CO-LOCATED TEMPORARY AND PERMANENT MONITORING WELLS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Location	17MIP02-TW30-MW22S		17MIP03-TW29-MW11S		17MIP29-TW38-MW12S		17MIP38-TW47-MW14S		17MIP39-TW48-MW15S	
Type of Well	Permanent	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent	Temporary
Sample Number	17-G-22S-0205	17-Q-30-0403	17-G-11S-0205	17-Q-29-0403	17-G-12S-0205	17-Q-38-0105	17-G-14S-0305	17-Q-47-0105	17-G-15S-0305	17-Q-48-0105
Screen Depth	10'-20'	14'-18'	10'-20'	14'-18'	4'-14'	5'-10'	4'-14'	10'-15'	10'-20'	10'-15'
Volatile Organics (µg/L)										
1,1,2-Trichloroethane	5 U	5 U	5U	6	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichlorotrifluorethane	160	395	NA	930	25.5	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	5 U	0.75 J	2 J	2 J	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	8	6.75 J	6	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5 U	5 U	0.7 J	1 J	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	5 U	5 U	5 U	0.6 J	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	2 J	4.5 J	6	8	5 U	5 U	5 U	5 U	5 U	5 U
Dichlorodifluoromethane	3 J	14.5	2 J	51	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	325	385	180	210	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Total 1,2-Dichloroethene	2 J	4.5 J	NA	8 J	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,2-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	12	44.5	50	120	5 U	5 U	5 U	5 U	5 U	5 U
Trichlorofluoromethane	1 J	4 J	3 J	9	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	5 U	5 U	2 U	.8 J	5 U	5 U	5 U	5 U	5 U	5 U

TABLE 4-10

SWMU 17 COMPARISON OF VOC DATA FROM CO-LOCATED TEMPORARY AND PERMANENT MONITORING WELLS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Location	17MIP40-TW49-MW16I		17MIP41-TW50-MW17I		17MIP42-TW51-MW18S		17MIP43-TW52-MW19S		17MIP48-TW57-MW20S	
Type of Well	Permanent	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent	Temporary
Sample Number	17-G-16I-0305	17-Q-49-0105	17-G-17I-0305	17-Q-50-0105	17-G-18S-0205	17-Q-51-0105	17-G-19S-0205	17-Q-52-0105	17-G-20S-0205	17-Q-57-0105
Screen Depth	15'-25'	16'-21'	13-23	24'-29'	4'-14'	5'-10'	8'-18'	13'-18'	4'-14'	6.5'-11.5'
1,1,2-Trichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichlorotrifluorethane	5 U	5 U	5 U	5 U	5 U	5 U	130	130	5 U	5 U
1,1-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.8 J	5 U
1,2-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	3 J	1 J
Chloroform	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.4 J	5 U
cis-1,2-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U	4 J	5	3 J	2 J
Dichlorodifluoromethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	3 J	2 J
Styrene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.8 J	0.5 J	5 U
Toluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Total 1,2-Dichloroethene	10 U	10 U	10 U	10 U		10 U	4 J	5 J	4 J	2 J
trans-1,2-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.6 J	5 U
Trichloroethene	5 U	5 U	0.3 J	5 U	5 U	5 U	260	310	120	87
Trichlorofluoromethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	5 U	5 U	5 U	5 U	2 U	5 U	5 U	5 U	5 U	5 U

NA = Not applicable.
J = Estimated.
U = Not detected at detection limit shown.

TABLE 4-11

SWMU 17 COMPARISON OF TREE CORING RESULTS WITH GROUNDWATER AND SOIL SAMPLES
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Sample Location	Sample Type	cis-1,2-DCE	TCE	PCE
Tree 1	Tree (pine)	15.73	7329	0
17TW01S	Groundwater (DPT)	350 J	31000	ND
Tree 2 (pine)	Tree (pine)	78.82	50220	0
17MIP19	Groundwater (MIP)	280 J	19000 J	1 J
17MIP20 *	Groundwater (MIP)	240 J	95000 J	4 J
17SB23	Soil (3-5 ft bgs)	86	1000	ND
Tree 4 (pine)	Tree (pine)	0	4220	0
17MIP18	Groundwater (MIP)	80	5300 J	ND
17SB22	Soil (3-5 ft bgs)	6 J	99	ND
Tree 5 (pine)	Tree (pine)	0	860	0
17MIP17	Groundwater (MIP)	18	9900 J	0.5 J
Tree 9 (pine)	Tree (pine)	0	0	10
17MIP12	Groundwater (MIP)	0.9 J	ND	6
Tree 18 (pine)	Tree (pine)	114.9	9285	0
17MIP21	Groundwater (MIP)	200	7000	1 J
Tree 102 (pine)	Tree (pine)	0	7	0
17MIP20 *	Groundwater (MIP)	240 J	95000 J	4 J
Tree 400 (pine)	Tree (pine)	16.99	79	0
17MIP14	Groundwater (MIP)	ND	32	ND
Tree 504 (pine)	Tree (pine)	19.4	15310	0
17MIP21	Groundwater (MIP)	200	7000	1 J
Tree 507 (tallow)	Tree (tallow)	0	0	13
17MW02S	Groundwater (Permanent Well)	3 J	2 J	61

Units for groundwater, soil, and tree coring results are in parts per billion (ppb).
Tree coring was conducted in September 2002.

* Elevated 17MIP20 groundwater concentrations correlate with elevated tree coring results at nearby Tree 2 but does not correlate well with low tree coring results at nearby Tree 102.

cis-1,2-DCE = cis-1,2-Dichloroethene.
PCE = Tetrachloroethene.
TCE = Trichloroethene.

DPT = Direct-push technology.
MIP = Membrane interface probe.
J = Estimated concentration.
ND = Not detected.

TABLE 4-12

SWMU 17 COMPARISON OF COLOR-TEC SCREENING RESULTS WITH GROUNDWATER SAMPLES
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Sample Number	MIP Location	Total Chlorinated VOCs (ug/L)	Total Chlorinated Ethenes (ug/L)	ColorTec Results [a]
17-Q-31	MIP01	106	94	2.5
17-Q-30	MIP02	850	440	0.1 to 3.0*
17-Q-29	MIP03	1329	339	0.1 to 3.0*
17-Q-28	MIP04	3021	479	0.1 to 3.0*
17-Q-27	MIP05	54	49	1
17-Q-26	MIP06	65	57	1
17-Q-24	MIP07	150	150	3
17-Q-23	MIP08	36	5	0.2
17-Q-21	MIP09	35	35	ND
17-Q-25D	MIP10	42	30	1.5
17-Q-25S	MIP10	ND	ND	ND
17-Q-11	MIP11	ND	ND	ND
17-Q-12	MIP12	239	7	ND
17-Q-16	MIP13	36	14	ND
17-Q-22	MIP14	32	32	0.5
17-Q-15	MIP15	4648	4608	1.5 to 2.0
17-Q-14	MIP16	3168	3073	>3.0
17-Q-20	MIP17	10098	9921	>3.0
17-Q-17	MIP18	5426	5381	>3.0
17-Q-18	MIP19	19665	19299	>3.0
17-Q-19	MIP20	96230	95267	>3.0
17-Q-13	MIP21	7437	7226	>3.0

MIP = Membrane Interface Probe.
ND = Nondetect.

a. Color Tec tube range 0.0 (ND) to 3.0.

* Operational error although contamination was present

TABLE 4-13

SWMU 16 SURFACE WATER SUMMARY STATISTICS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Detection	Maximum Detection	Sample Number of Maximum Detection	Sample Location of Maximum Detection	MCL [1]	Facility Background [3]
Volatile Organics (ug/L)							
ISOBUTANOL	1/1	6 J	6 J	16-W-02-1001	16SW/SD02	1,800 [2]	NA
TETRACHLOROETHENE	1/7	0.7 J	0.7 J	16-W-07-1001	16SW/SD07	5	NA
Explosives (ug/L)							
2,4-DINITROTOLUENE	1/14	0.66 J	0.66 J	16-W-01-1001	16SW/SD01	73 [2]	NA
2,6-DINITROTOLUENE	1/14	0.41 J	0.41 J	16-W-01-1001	16SW/SD01	36 [2]	NA
Inorganics (ug/L)							
ALUMINUM	6/7	524	11,000	16-W-05-1001	16SW/SD05	36,000 [2]	1,150,000
ANTIMONY	2/7	11.2	11.8	16-W-04-1001	16SW/SD04	6	NA
ARSENIC	1/7	3.9	4.5	16-W-01-1001-D	16SW/SD01	10	4.4
BARIUM	7/7	17.6	63.4	16-W-05-1001	16SW/SD05	2,000	300
CALCIUM	7/7	142,000	186,000	16-W-02-1001	16SW/SD02	NA	583,000
COPPER	2/7	11.7	12.8	16-W-02-1001	16SW/SD02	1,300	7
IRON	6/7	704	9,980	16-W-05-1001	16SW/SD05	11,000 [2]	521,000
LEAD	4/7	2.1	15.5	16-W-05-1001	16SW/SD05	15 [4]	19
MAGNESIUM	7/7	419,000	512,000	16-W-02-1001	16SW/SD02	NA	11,700
MANGANESE	7/7	1.5	388	16-W-07-1001	16SW/SD07	880 [2]	2,580
MERCURY	2/7	0.05	0.09	16-W-05-1001	16SW/SD05	2	NA
POTASSIUM	7/7	138,000	160,000	16-W-01-1001	16SW/SD01	NA	5,200
SILVER	1/7	1.2	1.2	16-W-01-1001	16SW/SD01	180 [2]	NA
SODIUM	7/7	3,250,000	4,270,000	16-W-01-1001	16SW/SD01	NA	208,000
VANADIUM	6/7	2.1	24.2	16-W-05-1001	16SW/SD05	260 [2]	78.8
ZINC	5/7	2	71	16-W-02-1001	16SW/SD02	11,000 [2]	153
Explosives (ug/L)							
2,4,6-TRINITROTOLUENE	1/7	0.21	0.21	16-W-07-1001	16SW/SD07	2.2 [2]	NA

Associated Samples:
16-W-01-1001,DUP
16-W-01-1001,AVG
16-W-01-1001-D,DUP
16-W-02-1001,NORMAL
16-W-03-1001,NORMAL
16-W-04-1001,NORMAL
16-W-05-1001,NORMAL
16-W-06-1001,NORMAL
16-W-07-1001,NORMAL

1 - USEPA Winter 2004, "Drinking Water Standards and Health Advisories".
2 - USEPA 2004 Preliminary Remediation Goals (PRGs) for Tap Water presented for informational purposes where Maximum Contaminant Levels (MCLs) not available.
3. NWS Charleston facility background concentration (TtNUS, 2002)
4. The statistically calculated background concentration for lead in groundwater was 19 ug/L, but based on State concerns with this value, the national action level of 15 ug/L was used as the default value.

J = Estimated concentration.
NA = Not applicable.

TABLE 4-14

SWMU 17 SURFACE WATER SUMMARY STATISTICS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Detection	Maximum Detection	Sample Number of Maximum Detection	Sample Location of Maximum Detection	MCL [1]	Facility Background [3]
ALUMINUM	1/1	1,400	1,400	17-W-01-1001	17SW/SD01	36,000 [2]	1,150,000
ANTIMONY	1/1	5.5	5.5	17-W-01-1001	17SW/SD01	6	NA
ARSENIC	1/1	4.4	4.4	17-W-01-1001	17SW/SD01	10	4.4
BARIUM	1/1	47.3	47.3	17-W-01-1001	17SW/SD01	2,000	300
CALCIUM	1/1	167,000	16,000	17-W-01-1001	17SW/SD01	NA	583,000
COBALT	1/1	2.9	2.9	17-W-01-1001	17SW/SD01	730	16
IRON	1/1	2,740	2,740	17-W-01-1001	17SW/SD01	11,000 [2]	521,000
MAGNESIUM	1/1	488,000	488,000	17-W-01-1001	17SW/SD01	NA	11,700
MANGANESE	1/1	169	169	17-W-01-1001	17SW/SD01	880 [2]	2,580
POTASSIUM	1/1	143,000	143,000	17-W-01-1001	17SW/SD01	NA	5,200
SILVER	1/1	1.3	1.3	17-W-01-1001	17SW/SD01	180 [2]	NA
SODIUM	1/1	4,100,000	4,100,000	17-W-01-1001	17SW/SD01	NA	208,000
VANADIUM	1/1	5.2	5.2	17-W-01-1001	17SW/SD01	260 [2]	78.8
ZINC	1/1	16.4	16.4	17-W-01-1001	17SW/SD01	11,000 [2]	153

Associated Samples:

17-W-01-1001,NORMAL

1 - USEPA Winter 2004, "Drinking Water Standards and Health Advisories".
2 - USEPA 2004 Preliminary Remediation Goals (PRGs) for Tap Water presented for informational purposes where Maximum Contaminant Levels (MCLs) not available.
3. NWS Charleston facility background concentration (TINUS, 2002)

NA = Not applicable.

TABLE 4-15

SWMU 16 SEDIMENT SUMMARY STATISTICS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Detection	Maximum Detection	Sample Number of Maximum Detection	Sample Location of Maximum Detection	Soil Facility Background Concentration[1]	Soil Region 9 PRG[2]
Volatile Organics (ug/kg)							
CARBON DISULFIDE	5/7	2 J	17 J	16-D-03-1001	16SW/SD03	NA	360,000
Semivolatile Organics (ug/kg)							
ANTHRACENE	1/7	68 J	68 J	16-D-03-1001	16SW/SD03	NA	22,000,000
BENZO(A)ANTHRACENE	4/7	44 J	200 J	16-D-03-1001	16SW/SD03	NA	620
BENZO(A)PYRENE	3/7	19 J	160 J	16-D-03-1001	16SW/SD03	NA	62
BENZO(B)FLUORANTHENE	4/7	21 J	1,100 J	16-D-02-1001	16SW/SD02	NA	620
BENZO(G,H,I)PERYLENE	1/7	130 J	130 J	16-D-03-1001	16SW/SD03	NA	2,300,000
CHRYSENE	2/7	190 J	710 J	16-D-02-1001	16SW/SD02	NA	62,000
FLUORANTHENE	4/7	42 J	350 J	16-D-03-1001	16SW/SD03	NA	2,300,000
INDENO(1,2,3-CD)PYRENE	1/7	120 J	120 J	16-D-03-1001	16SW/SD03	NA	620
PHENANTHRENE	1/7	190 J	190 J	16-D-03-1001	16SW/SD03	NA	2,300,000
PYRENE	3/7	81 J	940 J	16-D-02-1001	16SW/SD02	NA	2,300,000
Pesticides/PCBs (ug/kg)							
4,4'-DDD	3/7	1.4 J	5.3 J	16-D-06-1001	16SW/SD06	NA	2,400
4,4'-DDE	6/7	2.2 J	4.2 J	16-D-03-1001	16SW/SD03	21	1,700
4,4'-DDT	4/7	1 J	4.4 J	16-D-06-1001	16SW/SD06	NA	1,700
ALPHA-CHLORDANE	1/7	3.7 J	3.7 J	16-D-02-1001	16SW/SD02	NA	1,600
AROCLOR-1242	1/7	160 J	160 J	16-D-02-1001	16SW/SD02	NA	220
AROCLOR-1260	1/7	26 J	26 J	16-D-02-1001	16SW/SD02	NA	220
GAMMA-CHLORDANE	1/7	3.3 J	3.3 J	16-D-02-1001	16SW/SD02	NA	1,600
ALPHA-BHC	3/7	7 J	14 J	16-D-03-1001	16SW/SD03	NA	90
GAMMA-BHC (LINDANE)	3/7	5 J	6.4 J	16-D-03-1001	16SW/SD03	NA	440
Inorganics (mg/kg)							
ALUMINUM	7/7	3,640	45,100 J	16-D-05-1001	16SW/SD05	16900	76,000
ARSENIC	6/7	14.6 J	20.6 J	16-D-05-1001	16SW/SD05	9.45	0.39
BARIUM	7/7	5.7	49.6 J	16-D-05-1001	16SW/SD05	64.5	5,400
BERYLLIUM	7/7	0.18	1.8 J	16-D-03-1001 16-D-04-1001 16-D-05-1001	16SW/SD03 16SW/SD04 16SW/SD05	0.58	150
CALCIUM	7/7	714	3,240 J	16-D-03-1001	16SW/SD03	6120	NA
CHROMIUM	7/7	6.9	71.6 J	16-D-04-1001	16SW/SD04	42.9	30
COBALT	7/7	0.69	14.1 J	16-D-06-1001	16SW/SD06	2.71	900
COPPER	7/7	1.2	100 J	16-D-02-1001	16SW/SD02	3.23	3,100
IRON	7/7	3,720	51,400 J	16-D-05-1001	16SW/SD05	67900	23,000
LEAD	7/7	5.4	46.5 J	16-D-02-1001	16SW/SD02	15.5	400
MAGNESIUM	7/7	486	7,960 J	16-D-03-1001	16SW/SD03	746	NA
MANGANESE	7/7	12.8	234 J	16-D-05-1001	16SW/SD05	25.1	1,800
MERCURY	1/7	0.29 J	0.29 J	16-D-05-1001	16SW/SD05	0.21	23
NICKEL	4/7	19.2 J	29.1 J	16-D-02-1001	16SW/SD02	12.1	1,600
POTASSIUM	7/7	284	3,980 J	16-D-03-1001	16SW/SD03	225	NA
SELENIUM	4/7	1	2.6 J	16-D-05-1001	16SW/SD05	2.84	390
SODIUM	7/7	1,480	18,500 J	16-D-03-1001	16SW/SD03	370	NA
VANADIUM	7/7	7.1	79.4 J	16-D-04-1001	16SW/SD04	66.3	78
ZINC	7/7	8.4	158 J	16-D-02-1001	16SW/SD02	20.5	2,000
Miscellaneous Parameters							
Total Solids (%)	7/7	20	77	16-D-01-1001-D	16SW/SD01	NA	NA

J = Estimated
NA = Not Applicable (either not detected or a facility background concentration is not available).

1. NWS Charleston Facility Baseline Background Report for hydric soil (TtNUS, March 2002).
2. Region 9 Preliminary Remediation Goals (PRGs) for residential soil, (USEPA, 2004).

For duplicates, frequency of detection considers the average concentration of a sample and its duplicate while location of maximum concentration considers a sample and its duplicate as separate samples.

TABLE 4-15

SWMU 16 SEDIMENT SUMMARY STATISTICS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Associated Samples:
16-D-01-1001,DUP
16-D-01-1001-AVG,AVG
16-D-01-1001-D,DUP
16-D-02-1001,NORMAL
16-D-03-1001,NORMAL
16-D-04-1001,NORMAL
16-D-05-1001,NORMAL
16-D-06-1001,NORMAL
16-D-07-1001,NORMAL

TABLE 4-16

SWMU 17 SEDIMENT SUMMARY STATISTICS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Detection	Sample Number of Maximum Detection	Sample Location of Maximum Detection	Soil Facility Background Concentration[1]	Soil Region 9 PRG[2]
Volatile Organics (ug/kg)						
CARBON DISULFIDE	1/1	19 J	17-D-01-1001	17SW/SD01	NA	360,000
Pesticides (ug/kg)						
4,4'-DDE	1/1	3.6 J	17-D-01-1001	17SW/SD01	21	1,700
ENDOSULFAN SULFATE	1/1	2.8 J	17-D-01-1001	17SW/SD01	NA	370,000
HEPTACHLOR	1/1	1.5 J	17-D-01-1001	17SW/SD01	NA	110
Inorganics (mg/kg)						
ALUMINUM	1/1	20,900	17-D-01-1001	17SW/SD01	16,900	76,000
ARSENIC	1/1	9.4	17-D-01-1001	17SW/SD01	9.45	0.39
BARIUM	1/1	27.6	17-D-01-1001	17SW/SD01	64.5	5,400
BERYLLIUM	1/1	1.3	17-D-01-1001	17SW/SD01	0.58	150
CALCIUM	1/1	2,410	17-D-01-1001	17SW/SD01	6,120	NA
CHROMIUM	1/1	40.2	17-D-01-1001	17SW/SD01	42.9	30
COBALT	1/1	10.5	17-D-01-1001	17SW/SD01	2.71	900
COPPER	1/1	18.4	17-D-01-1001	17SW/SD01	3.23	3,100
IRON	1/1	24,500	17-D-01-1001	17SW/SD01	67,900	23,000
LEAD	1/1	35.2	17-D-01-1001	17SW/SD01	15.5	400
MAGNESIUM	1/1	5,070	17-D-01-1001	17SW/SD01	746	NA
MANGANESE	1/1	256	17-D-01-1001	17SW/SD01	25.1	1,800
MERCURY	1/1	0.39	17-D-01-1001	17SW/SD01	0.21	23
POTASSIUM	1/1	2,480	17-D-01-1001	17SW/SD01	225	NA
SODIUM	1/1	11,500	17-D-01-1001	17SW/SD01	370	NA
VANADIUM	1/1	60.9	17-D-01-1001	17SW/SD01	66.3	78
ZINC	1/1	73.4	17-D-01-1001	17SW/SD01	20.5	23,000
Miscellaneous Parameters						
TOTAL SOLIDS	1/1	30	17-D-01-1001	17SW/SD01	NA	NA

J = Estimated.

1. Region 9 Preliminary Remediation Goals (PRGs) for residential soil, (USEPA, 2004).
2. NWS Charleston Facility Baseline Background Report for hydric soil (TtNUS, March 2002).

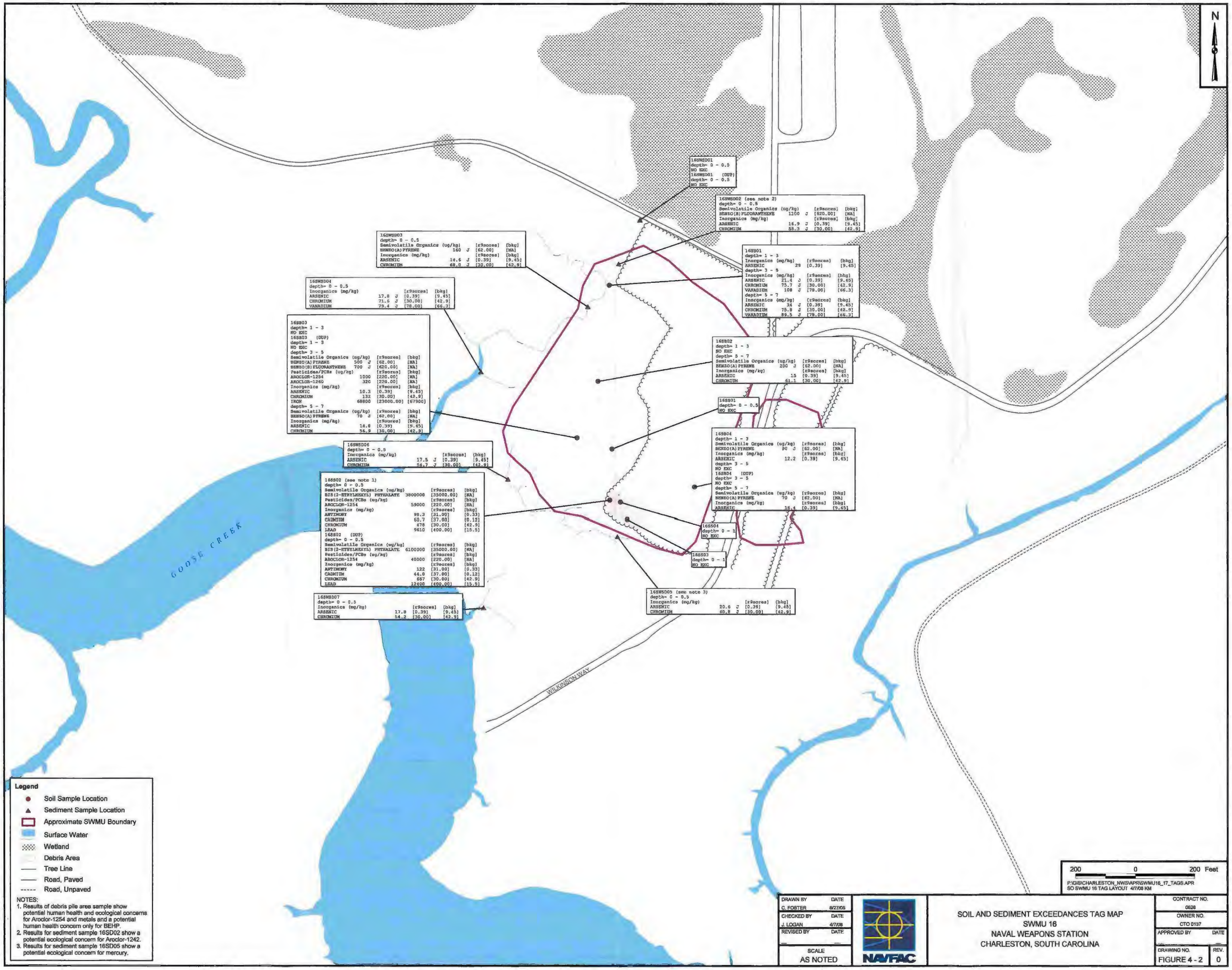
Associated Sample:

17-D-01-1001,NORMAL

DRAWN BY HJB	DATE 5/5/04	AREAS OF SWMU 16/17 DISTURBANCE/ACTIVITY BASED ON HISTORIC AERIAL PHOTOS NAVAL WEAPONS STATION CHARLESTON, SOUTH CAROLINA	CONTRACT NO. 0528
CHECKED BY	DATE		OWNER NO. 0000
REVISED BY	DATE		APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 4-1 / REV. 0

FORM CADD NO. SDIV-C-STD.DWG - REV 1 - 9/14/98

ACAD: 0528GM10.dwg 10/28/05 HJB PIT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16SWSD01
depth= 0 - 0.5
NO EXC
16SWSD01 (DUP)
depth= 0 - 0.5
NO EXC
16SWSD02 (see note 2)
depth= 0 - 0.5
Semivolatile Organics (ug/kg) [r9scores] [bkg]
BENZO(B)FLUORANTHENE 1100 J [620.00] [NA]
Inorganics (mg/kg) [r9scores] [bkg]
ARSENIC 16.9 J [0.39] [9.45]
CHROMIUM 58.3 J [30.00] [42.9]
16SWSD03
depth= 0 - 0.5
Semivolatile Organics (ug/kg) [r9scores] [bkg]
BENZO(A)PYRENE 160 J [62.00] [NA]
Inorganics (mg/kg) [r9scores] [bkg]
ARSENIC 14.6 J [0.39] [9.45]
CHROMIUM 68.0 J [30.00] [42.9]
16SWSD04
depth= 0 - 0.5
Inorganics (mg/kg) [r9scores] [bkg]
ARSENIC 17.8 J [0.39] [9.45]
CHROMIUM 71.6 J [30.00] [42.9]
VANADIUM 79.4 J [78.00] [66.3]
16SB01
depth= 1 - 3
Inorganics (mg/kg) [r9scores] [bkg]
ARSENIC 29 [0.39] [9.45]
depth= 3 - 5
Inorganics (mg/kg) [r9scores] [bkg]
ARSENIC 21.4 J [0.39] [9.45]
CHROMIUM 75.7 J [30.00] [42.9]
VANADIUM 108 J [78.00] [66.3]
depth= 5 - 7
Inorganics (mg/kg) [r9scores] [bkg]
ARSENIC 34 J [0.39] [9.45]
CHROMIUM 75.8 J [30.00] [42.9]
VANADIUM 89.5 J [78.00] [66.3]
16SB03
depth= 1 - 3
NO EXC
16SB03 (DUP)
depth= 1 - 3
NO EXC
depth= 3 - 5
Semivolatile Organics (ug/kg) [r9scores] [bkg]
BENZO(A)PYRENE 500 J [62.00] [NA]
BENZO(B)FLUORANTHENE 700 J [620.00] [NA]
Pesticides/PCBs (ug/kg) [r9scores] [bkg]
AROCLOR-1254 1000 [220.00] [NA]
AROCLOR-1260 320 [220.00] [NA]
Inorganics (mg/kg) [r9scores] [bkg]
ARSENIC 10.3 [0.39] [9.45]
CHROMIUM 132 [30.00] [42.9]
IRON 68800 [23000.00] [67900]
depth= 5 - 7
Semivolatile Organics (ug/kg) [r9scores] [bkg]
BENZO(A)PYRENE 70 J [62.00] [NA]
Inorganics (mg/kg) [r9scores] [bkg]
ARSENIC 14.8 [0.39] [9.45]
CHROMIUM 56.9 [30.00] [42.9]
16SB02
depth= 1 - 3
NO EXC
depth= 5 - 7
Semivolatile Organics (ug/kg) [r9scores] [bkg]
BENZO(A)PYRENE 200 J [62.00] [NA]
Inorganics (mg/kg) [r9scores] [bkg]
ARSENIC 15 [0.39] [9.45]
CHROMIUM 61.1 [30.00] [42.9]
16SS01
depth= 0 - 0.5
NO EXC
16SB04
depth= 1 - 3
Semivolatile Organics (ug/kg) [r9scores] [bkg]
BENZO(A)PYRENE 90 J [62.00] [NA]
Inorganics (mg/kg) [r9scores] [bkg]
ARSENIC 12.2 [0.39] [9.45]
depth= 3 - 5
NO EXC
16SB04 (DUP)
depth= 3 - 5
NO EXC
depth= 5 - 7
Semivolatile Organics (ug/kg) [r9scores] [bkg]
BENZO(A)PYRENE 70 J [62.00] [NA]
Inorganics (mg/kg) [r9scores] [bkg]
ARSENIC 16.4 [0.39] [9.45]
16SWSD06
depth= 0 - 0.5
Inorganics (mg/kg) [r9scores] [bkg]
ARSENIC 17.5 J [0.39] [9.45]
CHROMIUM 54.7 J [30.00] [42.9]
16SS02 (see note 1)
depth= 0 - 0.5
Semivolatile Organics (ug/kg) [r9scores] [bkg]
BIS(2-ETHYLHEXYL) PHTHALATE 3800000 [35000.00] [NA]
Pesticides/PCBs (ug/kg) [r9scores] [bkg]
AROCLOR-1254 59000 [220.00] [NA]
Inorganics (mg/kg) [r9scores] [bkg]
ANTIMONY 98.3 [31.00] [0.33]
CADMIUM 60.7 [37.00] [0.12]
CHROMIUM 478 [30.00] [42.9]
LEAD 9610 [400.00] [15.5]
16SS02 (DUP)
depth= 0 - 0.5
Semivolatile Organics (ug/kg) [r9scores] [bkg]
BIS(2-ETHYLHEXYL) PHTHALATE 6100000 [35000.00] [NA]
Pesticides/PCBs (ug/kg) [r9scores] [bkg]
AROCLOR-1254 40000 [220.00] [NA]
Inorganics (mg/kg) [r9scores] [bkg]
ANTIMONY 122 [31.00] [0.33]
CADMIUM 44.0 [37.00] [0.12]
CHROMIUM 667 [30.00] [42.9]
LEAD 12400 [400.00] [15.5]
16SS04
depth= 0 - 1
NO EXC
16SS03
depth= 0 - 1
NO EXC
16SWSD05 (see note 3)
depth= 0 - 0.5
Inorganics (mg/kg) [r9scores] [bkg]
ARSENIC 20.6 J [0.39] [9.45]
CHROMIUM 60.8 J [30.00] [42.9]
16SWSD07
depth= 0 - 0.5
Inorganics (mg/kg) [r9scores] [bkg]
ARSENIC 17.8 [0.39] [9.45]
CHROMIUM 54.2 [30.00] [42.9]
GOOSE CREEK
WILKINSON WAY
Legend
Soil Sample Location
Sediment Sample Location
Approximate SWMU Boundary
Surface Water
Wetland
Debris Area
Tree Line
Road, Paved
Road, Unpaved
NOTES:
1. Results of debris pile area sample show potential human health and ecological concerns for Aroclor-1254 and metals and a potential human health concern only for BEHP.
2. Results for sediment sample 16SD02 show a potential ecological concern for Aroclor-1242.
3. Results for sediment sample 16SD05 show a potential ecological concern for mercury.
200 0 200 Feet
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SO SWMU 16 TAG LAYOUT 4/7/08 KM
DRAWN BY C. FOSTER DATE 8/27/05
CHECKED BY J. LOGAN DATE 4/7/08
REVISED BY DATE
SCALE AS NOTED
NAVFAC
SOIL AND SEDIMENT EXCEEDANCES TAG MAP
SWMU 16
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA
CONTRACT NO. 0628
OWNER NO. CTO 0137
APPROVED BY DATE
DRAWING NO. FIGURE 4 - 2
REV. 0

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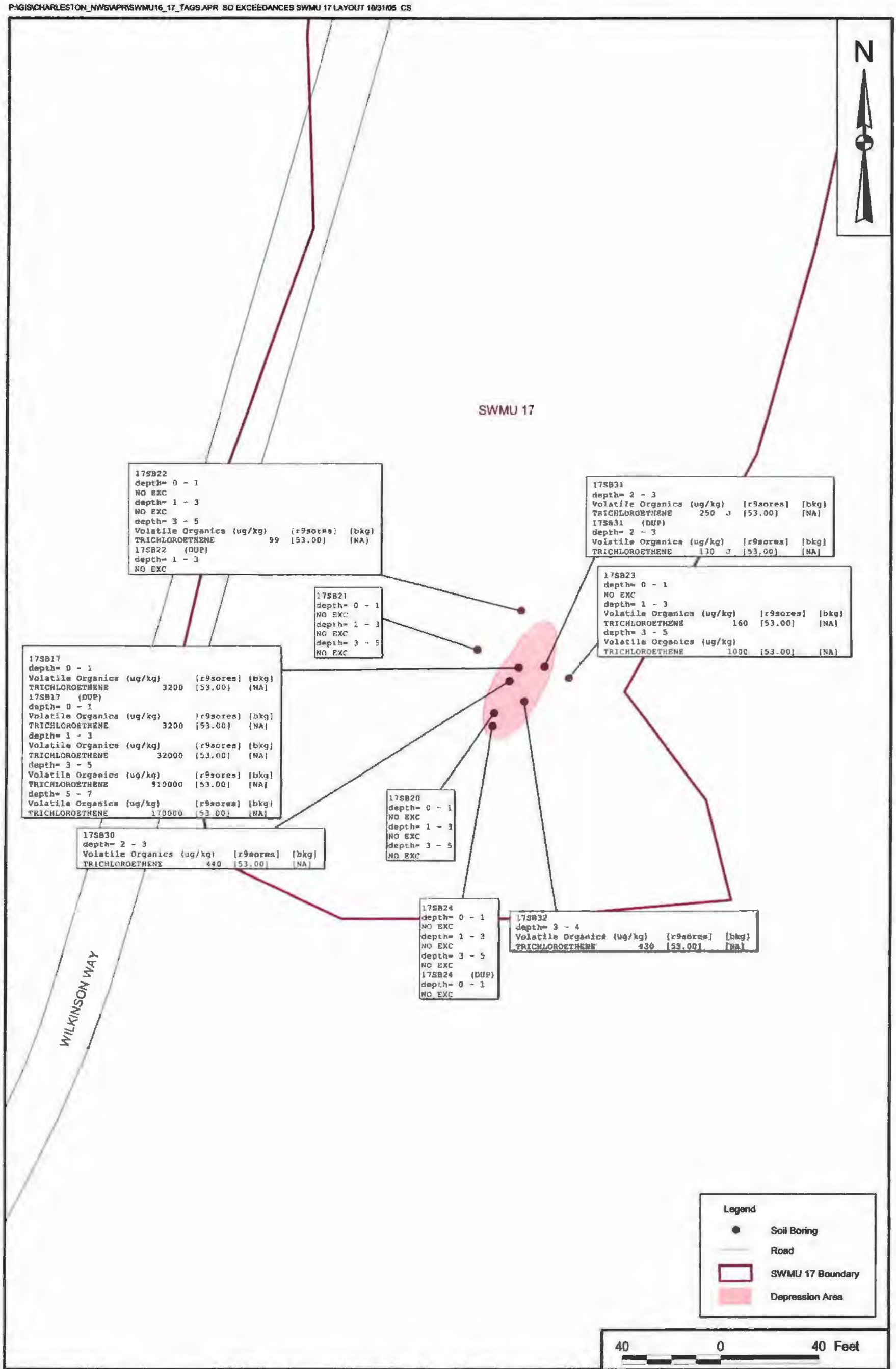
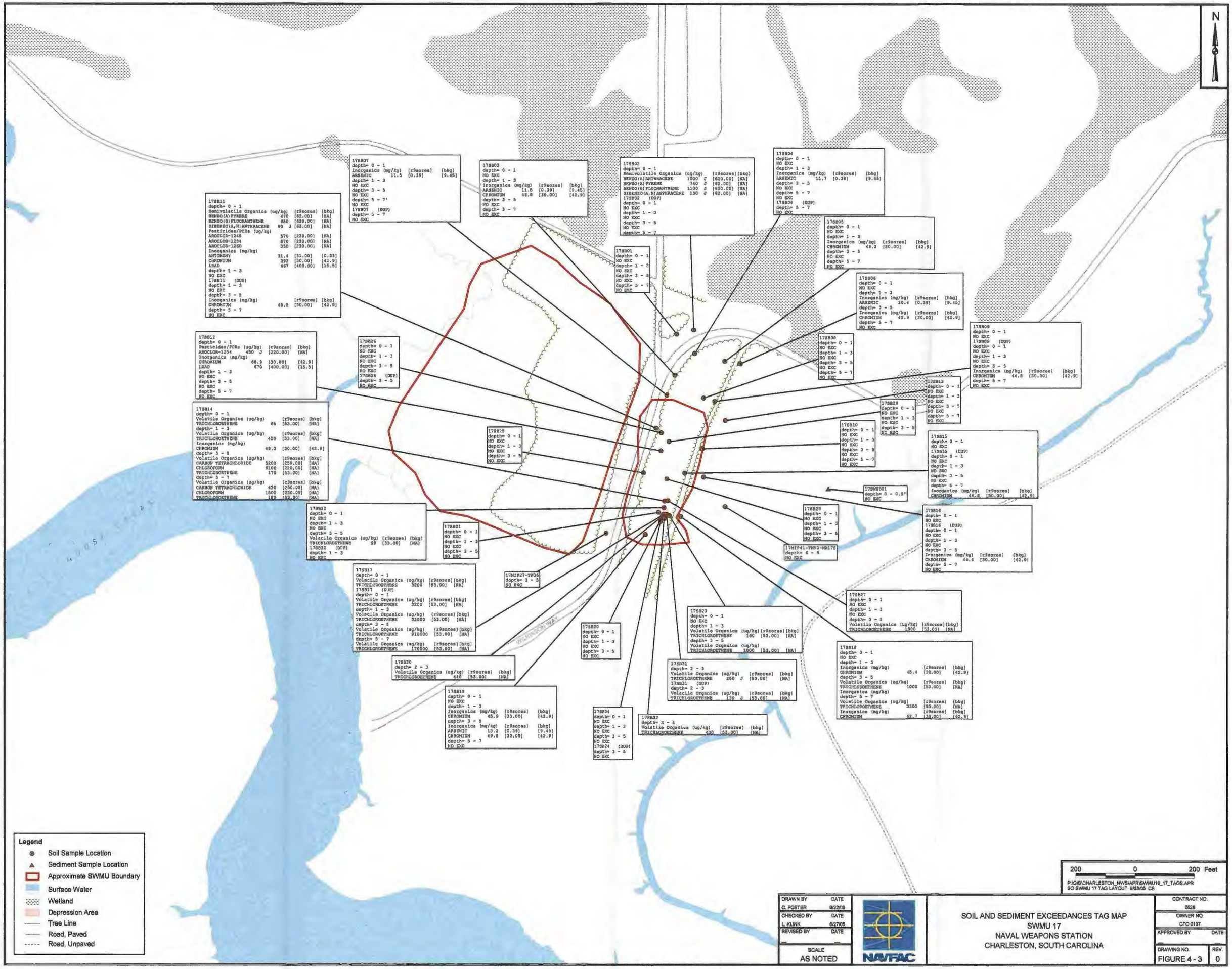
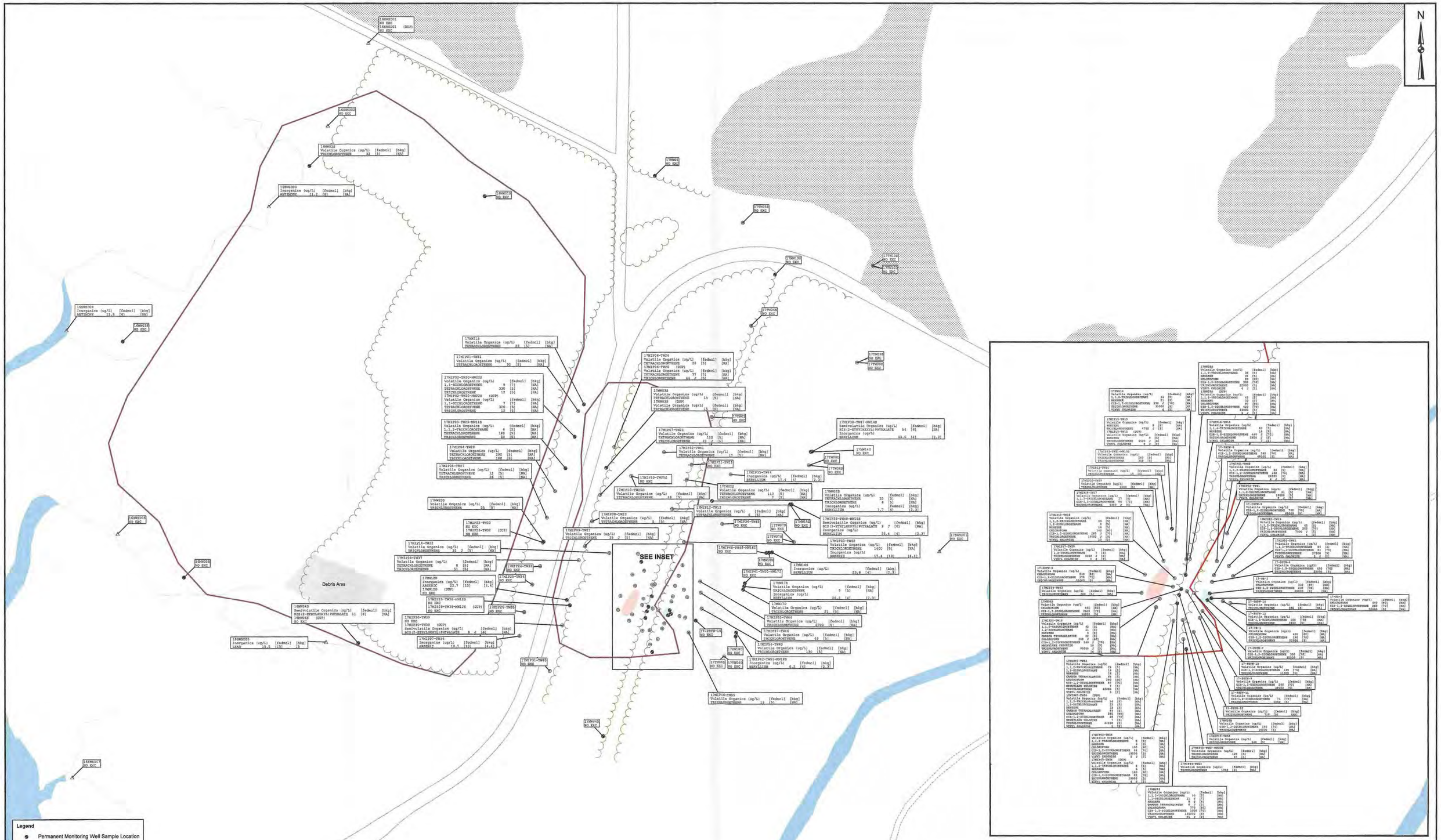


DRAWN BY C. SPEHAR	DATE 9/28/05	SOIL EXCEEDANCES TAG MAP SWMU 17 - DEPRESSION AREA NAVAL WEAPONS STATION CHARLESTON, SOUTH CAROLINA	CONTRACT NUMBER 0528
CHECKED BY L. KLINK	DATE 9/28/05		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED		NAVFAC	DRAWING NO. FIGURE 4 - 3A REV 0


N
17SB07
depth= 0 - 1
Inorganics (mg/kg) [r9scres] [bkg]
ARSENIC 11.5 [0.39] [9.45]
depth= 1 - 3
NO EXC
depth= 3 - 5
NO EXC
depth= 5 - 7'
17SB07 (DUP)
depth= 5 - 7
NO EXC
17SB03
depth= 0 - 1
NO EXC
depth= 1 - 3
Inorganics (mg/kg) [r9scres] [bkg]
ARSENIC 11.5 [0.39] [9.45]
CHROMIUM 48.8 [30.00] [42.9]
depth= 3 - 5
NO EXC
depth= 5 - 7
NO EXC
17SB02
depth= 0 - 1
Semivolatile Organics (ug/kg) [r9scres] [bkg]
BENZO(A)ANTHRACENE 1000 J [620.00] [NA]
BENZO(A)PYRENE 740 J [62.00] [NA]
BENZO(B)FLUORANTHENE 1100 J [620.00] [NA]
DIBENZO(A,H)ANTHRACENE 130 J [62.00] [NA]
17SB02 (DUP)
depth= 0 - 1
NO EXC
depth= 1 - 3
NO EXC
depth= 3 - 5
NO EXC
depth= 5 - 7
17SB04
depth= 0 - 1
NO EXC
depth= 1 - 3
Inorganics (mg/kg) [r9scres] [bkg]
ARSENIC 11.7 [0.39] [9.45]
depth= 3 - 5
NO EXC
depth= 5 - 7
NO EXC
17SB04 (DUP)
depth= 5 - 7
NO EXC
17SB11
depth= 0 - 1
Semivolatile Organics (ug/kg) [r9scres] [bkg]
BENZO(A)PYRENE 470 [62.00] [NA]
BENZO(B)FLUORANTHENE 880 [620.00] [NA]
DIBENZO(A,H)ANTHRACENE 90 J [62.00] [NA]
Pesticides/PCBs (ug/kg)
AROCLOR-1248 570 [220.00] [NA]
AROCLOR-1254 870 [220.00] [NA]
AROCLOR-1260 350 [220.00] [NA]
Inorganics (mg/kg)
ANTIMONY 31.4 [31.00] [0.33]
CHROMIUM 392 [30.00] [42.9]
LEAD 667 [400.00] [15.5]
depth= 1 - 3
NO EXC
17SB11 (DUP)
depth= 1 - 3
NO EXC
depth= 3 - 5
Inorganics (mg/kg) [r9scres] [bkg]
CHROMIUM 48.2 [30.00] [42.9]
depth= 5 - 7
NO EXC
17SB01
depth= 0 - 1
NO EXC
depth= 1 - 3
NO EXC
depth= 3 - 5
NO EXC
depth= 5 - 7
NO EXC
17SB08
depth= 0 - 1
NO EXC
depth= 1 - 3
Inorganics (mg/kg) [r9scres] [bkg]
CHROMIUM 43.2 [30.00] [42.9]
depth= 3 - 5
NO EXC
depth= 5 - 7
NO EXC
17SB06
depth= 0 - 1
NO EXC
depth= 1 - 3
Inorganics (mg/kg) [r9scres] [bkg]
ARSENIC 10.4 [0.39] [9.45]
depth= 3 - 5
Inorganics (mg/kg) [r9scres] [bkg]
CHROMIUM 42.9 [30.00] [42.9]
depth= 5 - 7
NO EXC
17SB09
depth= 0 - 1
NO EXC
17SB09 (DUP)
depth= 0 - 1
NO EXC
depth= 1 - 3
NO EXC
depth= 3 - 5
Inorganics (mg/kg) [r9scres] [bkg]
CHROMIUM 44.5 [30.00] [42.9]
depth= 5 - 7
NO EXC
17SB12
depth= 0 - 1
Pesticides/PCBs (ug/kg) [r9scres] [bkg]
AROCLOR-1254 450 J [220.00] [NA]
Inorganics (mg/kg)
CHROMIUM 68.9 [30.00] [42.9]
LEAD 670 [400.00] [15.5]
depth= 1 - 3
NO EXC
depth= 3 - 5
NO EXC
depth= 5 - 7
NO EXC
17SB26
depth= 0 - 1
NO EXC
depth= 1 - 3
NO EXC
depth= 3 - 5
NO EXC
17SB26 (DUP)
depth= 3 - 5
NO EXC
17SB13
depth= 0 - 1
NO EXC
depth= 1 - 3
NO EXC
depth= 3 - 5
NO EXC
depth= 5 - 7
NO EXC
17SB29
depth= 0 - 1
NO EXC
depth= 1 - 3
NO EXC
depth= 3 - 5
NO EXC
17SB14
depth= 0 - 1
Volatile Organics (ug/kg) [r9scres] [bkg]
TRICHLOROETHENE 65 [53.00] [NA]
depth= 1 - 3
Volatile Organics (ug/kg) [r9scres] [bkg]
TRICHLOROETHENE 450 [53.00] [NA]
Inorganics (mg/kg)
CHROMIUM 49.3 [30.00] [42.9]
depth= 3 - 5
Volatile Organics (ug/kg) [r9scres] [bkg]
CARBON TETRACHLORIDE 5200 [250.00] [NA]
CHLOROFORM 9100 [220.00] [NA]
TRICHLOROETHENE 170 [53.00] [NA]
depth= 5 - 7
Volatile Organics (ug/kg) [r9scres] [bkg]
CARBON TETRACHLORIDE 420 [250.00] [NA]
CHLOROFORM 1800 [220.00] [NA]
TRICHLOROETHENE 180 [53.00] [NA]
17SB25
depth= 0 - 1
NO EXC
depth= 1 - 3
NO EXC
depth= 3 - 5
NO EXC
17SB10
depth= 0 - 1
NO EXC
depth= 1 - 3
NO EXC
depth= 3 - 5
NO EXC
depth= 5 - 7
NO EXC
17SB15
depth= 0 - 1
NO EXC
17SB15 (DUP)
depth= 0 - 1
NO EXC
depth= 1 - 3
NO EXC
depth= 3 - 5
NO EXC
depth= 5 - 7
Inorganics (mg/kg) [r9scres] [bkg]
CHROMIUM 46.8 [30.00] [42.9]
17SWSD01
depth= 0 - 0.5'
NO EXC
17SB22
depth= 0 - 1
NO EXC
depth= 1 - 3
NO EXC
depth= 3 - 5
Volatile Organics (ug/kg) [r9scres] [bkg]
TRICHLOROETHENE 99 [53.00] [NA]
17SB22 (DUP)
depth= 1 - 3
NO EXC
17SB21
depth= 0 - 1
NO EXC
depth= 1 - 3
NO EXC
depth= 3 - 5
NO EXC
17SB28
depth= 0 - 1
NO EXC
depth= 1 - 3
NO EXC
depth= 3 - 5
NO EXC
17SB16
depth= 0 - 1
NO EXC
17SB16 (DUP)
depth= 0 - 1
NO EXC
depth= 1 - 3
NO EXC
depth= 3 - 5
Inorganics (mg/kg) [r9scres] [bkg]
CHROMIUM 44.4 [30.00] [42.9]
depth= 5 - 7
NO EXC
17MIP41-TW50-MW17S
depth= 6 - 8
NO EXC
17SB17
depth= 0 - 1
Volatile Organics (ug/kg) [r9scres] [bkg]
TRICHLOROETHENE 3200 [53.00] [NA]
17SB17 (DUP)
depth= 0 - 1
Volatile Organics (ug/kg) [r9scres] [bkg]
TRICHLOROETHENE 3200 [53.00] [NA]
depth= 1 - 3
Volatile Organics (ug/kg) [r9scres] [bkg]
TRICHLOROETHENE 32000 [53.00] [NA]
depth= 3 - 5
Volatile Organics (ug/kg) [r9scres] [bkg]
TRICHLOROETHENE 910000 [53.00] [NA]
depth= 5 - 7
Volatile Organics (ug/kg) [r9scres] [bkg]
TRICHLOROETHENE 170000 [53.00] [NA]
17MIP27-TW36
depth= 3 - 5
NO EXC
17SB27
depth= 0 - 1
NO EXC
depth= 1 - 3
NO EXC
depth= 3 - 5
Volatile Organics (ug/kg) [r9scres] [bkg]
TRICHLOROETHENE 1900 [53.00] [NA]
17SB23
depth= 0 - 1
NO EXC
depth= 1 - 3
Volatile Organics (ug/kg) [r9scres] [bkg]
TRICHLOROETHENE 160 [53.00] [NA]
depth= 3 - 5
Volatile Organics (ug/kg)
TRICHLOROETHENE 1000 [53.00] [NA]
17SB20
depth= 0 - 1
NO EXC
depth= 1 - 3
NO EXC
depth= 3 - 5
NO EXC
17SB18
depth= 0 - 1
NO EXC
depth= 1 - 3
Inorganics (mg/kg) [r9scres] [bkg]
CHROMIUM 45.4 [30.00] [42.9]
depth= 3 - 5
Volatile Organics (ug/kg) [r9scres] [bkg]
TRICHLOROETHENE 1000 [53.00] [NA]
Inorganics (mg/kg)
depth= 5 - 7
Volatile Organics (ug/kg) [r9scres] [bkg]
TRICHLOROETHENE 3300 [53.00] [NA]
Inorganics (mg/kg) [r9scres] [bkg]
CHROMIUM 62.7 [30.00] [42.9]
17SB30
depth= 2 - 3
Volatile Organics (ug/kg) [r9scres] [bkg]
TRICHLOROETHENE 440 [53.00] [NA]
17SB31
depth= 2 - 3
Volatile Organics (ug/kg) [r9scres] [bkg]
TRICHLOROETHENE 250 J [53.00] [NA]
17SB31 (DUP)
depth= 2 - 3
Volatile Organics (ug/kg) [r9scres] [bkg]
TRICHLOROETHENE 130 J [53.00] [NA]
17SB19
depth= 0 - 1
NO EXC
depth= 1 - 3
Inorganics (mg/kg) [r9scres] [bkg]
CHROMIUM 45.9 [30.00] [42.9]
depth= 3 - 5
Inorganics (mg/kg) [r9scres] [bkg]
ARSENIC 13.2 [0.39] [9.45]
CHROMIUM 49.8 [30.00] [42.9]
depth= 5 - 7
NO EXC
17SB24
depth= 0 - 1
NO EXC
depth= 1 - 3
NO EXC
depth= 3 - 5
NO EXC
17SB24 (DUP)
depth= 3 - 5
NO EXC
17SB32
depth= 3 - 4
Volatile Organics (ug/kg) [r9scres] [bkg]
TRICHLOROETHENE 430 [53.00] [NA]
WILMINGTON WAY
Legend
Soil Sample Location
Sediment Sample Location
Approximate SWMU Boundary
Surface Water
Wetland
Depression Area
Tree Line
Road, Paved
Road, Unpaved
200 0 200 Feet
P:\GIS\CHARLESTON_NWS\APR\SWMU16_17_TAGS.APR
SO SWMU 17 TAG LAYOUT 9/28/05 CS
DRAWN BY C. FOSTER DATE 8/22/05
CHECKED BY L. KLINK DATE 8/27/05
REVISED BY DATE
SCALE AS NOTED
NAVFAC
SOIL AND SEDIMENT EXCEEDANCES TAG MAP
SWMU 17
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA
CONTRACT NO. 0528
OWNER NO. CTO 0137
APPROVED BY DATE
DRAWING NO. FIGURE 4 - 3
REV. 0

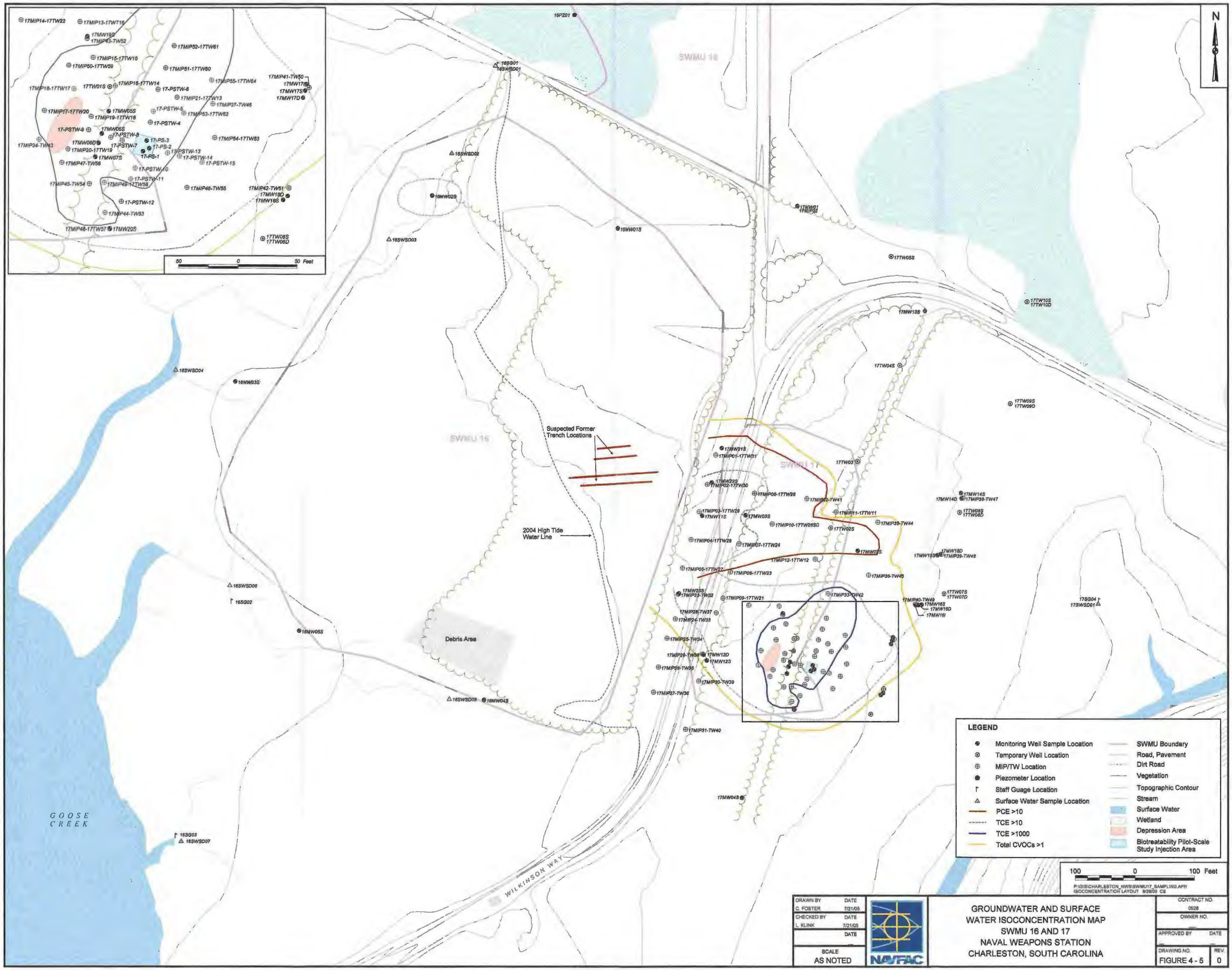


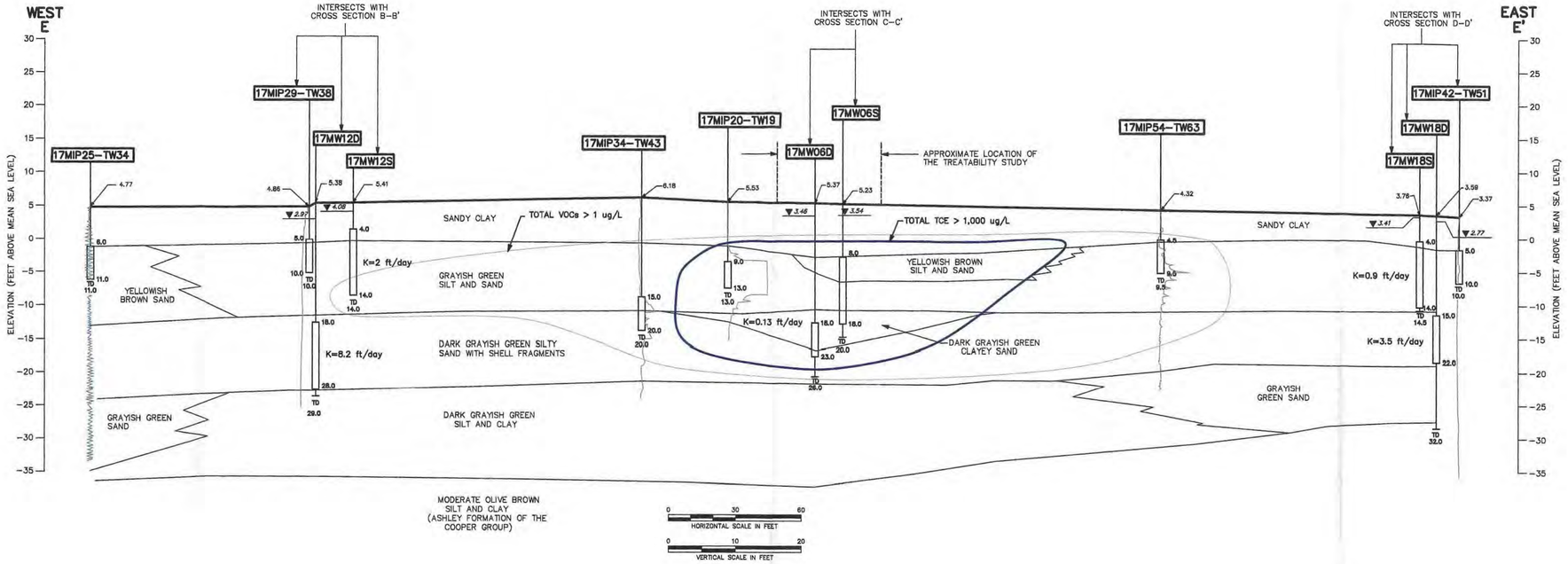
DRAWN BY C. FOSTER	DATE 6/23/05
CHECKED BY L. KLINK	DATE 7/14/05
	DATE
SCALE AS NOTED	

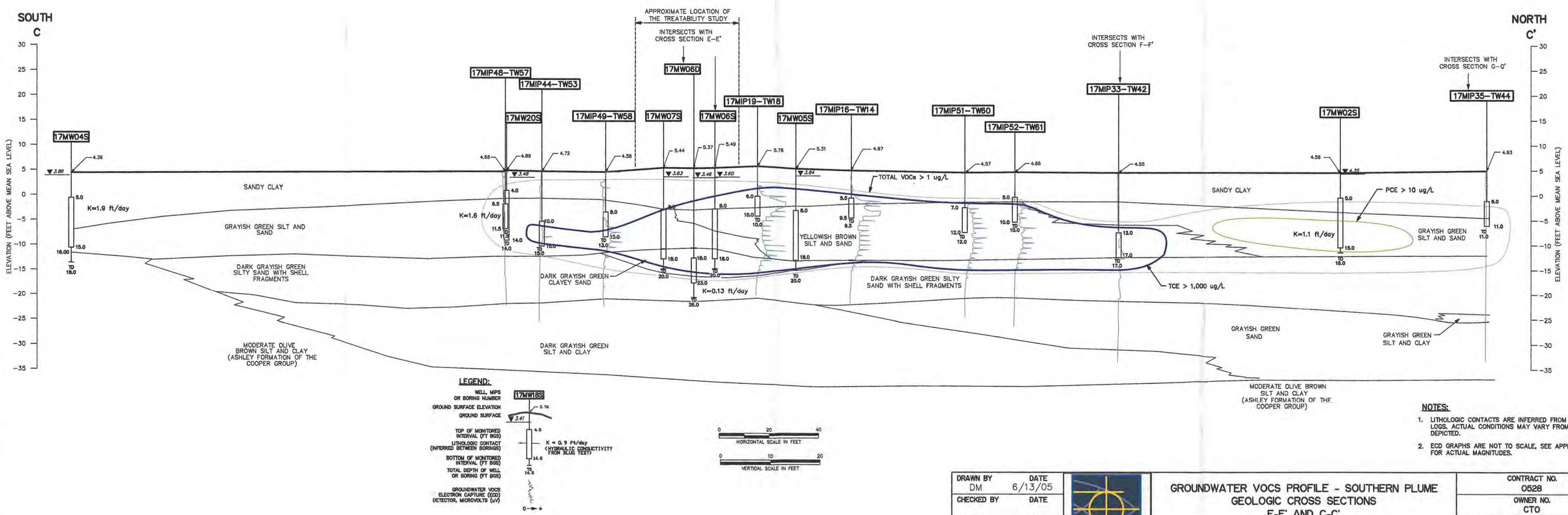
NAVFAC

GROUNDWATER AND SURFACE WATER TAG MAP
SWMUs 16 AND 17
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 0528	
OWNER NO.	
APPROVED BY	DATE
DRAWING NO. FIGURE 4 - 4	REV. 0


N
SWMU 16
SWMU 15
SWMU 17
Suspected Former Trench Locations
2004 High Tide Water Line
Debris Area
GOOSE CREEK
WILKINSON WAY
50 0 50 Feet
100 0 100 Feet
LEGEND
Monitoring Well Sample Location
Temporary Well Location
MIP/TW Location
Piezometer Location
Staff Guage Location
Surface Water Sample Location
PCE >10
TCE >10
TCE >1000
Total CVOCs >1
SWMU Boundary
Road, Pavement
Dirt Road
Vegetation
Topographic Contour
Stream
Surface Water
Wetland
Depression Area
Biotreatability Pilot-Scale Study Injection Area
P:\GIS\CHARLESTON_NWS\SWMU17_SAMPLING.APR
ISOCONCENTRATION LAYOUT 9/28/05 CS
DRAWN BY C. FOSTER DATE 7/21/05
CHECKED BY L. KLINK DATE 7/21/05
DATE
SCALE AS NOTED
NAVFAC
GROUNDWATER AND SURFACE WATER ISOCONCENTRATION MAP
SWMU 16 AND 17
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA
CONTRACT NO. 0528
OWNER NO.
APPROVED BY DATE
DRAWING NO. FIGURE 4 - 5
REV. 0





LEGEND:

WELL, MIPS OR BORING NUMBER — 17MW16S
GROUND SURFACE ELEVATION — 3.76
GROUND SURFACE — 3.41
TOP OF MONITORED INTERVAL (FT BGS) — 4.0
LITHOLOGIC CONTACT (INFERRED BETWEEN BORINGS)
K = 0.9 ft/day (HYDRAULIC CONDUCTIVITY FROM SLUG TEST)
BOTTOM OF MONITORED INTERVAL (FT BGS) — 14.0
TOTAL DEPTH OF WELL OR BORING (FT BGS) — TD 14.5
GROUNDWATER VOCS ELECTRON CAPTURE (ECD) DETECTOR, MICROVOLTS (uV) — 0 → +

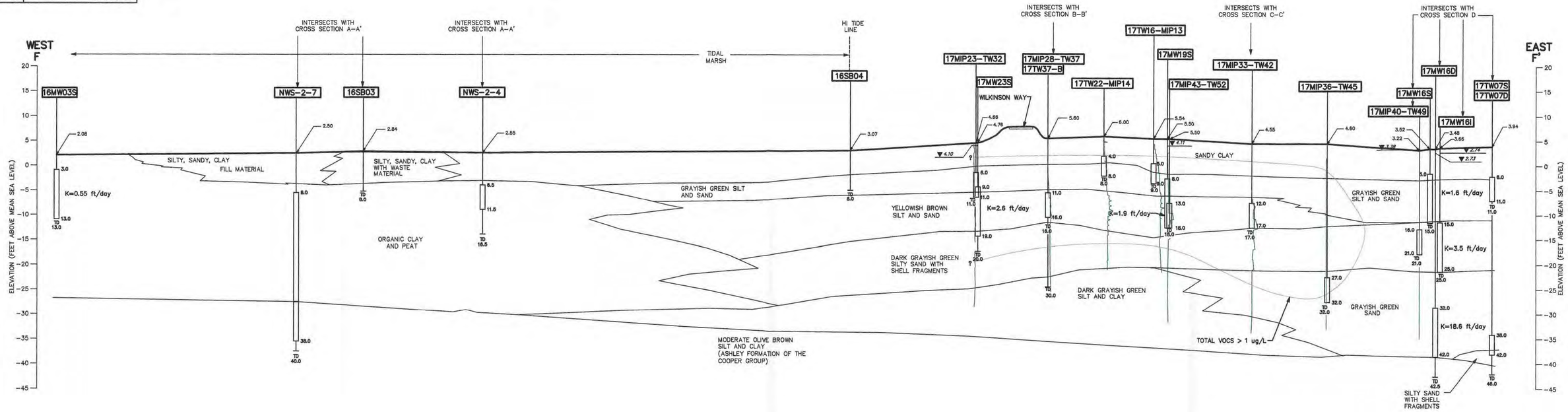
NOTES:

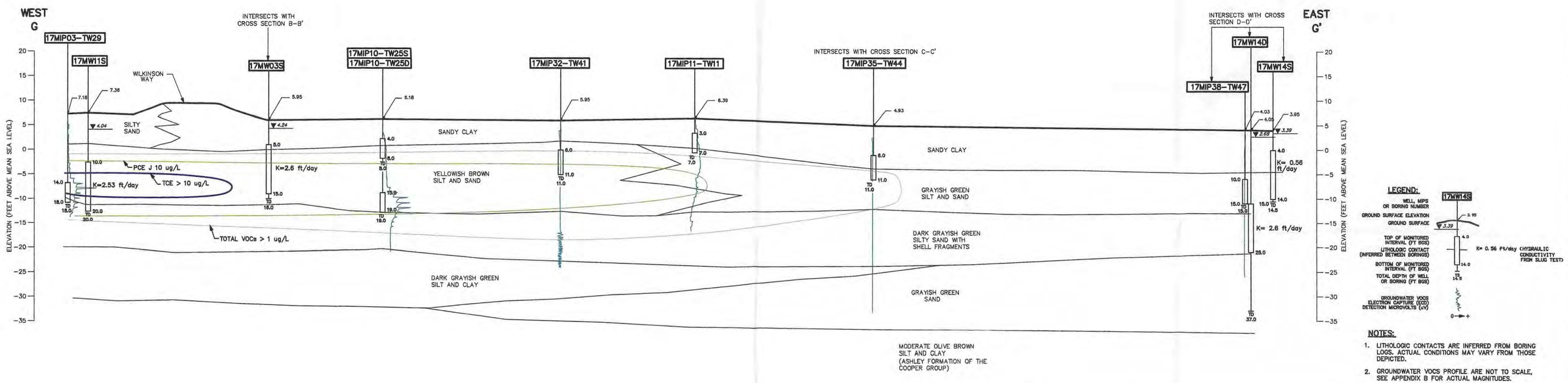
1. LITHOLOGIC CONTACTS ARE INFERRED FROM BORING LOGS. ACTUAL CONDITIONS MAY VARY FROM THOSE DEPICTED.
2. ECD GRAPHS ARE NOT TO SCALE, SEE APPENDIX B FOR ACTUAL MAGNITUDES.

DRAWN BY DM	DATE 6/13/05	GROUNDWATER VOCS PROFILE - SOUTHERN PLUME GEOLOGIC CROSS SECTIONS E-E' AND C-C' NAVAL WEAPONS STATION CHARLESTON, SOUTH CAROLINA
CHECKED BY	DATE	
REVISED BY	DATE	
SCALE AS NOTED		

NAVFAC

CONTRACT NO. 0528
OWNER NO. CTO
APPROVED BY — DATE
DRAWING NO. FIGURE 4-6 — REV. 0





LEGEND:

NOTES:

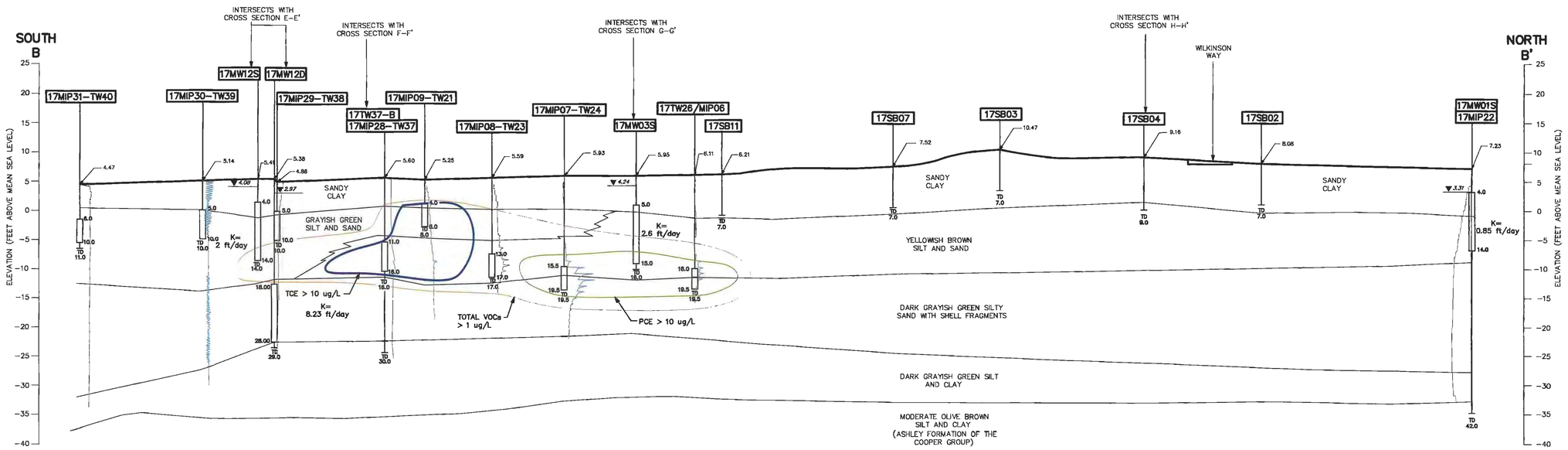
1. LITHOLOGIC CONTACTS ARE INFERRED FROM BORING LOGS. ACTUAL CONDITIONS MAY VARY FROM THOSE DEPICTED.
2. GROUNDWATER VOCS PROFILE ARE NOT TO SCALE, SEE APPENDIX B FOR ACTUAL MAGNITUDES.

DRAWN BY DM	DATE 6/14/05	NAVFAC	GROUNDWATER VOCS PROFILE - NORTHERN PLUME GEOLOGIC CROSS SECTIONS F-F' AND G-G' NAVAL WEAPONS STATION CHARLESTON, SOUTH CAROLINA	CONTRACT NO. 0528
CHECKED BY	DATE			OWNER NO. CTO
REVISED BY	DATE			APPROVED BY / DATE
SCALE AS NOTED				DRAWING NO. FIGURE 4-7 / REV. 0

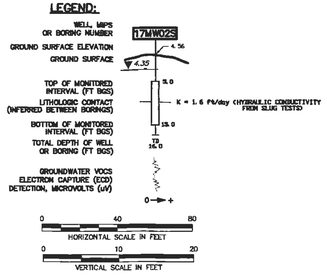
FORM CADD NO. SDIV-D-STBJ.DVG - REV 1 - 9/14/98

ACAD:0528GX38.dwg 10/28/05 HJB PIT

DRAWING NO. FIGURE 4-7 REV. 0



LEGEND:



NOTES:

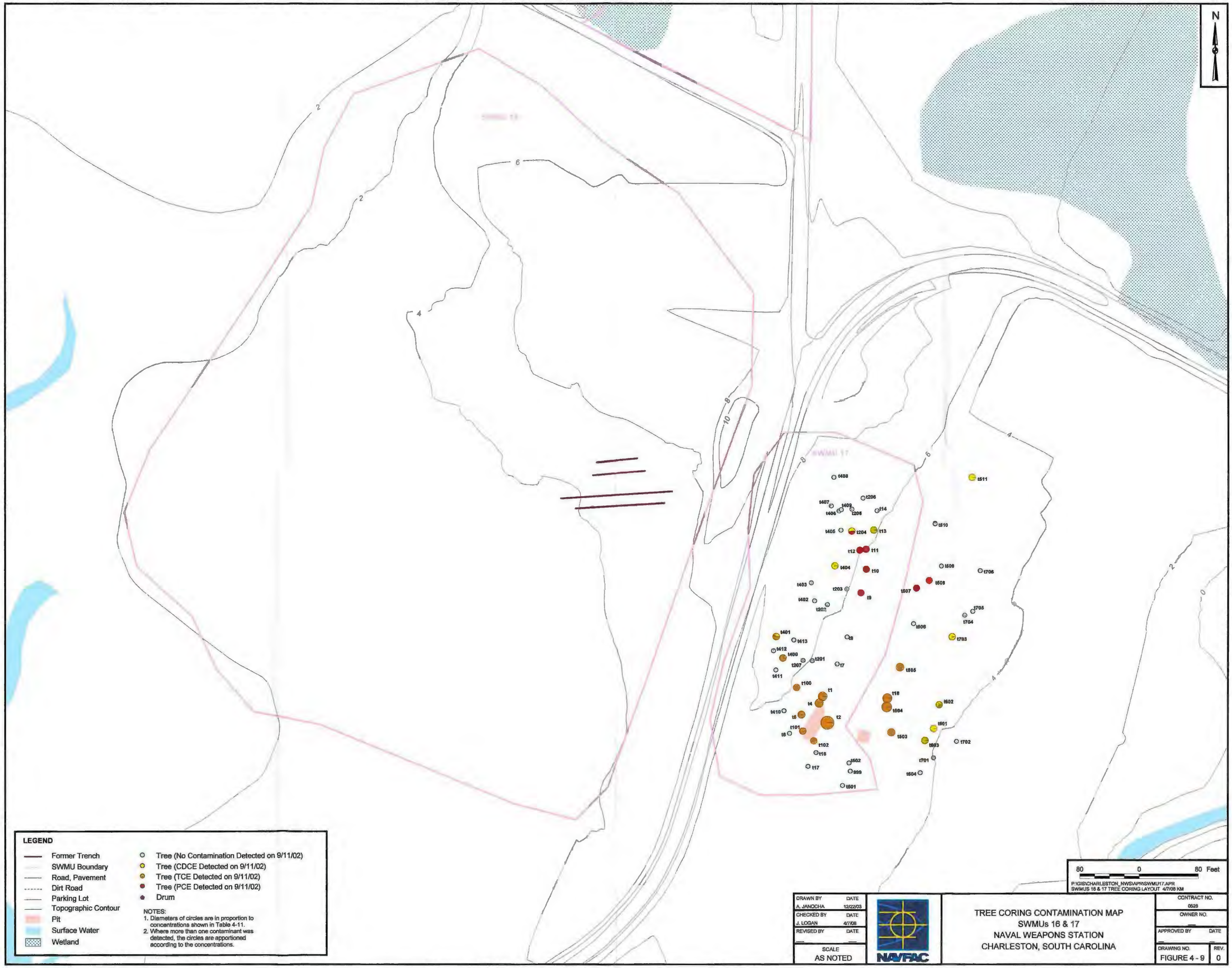
1. LITHOLOGIC CONTACTS ARE INFERRED FROM BORING LOGS. ACTUAL CONDITIONS MAY VARY FROM THOSE DEPICTED.
2. ECD GRAPHS ARE NOT TO SCALE, SEE APPENDIX B FOR ACTUAL MAGNITUDES.

DRAWN BY DM	DATE 6/13/05	GROUNDWATER VOCS PROFILE B-B' - NORTHERN PLUME NAVAL WEAPONS STATION CHARLESTON, SOUTH CAROLINA	CONTRACT NO. 0528
CHECKED BY	DATE		OWNER NO. CTO
REVISED BY	DATE		APPROVED BY / DATE
SCALE AS NOTED		NAVFAC	DRAWING NO. FIGURE 4-8 / REV. 0

FORM CADD NO. EDIV-D-STANDVG - REV 1 - 9/14/98

ACAD: 0528GW41.dwg 10/28/05 HJB PIT

DRAWING NO. FIGURE 4-8 REV. 0


N
SWMU 17
LEGEND
Former Trench
SWMU Boundary
Road, Pavement
Dirt Road
Parking Lot
Topographic Contour
Pit
Surface Water
Wetland
Tree (No Contamination Detected on 9/11/02)
Tree (CDCE Detected on 9/11/02)
Tree (TCE Detected on 9/11/02)
Tree (PCE Detected on 9/11/02)
Drum
NOTES:
1. Diameters of circles are in proportion to concentrations shown in Table 4-11.
2. Where more than one contaminant was detected, the circles are apportioned according to the concentrations.
80 0 80 Feet
P:\GIS\CHARLESTON_NWS\APR\SWMU17.APR
SWMUS 16 & 17 TREE CORING LAYOUT 4/7/08 KM
DRAWN BY A. JANOCHA DATE 12/22/03
CHECKED BY J. LOGAN DATE 4/7/08
REVISED BY DATE
SCALE AS NOTED
NAVFAC
TREE CORING CONTAMINATION MAP
SWMUs 16 & 17
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA
CONTRACT NO. 0528
OWNER NO.
APPROVED BY DATE
DRAWING NO. FIGURE 4 - 9
REV. 0

5.0 CHEMICAL FATE AND TRANSPORT ANALYSIS

This section contains information on contaminant fate and transport and the chemical properties affecting contaminant migration at SWMUs 16 and 17. Section 5.1 contains a discussion of the chemical and physical properties of the analytes detected in all media. Section 5.2 presents brief discussions of contaminant persistence, and Section 5.3 presents a summary of contaminant migration information.

5.1 CHEMICAL AND PHYSICAL PROPERTIES

Various chemical and physical properties of the compounds detected on site are presented and discussed in this section. These parameters are used to estimate the environmental behavior of site chemicals. Physical and chemical properties of the organic chemicals detected at NWS Charleston are provided in Table 5-1. Physical and chemical properties for inorganics are provided in Table 5-2. Empirically determined literature values for the water solubility, octanol/water partition coefficient, organic carbon partition coefficient, vapor pressure, Henry's Law constant, bioconcentration factor, and specific gravity are presented, when available. Calculated values, which were obtained using approximation methods, are presented when literature values are not available.

5.2 CHEMICAL PERSISTENCE

The persistence of various classes of chemicals is discussed in this section. Several transformation mechanisms affect chemical persistence, including hydrolysis, biodegradation, photolysis, and oxidation/reduction reactions. The following general classes of compounds detected at SWMUs 16 and 17 are discussed as follows:

- Ketones
- Monocyclic aromatics
- Halogenated aliphatics
- Phthalate esters
- PAHs
- Pesticides
- PCBs
- Explosives
- Inorganics

5.2.1 Ketones

Ketones are highly volatile and soluble, and these two processes dominate the fate of these compounds in the environment. Hydrolysis is generally not a significant fate process for this class of chemicals, nor is bioconcentration significant based on low octanol/water partition coefficients (Howard, 1990).

Acetone is completely miscible in water and is unlikely to adsorb to soil or sediments or bioaccumulate. It has a high vapor pressure and, once released to the air, photolysis and reaction with hydroxyl radicals result in an average half-life of 22 days (Howard, 1990).

2-Butanone will partially evaporate into the atmosphere if released to the soil and may also leach into the groundwater. Once in the groundwater, 2-butanone may slowly degrade. In surface water, 2-butanone has a half-life of approximately 3 to 12 days. Hydrolysis, photolysis, bioconcentration, and adsorption are not significant fate processes for this chemical (Howard, 1990).

5.2.2 Monocyclic Aromatics

Several of these compounds have specific gravities less than that of water (e.g., benzene, toluene). These compounds are typically found in fuels; if a large enough fuel spill occurs, these compounds may move through the soil column as a bulk liquid, until they reach the water table. There, instead of going into solution, the majority of the release may remain as a discrete fuel layer on the water table surface, with some of the material going into solution at the water/fuel interface.

Monocyclic aromatic compounds such as benzene, toluene, and xylenes are not considered to be persistent in the environment, particularly in comparison with chemicals such as PCBs and pesticides. Monocyclic aromatics are subject to degradation via the action of both soil and aquatic microorganisms. The biodegradation of these compounds in the soil matrix is dependent on the abundance of microflora, macronutrient availability, soil reaction (pH), temperature, etc. Benzene in groundwater is significantly reduced by the action of aerobic bacteria. A biodegradation rate of 0.95 percent per day has been reported (Chiang et al., 1989). The amount of benzene, toluene, and xylenes in groundwater was reported to be directly proportional to the availability of dissolved oxygen (DO).

Although these compounds are amenable to microbial degradation, it is not anticipated that degradation will occur at an appreciable rate, although macronutrient availability is not known. In the event that these compounds discharge to surface water bodies, volatilization and biodegradation may occur relatively rapidly. For example, a reported biodegradation rate constant for benzene is 0.11 day^{-1} in aquatic systems (Lyman et al., 1990). This corresponds to an aquatic half life of approximately 6 days. Other monocyclic aromatics are subject to similar degradation processes in aquatic environments (USEPA,

December 1982). However, chlorinated monocyclic aromatics such as chlorobenzene are not expected to be as susceptible to microbial degradation. For example, a reported first-order biodegradation rate constant for chlorobenzene is 0.0045 day^{-1} in aquatic systems (Lyman et al., 1990), which corresponds to an aquatic half-life of approximately 150 days.

Additional environmental degradation processes such as hydrolysis and photolysis are considered to be insignificant fate mechanisms for monocyclic aromatics in aquatic systems (USEPA, December 1982). However, some monocyclic aromatics such as benzene and toluene have been shown to undergo clay-, mineral-, and soil-catalyzed oxidation (Dragun, 1988).

5.2.3 Halogenated Aliphatics

Halogenated aliphatic hydrocarbons such as PCE, TCE, and 1,1,1-TCA are subject to abiotic dehydrohalogenation. This process is an elimination reaction that results in the formation of an ethene from a saturated halogenated compound (Olsen & Davis, 1990). Research indicates that microbial degradation of highly chlorinated ethanes is a relatively slow process. 1,1,1-TCA has been shown to break down to 1,1-DCA and chloroethane (Smith and Dragun, 1984), with half-lives reported on the order of 6 to 8 months. Hydrolysis, photolysis, and oxidation are generally not considered to be significant fate processes for chlorinated ethanes. Although TCE is reportedly susceptible to degradation, the primary end product is reportedly vinyl chloride, which degrades slowly (Cline & Viste, 1984). It does not appear that appreciable degradation of halogenated aliphatics occurs in aerobic aquatic systems (USEPA, December 1982) or in unsaturated soils (Lyman et al., 1990).

Photolysis is not considered to be a relevant degradation mechanism for this class of compounds (USEPA, December 1982). Limited hydrolysis of saturated aliphatics (i.e., alkanes) may occur, but it does not appear to be a significant degradation mechanism for unsaturated species (i.e., alkenes) (USEPA, December 1982).

Under certain conditions, volatilization is a significant fate process for these compounds. Volatilization is only significant at the air-soil or air-water interface. Adsorption should not be considered as an important fate for these types of compounds when compared to more hydrophobic compounds (e.g., PCBs).

Releases of chloroform to land and water will rapidly evaporate to the atmosphere. In the atmosphere, chloroform may be transported long distances and react in the gas phase with photochemically produced hydroxyl radicals, with a reaction half-life of several months. Chloroform may leach to groundwater and from there it may discharge to surface water bodies. Half-lives for this compound in various surface water bodies range from 30 hours to 10 days (Howard, 1990).

Several other aliphatic hydrocarbons (bromodichloromethane, chlorodibromomethane, and methylene chloride) will rapidly volatilize when released to soil and water. These compounds also significantly biodegrade under aerobic conditions. Releases to the atmosphere will react with hydroxyl radicals. These reactions have estimated half-lives of several months (Howard, 1990).

5.2.4 Phthalate Esters

Phthalate esters are considered to be relatively persistent chemicals in the environment. Although numerous studies have demonstrated that phthalate esters undergo biodegradation, it appears that this is a slow process in both soils and surface waters. Certain microorganisms have been shown to excrete products that increase the solubility of phthalate esters and enhance their biodegradation (Gibbions & Alexander, 1989).

Biodegradation of bis(2-ethylhexyl) phthalate (BEHP) and other phthalates in water is an important fate mechanism, with a half-life of 2 to 3 weeks reported for BEHP (Howard, 1990). Bioaccumulation is also a significant fate process. Hydrolysis of phthalate esters is very slow, with calculated half-lives of 3 years (dimethlyphthalate) to 2,000 years (BEHP) (USEPA, December 1979). Similarly, photolysis and volatilization are considered to be insignificant degradation mechanisms (USEPA, December 1979; Howard, 1989).

5.2.5 Polynuclear Aromatic Hydrocarbons

Polynuclear aromatic hydrocarbons (PAHs) have very low solubilities, vapor pressures, and Henry's Law constants, and high octanol/water and organic carbon partition coefficients. The low-molecular-weight PAHs (e.g., acenaphthene, fluoranthene, and phenanthrene) may volatilize from surface waters, whereas the high-molecular-weight PAHs (e.g., benzo(a)pyrene, benzo(a)anthracene, chrysene, etc.) are less likely to volatilize. PAHs in soil are much more likely to bind to soil and be transported via mass transport mechanisms than to go into solution.

Bioconcentration of PAHs in aquatic organisms is greater for the higher-molecular-weight compounds than the lower-molecular-weight compounds. PAHs can be bioaccumulated from water, sediments, or lower organisms in the food chain.

Land spreading applications have indicated that PAHs are highly amenable to microbial degradation in soil. The rate of degradation is influenced by temperature, pH, oxygen concentrations, initial chemical concentrations, and moisture. Photolysis, hydrolysis, and oxidation are not important fate processes for the degradation of PAHs in soil (ATSDR, October 1989).

The most important fates of PAHs in water are photo-oxidation, chemical oxidation, and biodegradation. PAHs do not contain functional groups that are susceptible to hydrolytic action; therefore, hydrolysis is considered to be an insignificant degradation mechanism. The rate of photodegradation is influenced by water depth, turbidity, and temperature. Benzo(a)pyrene, chrysene, fluorene, and pyrene are reported to be resistant to photodegradation. PAHs may also be oxidized by chlorination and ozonation and may be metabolized by microbes under oxygenated conditions (ATSDR, October 1989).

5.2.6 Pesticides

Whether pesticides are sprayed, dusted, or applied directly to the soil, the soil is the ultimate sink for these chemicals. Runoff may carry pesticides to adjacent surface water bodies. Bioconcentration of pesticides in the food chain is another important fate mechanism. Hydrolysis, oxidation, and photolysis are not generally important fate mechanisms for pesticides in soil or water. Hydrolysis half-lives for several pesticides are reported in periods of months to years (USEPA, December 1979).

4,4'-DDT and its metabolites are considered to be persistent chemicals. They undergo extensive adsorption to soil and are not highly soluble. Biodegradation may occur under both aerobic and anaerobic conditions in the presence of certain soil microorganisms. Under aerobic conditions, DDT may be transformed to DDE, whereas under anaerobic conditions, DDD may result. These compounds are however somewhat volatile, with a reported half-life of 100 days for DDT. These compounds are highly lipophilic and therefore readily bioaccumulate (ATSDR, October 1992). DDT is not longer in production in the United States.

Other pesticides such as dieldrin (half-life greater than 7 years) and chlordane (half-life of 3.3 years) also persist in the soil for extremely long periods of time (Howard, 1991). They also bioaccumulate significantly in terrestrial and aquatic receptors. Aldrin residues in soils and plants will volatilize from surface soil or be slowly transformed to dieldrin. Aldrin is considered to be moderately persistent with a half life of 20 to 100 days.

5.2.7 Polychlorinated Biphenyls

Polychlorinated biphenyls (PCBs) are considered to be very persistent organic chemicals. Biodegradation is the only process known to transform PCBs under environmental conditions, and only the lighter compounds are measurably biodegraded (USEPA, December 1979). Although some microorganisms (e.g., Phanaerochaete chrysosporium) may biodegrade PCBs, such fungi may not exist in local soil. There is experimental evidence to suggest that heavier PCBs (five or more chlorine atoms per molecule) can undergo photolytic degradation, but there are no data to suggest that this process operates under

environmental conditions (USEPA, December 1979). Base-, acid-, and neutral-promoted hydrolysis are considered to be inconsequential degradation mechanisms for PCBs (USEPA, December 1982).

5.2.8 Explosives

Explosives are not considered to be persistent in the environment, particularly in comparison to chemicals such as PCBs and pesticides. Explosives are subject to degradation via the action of both soil and aquatic microorganisms. The biodegradation of these compounds in the soil matrix is dependent on the abundance of microflora, macronutrient availability, soil reaction (pH), temperature, etc.

Trinitrotoluene (TNT) will not strongly absorb to soil or sediment and is not expected to partition from surface water to the atmosphere on the basis of the relatively low vapor pressure and relatively high water solubility. TNT will degrade under anaerobic conditions. The end product of TNT degradation is acetate. By-products of TNT degradation included 2-amino-4,6-dinitrotoluene, 4-amino-2,6-dinitrotoluene, 2,4-diamino-6-nitritoluene, 2-nitrobenzoic acid, cyclohexanone, 2-methyl-penatanoate, and butyrate.

2,4-Dinitrotoluene (DNT) has a slight tendency to sorb to sediments, suspended solids, and biota. Volatilization is probably not significant, as evidenced by the high volatilization half-life. Hydrolysis and photolysis are not significant processes in soils. However, photolysis is probably the most significant removal process in surface waters, as evidenced by photolytic half-lives of 2.7, 9.6, and 3.7 hours for river, bay, and pond surface waters, respectively (Howard, 1989).

2,6-Dinitrotoluene has a slight tendency to sorb to sediments, suspended solids, and biota. Volatilization of 2,6-dinitrotoluene from water is relatively slow and hydrolysis is probably not significant since 2,6-dinitrotoluene does not contain hydrolyzable functional groups. Photolysis is probably the most significant removal process in waters (Howard, 1989).

4-Nitrotoluene is expected to be moderately to highly mobile in soil and to volatilize slowly from dry soil surfaces. If released to soil, 4-nitrotoluene is expected to be resistant to oxidation and chemical hydrolysis. 4-Nitrotoluene would be susceptible to photolysis, volatilization, and possibly aerobic degradation provided suitable acclimation has taken place. 4-Nitrotoluene is reported to biodegrade to toluidine under anaerobic conditions.

5.2.9 Metals

Metals are highly persistent environmental contaminants. They do not biodegrade, photolyze, hydrolyze, etc. The major fate mechanisms for metals are adsorption to the soil matrix (as opposed to being part of the soil structure) and bioaccumulation.

The mobility of metals is influenced primarily by their physical and chemical properties in combination with the physical and chemical characteristics of the soil matrix. Factors that assist in predicting the mobility of inorganic species are the soil/pore water pH, soil/pore water Eh, and cation exchange capacity. The mobility of metals generally increases with decreasing soil pH and cation exchange capacity.

5.3 CHEMICAL MIGRATION

This section presents a brief overview of contaminant fate and transport issues for several major chemical classes detected at SWMUs 16 and 17.

5.3.1 Volatile Organics

Volatile organic chemicals are typically considered to be fairly soluble with a low capacity for retention by soil organic carbon; therefore, these are the organic compounds most frequently detected in groundwater. These types of chemicals may migrate through the soil column after being released by a spill event or by subsurface waste burial as infiltrating precipitation solubilizes them. Some fraction of these chemicals is retained by the soil, but most will continue migrating downward to the water table. At that time, migration occurs primarily laterally with the hydraulic gradient. Again, some portion of the chemical may be retained by the saturated soil.

Several of these compounds have specific gravities less than that of water (e.g., ethylbenzene, toluene). These compounds are typically found in fuels; if a large enough fuel spill occurs, these compounds may move through the soil column as a bulk liquid, until they reach the water table. There, instead of going into solution, the majority of the release may remain as a discrete fuel layer on the water table surface, with some of the material going into solution at the water/fuel interface.

Similarly, compounds with specific gravities greater than that of water (e.g., TCE) are often used in various industrial applications such as degreasing. If a large enough spill of these solvents occurs, these chemicals may also migrate as a bulk liquid but will not stop at the water table (i.e., these chemicals will mix/sink into the aquifer).

5.3.2 Polynuclear Aromatic Hydrocarbons

PAHs are generally considered to be fairly immobile chemicals in the environment. They are large molecules with high organic carbon partition coefficients and low solubilities compared to the volatile organics. These compounds, when found in soil, generally do not migrate vertically to a great extent. Instead, they are more likely to adhere to soil particles and be removed form the site via surface runoff and erosional processes.

5.3.3 Pesticides

Pesticides were widely used at this installation. Many of the compounds detected are no longer licensed for general sale and use in the United States. Therefore, it is assumed that much of what was detected in the soil and sediments is representative of past application for insect control.

Like PAHs, pesticides as a class of compounds are not considered to be very mobile in the environment. These chemicals, upon application or disposal, tend to remain affixed to soil particles. Migration of pesticides occurs primarily by erosion via the action of wind or water.

5.3.4 Explosives

Explosives are typically considered to be fairly soluble and have a low capacity for retention by soil organic carbon and therefore will not strongly adhere to soil. On the basis of relatively low vapor pressures and high water solubilities, explosives are not expected to migrate from surface water to air. Explosives may migrate through the soil column after being released by a spill event or by subsurface waste burial as infiltrating precipitation solubilizes them.

5.3.5 Inorganics

Because metals are frequently incorporated into the soil matrix and remain bound to particulate matter, they also migrate from the source areas via bulk movement processes (erosion). The larger particles (greater than 0.45 micron) that are removed via the filtration step prior to water analysis) are not generally considered to be mobile in groundwater. The metals detected in unfiltered groundwater samples are often representatives of suspended soil material in the samples.

There are some instances however where these metals are found at such concentrations or in such form as to be able to migrate to solution. It is possible that industrial activities could saturate all available exchange sites in soil and hence a metal may be mobilized. Metals are also more mobile under acidic conditions that may exist in areas where plating-type activities have occurred. Finally, a metal solution

may be utilized in some industrial applications. In these cases, it is possible for metals to migrate vertically through the soil column and reach the groundwater.

TABLE 5-1

FATE AND TRANSPORT PHYSICAL AND CHEMICAL CHARACTERISTICS FOR ORGANICS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA
PAGE 1 OF 2

Chemical	Specific Gravity (@ 20/4°C)(1)	Vapor Pressure (mm Hg @ 20°C)(1)	Solubility (mg/L @ 20°C)(1)	Octanol/ Water Partition Coefficient(1)	Organic Carbon Partition Coefficient(2)	Henry's Law Constant (atm-m3/mole@25°C)(1)	Bioconcentration Factor (mg/L/mg/kg)(2)
KETONES							
Acetone	7.90E-01	2.66+02 (25°C)	Miscible	5.75E-01	7.8E+03 (7)	4.28E-05	3.81E-01 (4)
2-Butanone	8.05E-01	1.0E+02 (25°C)	2.75E+05	1.82E+00	4.44E+00 (6)	4.66E-05	9.3E-01 (4)
MONOCYCLIC AROMATICS							
Benzene	8.79E-01	1.00E+02 (26.1oC)	1.75E+03	1.35E+02	1.35E+02	5.55E-03	3.70E+01
Ethylbenzene	8.67E-01	1.0E+01 (25.9°C)	1.52E+02	1.41E+03	1.10E+03	8.04E-03	4.70E+02
4-Methylphenol	1.0178	1.1E-01 (25°C)	2.4E+04 (40°C)	8.32E+01	9.0E-01(8)	3.92E-07	1.7E+01(4)
Xylenes (Total)	8.61E-01 - 8.80E-01	1E+01 (27.3 - 32.1°C)	1.6E+02 - 1.75E+02(3)	5.89E+02 - 1.58E+03	3.63E+02 - 4.07E+02 (7)	4.184E-03 - 6.662E-03	7.5E+01 - 1.59E+02 (4)
HALOGENATED ALIPHATICS							
Carbon Tetrachloride	1.59E+00	1.13E+02 (25oC)	8.00E+02	5.37E+02	9.12E+02	2.93E-02	2.11E+02
Chloroform	1.48E+00	1.60E+02	9.3E+03 (25oC)	9.33E+01	4.40E+01	3.39E-03	2.60E+01
1,1-Dichloroethane	1.1757	2.34E+02 (25°C)	5.50E+03	1.67E+01	3.13E+01 (7)	5.871E-03 (25°C)	1.90E+01
1,2-Dichloroethane	1.26E+00	7.90E+01 (25oC)	8.69E+03	2.82E+01	3.00E+01	1.18E-03	9.00E+00
1,1-Dichloroethene	1.22	5.91E+02 (25oC)	2.10E+02 (25oC)	3.02E+01	1.35E+02	2.29E-02	5.30E+01
cis-1,2-Dichloroethene	1.2837	2.02E+02 (25°C)	8.00E+02	NA	3.55E+01 (7)	4.08E-03 (24.8°C)	1.4E+01(2)
trans-1,2-Dichloroethene	1.2565	3.31E+02 (25°C)	6.00E+02	3.02E+01	5.25E+01	6.673E-03 (25°C)	4.80E+01
1,2-Dichloroethene, total	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	1.16E+00	4.20E+01	2.70E+03	1.91E+02	1.05E+02	2.68E-03	3.00E+01
Methylene chloride	1.3266	4.29E+02 (25°C)	1.67E+04 (25°C)	1.78E+01	1.17E+01 (7)	3.19E-03 (25°C)	6.00E+00
Tetrachloroethene	1.63E+00	1.90E+01 (25oC)	1.50E+02 (25oC)	3.39E+02	7.59E+02	2.69E-02	2.52E+02
1,1,1-Trichloroethane	1.32E+00	1.00E+02	4.40E+03	2.95E+02	3.20E+01	4.08E-03	8.10E+01
1,1,2-Trichloroethane	1.44E+00	2.50E+01 (25oC)	4.50E+03	1.48E+02	1.17E+02	9.61E-04	3.30E+01
Trichloroethene	1.46E+00	7.7E+01 (25oC)	1.1E+03 (25oC)	3.39E+02	1.66E+02 (7)	1.17E-02	9.70E+01
Vinyl Chloride	9.12E-01	2.58E+03	1.10E+03 (25oC)	3.98E+00	1.70E+01	2.78E-02	5.70E+00
MISCELLANEOUS VOLATILE ORGANICS							
Carbon disulfide	1.26E+00	2.98E+02	2.90E+03	1.45E+02	4.57E+01 (7)	1.92E-02	2.6E+01 (4)
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs)							
Acenaphthene	1.0242 (90/4°C)	1E+01 (131°C)	3.42E+0 (25°C)	8.32E+03	7.08E+03 (7)	2.41E-04 (25°C)	1.80E+03
Acenaphthylene	0.8988 (16/2°C)	2.90E-02	3.93E+0 (25°C)	1.17E+04	2.50E+03	1.14E-04 (25°C)	1.00E+03
Anthracene	1.283 (25/4°C)	1.95E-04 (25°C)	1.29E+0 (25°C)	2.82E+04	2.95E+04 (7)	8.6E-05 (25°C)	4.70E+03
Benzo(a)anthracene	1.274	5.00E-09	1E-02 (24°C)	4.07E+05	3.98E+05 (7)	6.60E-07	5.30E+04
Benzo(b)fluoranthene	NA	5.00E-07	1.2E-03 (25°C)	3.72E+06	1.23E+06 (7)	1.20E-05	1.40E+05
Benzo(k)fluoranthene	NA	9.59E-11	5.5E-04 (25°C)	6.92E+06	1.23E+06 (7)	1.04E-03	1.40E+05
Benzo(g,h,i)perylene	NA	1.00E-10	2.6E-04 (25°C)	1.70E+07	1.60E+06	1.4E-07 (25°C)	3.50E+05
Benzo(a)pyrene	1.351	5.00E-09	3.8E-03 (25°C)	9.55E+05	1.02E+06 (7)	4.9E-07 (25°C)	1.40E+05
Chrysene	1.274 (20°C)	6.3E-09 (25°C)	6E-03 (25°C)	4.07E+05	3.98E+05 (7)	1.05E-06 (25°C)	5.30E+04
Dibenz(a,h)anthracene	1.282	1.00E-10	5E-04 (25°C)	9.33E+05	3.80E+06 (7)	7.3E-08 (25°C)	6.90E+05
Fluoranthene	1.252	5.0E-06 (25°C)	2.65E-01 (25°C)	2.14E+05	1.07E+05 (7)	6.5E-06 (25°C)	1.20E+04
Indeno(1,2,3-cd)pyrene	NA	1E-010 (25°C)	6.20E-02	4.57E+07	3.47E+06 (7)	6.95E-08 (25°C)	3.50E+05
Phenanthrene	0.980 (4°C)	1E+0 (118.2°C)	8.16E-01 (21°C)	2.88E+04	1.40E+04	3.93E-05 (25°C)	4.70E+03
Pyrene	1.271 (23/4°C)	2.5E+0 (200°C)	1.6E-01 (26°C)	1.51E+05	1.05E+05 (7)	5.1E-06 (25°C)	1.20E+04
PHTHALATE ESTERS							
Bis(2-ethylhexyl)phthalate	9.9E-01 (20/20°C)	1.2E+00 (200°C)	4E-01 (25°C)	2.00E+05	1.51E+07 (7)	3.00E-07	2.30E+08
Di-n-butylphthalate	1.05E+00(20/20°C)	1E-01 (115°C)	4E+02 (25°C)	1.58E+05	3.39E+04 (7)	2.80E-07	4.70E+04
MISCELLANEOUS SEMIVOLATILE ORGANICS							
Carbazole	1.10E+00 (18°C/4°C)	4.0E+02 (323°C)	NA	1.95E+03(5)	3.39E+03 (7)	NA	1.86E+02 (4)

TABLE 5-1

FATE AND TRANSPORT PHYSICAL AND CHEMICAL CHARACTERISTICS FOR ORGANICS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Chemical	Specific Gravity (@ 20/4°C)(1)	Vapor Pressure (mm Hg @ 20°C)(1)	Solubility (mg/L @ 20°C)(1)	Octanol/ Water Partition Coefficient(1)	Organic Carbon Partition Coefficient(2)	Henry's Law Constant (atm-m3/mole@25°C)(1)	Bioconcentration Factor (mg/L/mg/kg)(2)
PESTICIDES							
4,4'-DDD	1.48E+00	1E-06 (30°C)	1.6E-01 (24°C)	9.77E+05	1.00E+06 (7)	2.16E-05	1.80E+05
4,4'-DDE	NA	6.50E-06	4.00E-02	4.90E+05	4.47E+06 (7)	2.34E-05	8.90E+05
4,4'-DDT	1.50E+00(15/4°C)	1.50E-07	3.1E-03 (25°C)	1.55E+06	2.63E+06 (7)	3.89E-05	8.00E+06
beta-BHC	1.89+00 (19°C)	1.7E-01 (40°C)	7.00E-01 (25°C)	6.31E+03	3.80E+03	2.30E-07	1.50E+03
delta-BHC	1.87E+00	2.00E-02	2.1E+01 (25°C)	1.38E-04	6.60E+03	2.50E-07	3.50E+03
Alpha-Chlordane	1.61E+00 (25°C)	1E-05 (25°C)	5.60E-02	6.03E+02	1.20E+05 (5)	4.79E-05	4.00E+04
Dieldrin	1.75E+00	1.8E-07 (25°C)	1.86E-01	1.23E-04	1.70E+03	5.84E-05	7.10E+02
Gamma-Chlordane	1.61E+00 (25°C)	1E-05 (25°C)	5.60E-02	6.03E+02	1.20E+05 (5)	4.79E-05	4.00E+04
EXPLOSIVES							
2,4-Dinitrotoluene	1.3208	1.3E-03 (59°C)	270 (22°C)	1.02E+02	4.47E+01	8.67E-07	3.90E+01
2,4,6-Trinitrotoluene	1.654	5.51E-06	1.50E+02	1.15E+02	5.25E+02	1.10E-08	2.18E+01
PCBs							
Aroclor-1260	1.58 (25°C)(2)	4.05E-05(2)	2.7E-03(2)	1.4E+7(2)	6.70E+06	7.4E-01(2)	1.30E+06

1 USEPA, September 1992, Handbook for RCRA Groundwater Monitoring Constituents: Chemical and Physical Properties.
2 USEPA, December 1982, Aquatic Fate Process Data for Organic Priority Pollutants.
3 ATSDR, October 1989, Toxicity Profile for Xylenes.
4 Lyman et al., 1990, Eq. 5-2.
5 Verschueren, 1983, Handbook of Environmental Data of Organic Chemicals.
6 Lyman et al., 1990; Equation 4-5.
7 USEPA, July 1996, Soil Screening Guidance.
8 Howard, 1989, Handbook of Environmental Fate and Exposure Data for Organic Chemicals, Volume I.
NA Not available.

TABLE 5-2

FATE AND TRANSPORT PHYSICAL AND CHEMICAL CONSTANTS FOR INORGANICS
SWMU 16 AND 17 RFI
NWS CHARLESTON, SOUTH CAROLINA

Chemical	Molecular Weight (g/mol) (1)	Specific Gravity (20/4 C) (1)	Vapor Pressure (25 C) (mm Hg) (1)	Solubility (25 C) (mg/L) (1)	Henry's Law Constant (25 C) (atm-m^3/mol) (1)	Bioconcentration Factor (L/kg) (2)
Inorganics						
Aluminum	26.98 (5)	2.708 (20 C) (5)	NA	NA	NA	36
Antimony	121.75	6.684 (25 C)	1 (886 C)	insoluble	NA	NA
Arsenic	74.9216	5.727 (14 C)	1 (372 C)	insoluble	NA	350
Barium	137.33	3.51 (20 C)	10 (1049 C)	hydrolyzes	NA	NA
Beryllium	9.01218	1.85 (20 C)	1 (1520 C)	insoluble	NA	NA
Cadmium	112.41	8.642 (UT)	NA	insoluble	NA	7400
Chromium	51.996	7.2 (28 C)	1 (1616 C)	insoluble	NA	1
Cobalt	58.9332	8.9 (UT)	30 (2375) C	insoluble	NA	NA
Copper	63.546	8.92 (UT)	1 (1628 C)	insoluble	NA	23000
Cyanide	26.02	NA	NA	NA	NA	NA
Iron	55.85 (2)	7.9 (2)	NA (2)	NA (2)	NA (2)	NA
Lead	207.2	11.2960 (16 C)	1(970 C)	insoluble	NA	1700
Manganese	54.938 (4)	7.2 (4)	NA	decomposes (4)	NA	NA
Mercury	200.59	13.5939	100 (260 C)	0.056	1.14E-02 (UT)	3133 (3)
Nickel	58.69	8.9 (UT)	1 (1800 C)	insoluble	NA	110
Selenium	78.96	4.81 (20/4+1 C)	NA	NA	NA	5700
Silver	107.87	10.5	1 (1310 C)	insoluble	NA	28
Thallium	204.383	11.85 (UT)	1 (825 C)	insoluble	NA	130
Vanadium	50.9415	5.96 (UT)	NA	insoluble	NA	NA
Zinc	65.38	7.14 (UT)	1 (487 C)	insoluble	NA	970

1 USEPA, Handbook of RCRA Ground-Water Monitoring Constituents: Chemical and Physical Properties, September 1992.

2 USEPA, Superfund Chemical Data Matrix, 1997.

3 Lyman, W., Reehl, W., and Rosenblatt, D., 1990. Handbook of Chemical Property Estimation Methods.

4 Clement Associates, Chemical, Physical, and Biological Properties of Compounds Present at Hazardous Waste Sites, September 1985.

5 The Condensed Chemical Dictionary, Van Nostrand Reinhold Company, New York 1971.

UT There is no reference temperature available.

NA Not available.

6.0 HUMAN HEALTH RISK ASSESSMENT

This section presents the Human Health Risk Assessments (HHRAs) for SWMUs 16 and 17 at NWS Charleston. The objective of the HHRAs is to determine whether detected concentrations of chemicals within the study areas pose a significant threat to potential human receptors under current and/or future land use. The potential risks to human receptors are estimated based on the assumption that no actions are taken to control contaminant releases.

The following current USEPA and United States Navy risk assessment guidance documents were used to develop the framework for the baseline HHRAs:

- Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part A) (USEPA, December 1989).
- Human Health Risk Assessment Bulletins-- Supplement to RAGS (USEPA Region 4, May 2000).
- Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors (USEPA, March 1991).
- Distribution of Preliminary Review Draft: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure (USEPA, May 1993).
- Soil Screening Guidance: Technical Background Document (USEPA, July 1996).
- Exposure Factors Handbook. Office of Health and Environmental Assessment (USEPA, August 1997).
- Risk Assessment Guidance for Superfund: Volume 1 - Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments) (USEPA, December 2001).
- Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final Guidance (USEPA, July 2004).
- Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. (USEPA, December 2002).

- Navy Final Policy on the Use of Background Chemical Levels (Navy, December 2004).

- Conducting Human Health Risk Assessments under the Environmental Restoration Program (Navy, February 2001).

A HHRA consists of five components: data evaluation, exposure assessment, toxicity assessment, risk characterization, and uncertainty analysis. Sections 6.1 through 6.5 contain detailed discussions of the five components of the HHRA.

Three major aspects of chemical contamination and environmental fate and transport must be considered to evaluate potential risks: (1) contaminants with toxic characteristics must be found in environmental media and must be released by either natural processes or by human action; (2) potential exposure points must exist; and (3) human receptors must be present at the point of exposure. Risk is a function of both toxicity and exposure. If any one of these factors is absent for a site, the exposure route is regarded as incomplete, and no potential risks are considered to exist for human receptors.

6.1 DATA EVALUATION

Data evaluation, the first component of a baseline HHRA, is a medium-specific task involving the compilation and evaluation of analytical data. The main objective of data evaluation is to develop a medium-specific list of chemicals of potential concern (COPCs) that will be used to quantitatively determine potential human health risks for site media.

6.1.1 Data Usability

Data from samples collected during the following field investigations were used to assess risks to potential human receptors:

SWMU 16

Surface Soil – four samples collected in October 2001 and January 2005
Subsurface Soil – 11 samples collected in June 2001
Groundwater – five samples collected in February and March 2005
Surface Water and Sediment – seven samples collected in February and March 2005

SWMU 17

Surface Soil – 29 samples collected in June 2001 and April 2003
Subsurface Soil – 82 samples collected in June 2001, April 2003, and January 2005
Groundwater – 104 samples collected in 2002, 2003, 2004, and 2005
Surface Water and Sediment – one sample collected in October 2001

Analytical results from fixed-base laboratories only were used in the quantitative risk evaluation. Unfiltered results for groundwater and surface water were used to assess risks associated with these media. Field measurements and data regarded as unreliable (i.e., qualified as "R" during the data validation process) were not used in the quantitative risk assessment. The elimination of data qualified as "R" may result in data gaps that increase the uncertainty in the risk assessment. However, as shown in Appendix F, the chemicals qualified "R" are typically not constituents of concern at SWMUs 16 and 17 (e.g., hexachlorophene) or the unreliable results occurred in a only a few samples. In addition, most of the results qualified as unreliable were detection limits (qualified "UR"), not positive detections. Therefore, it is unlikely that risks have been underestimated by the removal of the unreliable data from the data sets.

6.1.2 Selection of Chemicals of Potential Concern

The selection of COPCs is a qualitative screening process used to limit the number of chemicals and exposure routes quantitatively evaluated in the baseline HHRA to those site-related constituents that dominate overall potential risks. Screening by risk-based concentrations was used to focus the risk assessment on meaningful chemicals and exposure routes.

In general, a chemical was selected as a COPC and retained for further quantitative risk evaluation if the maximum concentration detected in a sampled medium exceeded a conservative screening level(s) and background level for metals. Chemicals eliminated from further evaluation during this evaluation are assumed to present minimal risks to potential human receptors.

6.1.2.1 Derivation of Screening Criteria

Several types of screening levels were used to identify COPCs for SWMUs 16 and 17. Screening concentrations based on USEPA Region 9 PRGs (USEPA Region 9, October, 2004) were used, as well as other USEPA criteria.

The COPC screening levels based on USEPA Region 9 PRGs correspond to a Hazard Quotient (HQ) of 0.1 (for noncarcinogens) or an Incremental Lifetime Cancer Risk (ILCR) of 1×10^{-6} (for carcinogens). The USEPA Region 9 PRGs for noncarcinogens are based on a Hazard Index (HI) of 1. The Region 9 PRG

values for noncarcinogens were multiplied by 0.1 to account for potential cumulative effects of several chemicals affecting the same target area or producing the same adverse noncarcinogenic health effect. The screening levels used for each medium in the risk assessments are briefly discussed below.

Soil

Screening concentrations based on the following criteria were used to select COPCs for surface and subsurface soil:

- USEPA Region 9 PRGs for Residential Soil (USEPA Region 9, October 2004).

- USEPA generic soil screening levels (SSLs) for the inhalation of volatiles and fugitive dusts calculated online at http://risk.lsd.ornl.gov/calc_start.shtml based on methodology from the USEPA's Soil Screening Guidance (USEPA, July 1996 and December 2002).

- USEPA generic SSLs for migration from soil to groundwater calculated online at http://risk.lsd.ornl.gov/calc_start.shtml based on methodology from the USEPA's Soil Screening Guidance (USEPA, July 1996 and December 2002).

If the maximum concentration of a constituent exceeded screening levels based on any of these criteria and background levels for metals in hydric soil, the chemical was selected as a COPC for soil and evaluated in the quantitative risk assessment. Exceedances of background levels for organic chemicals are addressed in the Uncertainty Section (Section 6.5.1).

The comparison of site soil data to USEPA generic SSLs for transfers from soil to air (inhalation) was used to identify whether a quantitative analysis of the inhalation of particulates or vapors from soil was warranted. If the maximum soil concentration of a chemical exceeded the SSL, a quantitative evaluation of potential risks from inhalation of that chemical was performed. Otherwise, the risks associated with the inhalation pathway were considered insignificant, and this exposure pathway was eliminated from further evaluation.

Comparisons of chemical concentrations in soil with SSLs for the protection of groundwater were used to indicate the potential for a chemical in soil to adversely impact groundwater. Chemicals with maximum concentrations exceeding the migration-to-groundwater SSLs are quantitatively evaluated in the quantitative risk assessment.

Because of the different exposure scenarios for potential human receptors, COPCs were identified separately for surface and subsurface soil. Surface soil is defined as soil collected from 0 to 1 feet bgs and subsurface soil is defined as soil deeper than 1 foot bgs.

Sediment

No specific screening levels exist for human exposure to sediment. COPCs for sediment were selected by comparing detected site concentrations to screening levels based on the following:

- USEPA Region 9 PRGs for residential soil (USEPA Region 9, October 2004)

A chemical detected in sediment was selected as a COPC for sediment if the maximum detected concentration exceeded screening levels based on these criteria and concentrations in upgradient sediment samples. The use of soil screening criteria for sediment COPC identification is regarded as a conservative approach because exposure to sediment is expected to be less than exposure to soil. USEPA generic SSLs for transfers from soil to air and for migration to groundwater are not considered to be appropriate for sediment screening because of the high moisture content associated with sediment matrices.

Groundwater

Screening concentrations based on the following criteria were used to select COPCs for groundwater:

- USEPA Region 9 Tap Water PRGs (USEPA Region 9, October 2004)
- USEPA MCLs (USEPA, Winter 2004)

Surface Water

Screening concentrations based on the following criteria were used to select COPCs for surface water:

- USEPA Region 9 PRGs for tap water (USEPA Region 9, October 2004)
- USEPA National Recommended Water Quality Criteria for Priority Toxic Pollutants, Consumption of Water and Organisms (USEPA, 2004)

If the maximum concentration of a constituent exceeded any screening levels based on these criteria and facility background levels for groundwater or concentrations in upgradient surface water samples, the chemical was selected as a COPC and carried through the quantitative risk assessment.

Risk-based COPC screening levels for tap water ingestion, which are based on daily, residential exposure assumptions, were used to select COPCs for groundwater and surface water. In general, the use of tap water screening levels is regarded as a highly conservative approach to COPC selection at SWMUs 16 and 17 because groundwater at the sites is not used and is not likely to be used as a potable drinking water source in the future. Potential human exposure to surface water located in or near the sites is expected to be limited to incidental exposures such as that which occurs during trespassing, which is anticipated to be significantly less than the daily exposure assumed for the tap water ingestion scenario.

Lead as a COPC

Limited criteria are available to evaluate the potential risks associated with lead. There are no risk-based concentrations for this chemical because USEPA has not developed toxicity values [i.e., Cancer Slope Factors (CSFs), Reference Doses (RfDs)] for lead. However, recommended screening levels are available for lead in soil that are used to indicate the need for response activities.

Guidance from both the Office of Prevention, Pesticides, and Toxic Substances (OPPTS) and the Office of Solid Waste and Emergency Response (OSWER) recommend 400 mg/kg as the lowest screening level for lead-contaminated soil in a residential setting where children are frequently present (USEPA, July 1994). OPPTS identifies 2,000 to 5,000 mg/kg as an appropriate range for areas where contact with soil by children in a residential setting is less frequent. A value of 400 mg/kg was used as the screening level for soil and sediment in the HHRA for SWMUs 16 and 17.

The SDWA Action Level (15 µg/L) was used as the screening level for lead in groundwater and surface water.

Essential Nutrients and Chemicals without Toxicity Criteria

The essential nutrients calcium, magnesium, potassium, and sodium were not identified as COPCs because these inorganic chemicals are naturally abundant in environmental matrices and are only toxic at high doses. In addition, because of the lack of toxicity criteria, risk-based COPC screening levels are not available for some chemicals (e.g., benzo(g,h,i)perylene, phenanthrene, and 2-methylnaphthalene). Appropriate surrogates were selected for some of these chemicals based on similar chemical structures. Pyrene was used as the surrogate for benzo(g,h,i)perylene and phenanthrene and naphthalene was used as the surrogate for 2-methylnaphthalene.

Determination of Site-Related Chemicals (Background Evaluation)

COPCs were also selected at SWMUs 16 and 17 based on a comparison of the concentrations detected in site samples to concentrations detected in facility background or upgradient samples. If the maximum concentration of an inorganic constituent was less than the representative facility background concentration for soil and groundwater or the concentrations in upgradient surface water or sediment samples, that chemical was not selected as a COPC. The development of the representative facility background soil and groundwater concentrations is discussed in NWS Charleston Baseline Background Report (TtNUS, March 2002). The statistical analysis of the NWS background data and the resulting base-wide background levels presented in that document have been approved by USEPA Region 4. A 95 percent upper tolerance limit (UTL_{95}) for each chemical detected in NWS Charleston background samples was calculated in the Baseline Background Report. The UTL_{95} has been selected as the representative background concentration. This is the value where 95 percent of the background samples concentrations are less than the upper confidence limit 95 percent of the time for normally and log normally distributed chemicals. The maximum concentration was selected as the representative background concentration when the background dataset for a chemical was not determined to be normally or lognormally distributed (i.e., the distribution of the dataset was undefined). Chemical concentrations in surface water and sediment for SWMUs 16 and 17 were screened against the concentrations in the sample from the upgradient location, 23SW/SD08 collected during the SWMU 23 Supplemental RFI (TtNUS, 2000). The selected background screening concentrations for soil, groundwater, surface water and sediment are presented in Tables 6-1 through 6-10. As discussed in the Baseline Background Report, soil facility background concentrations were developed for hydric and nonhydric soils. The hydric soil values were selected for screening of SWMUs 16 and 17 soil data, based on site conditions inside the fenceline where the samples were collected.

The elimination of chemicals as site-related COPCs on the basis of background comparisons follows Navy Policy on the Use of Background Chemical Levels (Department of the Navy, January 2004). This document also presents the Navy's interpretation of USEPA guidance provided in the document titled Role of Background in the CERCLA Cleanup Program (USEPA, April 2002) and details the methodology to be used in evaluating background under the Navy's Environmental Restoration and Base Realignment and Closure (BRAC) programs. Navy policy applies to both the screening-level and baseline risk assessments and requires the following:

1. A clear and concise understanding of chemicals released from a site thus ensuring the Navy is focusing on remediating the release.

2. The use of background data in the screening-level risk assessment.
   a. The comparison of site chemical levels to risk-based screening criteria.
   b. The comparison of site chemical levels to background concentrations.
   c. The identification of site-related COPCs based on screening criteria comparisons AND background comparisons. Site-related COPCs are those chemicals with concentrations exceeding risk-based screening criteria and background concentrations. To the extent possible, site-related COPCs are further evaluated quantitatively in the baseline risk assessment.

3. The consideration of background in the baseline risk assessment.
   a. The calculation of risk estimates for site-related COPCs only.
   b. The further evaluation of non-site-related COPCs in the risk characterization section only (e.g., the evaluation of chemicals detected at concentrations exceeding screening criteria but less than background concentrations). The Navy considers this comparison to be consistent with USEPA's Role of Background in the CERCLA Cleanup Program (USEPA, April 2002).

4. The selection of site cleanup remedial goals at levels not less than background levels. Additionally, cleanup levels should not be developed for chemicals not identified as chemicals of concern (COCs). As defined in the Navy guidance, COCs are site-related COPCs found to be the risk drivers in the baseline risk assessment and that may pose unacceptable human or ecological risks.

6.1.2.2 Decision Rules for Establishing COPCs

The following decision rules were used to select initial lists of COPCs for SWMUs 16 and 17:

- A chemical detected in groundwater, soil, surface water, or sediment was selected as a COPC if any detected chemical concentration exceeded the screening levels described in Section 6.1.2.1 and facility background levels. Only metals were eliminated as COPCs on the basis of background. Facility background concentrations have also been determined for organic chemicals (e.g., pesticides and PAHs) but were not used for COPC screening. The uncertainty in risk assessment associated with not including organics in background screening is discussed in Section 6.5.1.

- If a chemical was not detected in any of the samples in a particular medium, but detection limits exceeded the risk-based screening levels, the chemical was not selected as a COPC but is qualitatively discussed in the uncertainty analysis section.

6.1.2.3 COPCs Selected for HHRA

COPCs for SWMUs 16 and 17 were selected for surface soil, subsurface soil, groundwater, surface water, and sediment using the COPC screening concentrations described in Section 6.1.2.1. A discussion of the chemicals identified as COPCs and the rationale for COPC selection are provided in the following subsections. COPC selection tables for each medium are presented in Tables 6-1 through 6-10. Chemicals retained as COPCs for SWMU 16 are presented in Table 6-11 and COPCs for SWMU 17 are presented in Table 6-12. The Risk Assessment Guidance for Superfund (RAGS) Part D tables for COPC selection is included in Appendix F.

6.1.2.3.1 Selection of COPCs for Surface Soil (0 to 1 feet bgs) – SWMU 16

This section discusses the COPC selection for chemicals detected in four surface soil samples collected at SWMU 16 in October 2001 and January 2005. One VOC, six SVOCs (mainly phthalates), one PCB (Aroclor-1254), three pesticides (DDT and metabolites), and 20 metals were detected in the surface soil samples. The maximum detected surface soil concentrations were compared to screening levels based on the USEPA Region 9 PRGs for residential land use, USEPA SSLs for migration from soil to groundwater, USEPA SSLs for migration from soil to air, and facility background levels for metals. The following chemicals were retained as COPCs for surface soil at SWMU 16:

- bis(2-Ethylhexyl)phthalate (BEHP)
- Aroclor-1254
- Inorganics – antimony, barium, cadmium, chromium, and lead

The maximum concentrations of these COPCs were detected at location 16SS02 (in the debris pile). The concentrations of the COPCs at this location were greater than concentrations in the other surface soil samples by more than three orders of magnitude and probably represent a "hotspot" at the site.

The COPC selection for surface soil at SWMU 16 is presented in Table 6-1.

A comparison of the maximum detected surface soil concentrations to USEPA SSLs for chemical migration from soil to air is also presented in Table 6-1. As shown in the table, the maximum detected concentration of chromium exceeded the USEPA SSL for soil to air. Therefore, potential exposures through inhalation of fugitive dust emissions from surface soil were quantitatively evaluated for chromium.

The maximum detected surface soil concentrations were also compared to USEPA Generic SSLs for chemical migration from soil to groundwater (Table 6-1). The following chemicals were detected in

surface soil at maximum concentrations that exceeded the screening levels for migration from soil to groundwater:

- BEHP
- Inorganics – antimony, barium, cadmium, and chromium

Of the chemicals that exceeded the soil to groundwater SSLs, only BEHP and barium were detected in groundwater samples at the site. Also, barium was selected as a COPC only because its maximum concentration (207 mg/kg) exceeded the migration-to-groundwater SSL but did not exceed the risk-based screening level or the Region 9 PRG (5,400 mg/kg). Consequently, the risks from exposure to barium in surface soil are negligible.

6.1.2.3.2 Selection of COPCs for Subsurface Soil (1 to 7 feet bgs) – SWMU 16

This section discusses the COPC selection for chemicals detected in 11 subsurface soil samples collected at SWMU 16 during the field investigations conducted in June 2001. Five VOCs, 20 SVOCs (predominantly PAHs), two PCBs (Aroclor-1254 and Aroclor-1260), 15 pesticides, and 22 metals were detected in the subsurface soil samples. The maximum detected subsurface soil concentrations were compared to screening levels based on the USEPA Region 9 PRGs for residential land use, USEPA SSLs for migration to groundwater, USEPA SSLs for migration from soil to air, and facility background levels for metals. The following chemicals were retained as COPCs for subsurface soil at SWMU 16:

- PAHs - benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, carbazole, and chrysene
- PCBs - Aroclor-1254 and Aroclor-1260
- Pesticides – alpha-BHC and gamma-BHC
- Inorganics - aluminum, antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, manganese, mercury, nickel, silver, thallium, vanadium, and zinc

Only two of the 15 pesticides (alpha-BHC and gamma-BHC) detected in subsurface soil were selected as COPCs, and these two compounds were identified as COPCs only because the maximum concentrations exceeded the migration-to-groundwater SSLs but did not exceed the screening levels, based on direct contact with soil. Most pesticides were detected infrequently at concentrations less than screening levels and their presence may be the result of historical spraying for pest control rather than disposal practices at the site. In addition to alpha-BHC and gamma-BHC, benzo(a)anthracene, carbazole, chrysene, chromium, cobalt, mercury, nickel, and silver were selected as COPCs only because their maximum concentrations exceeded the migration-to-groundwater SSLs but were less than risk-based screening concentrations.

The COPC selection for subsurface soil is presented in Table 6-2.

The comparison of the maximum detected soil concentrations to USEPA SSLs for chemical migration from soil to air presented in Table 6-2 indicates that concentrations for all chemicals were less than the USEPA SSLs for soil to air. Therefore, exposures through inhalation of fugitive dust emissions from subsurface soil at SWMU 16 were not evaluated quantitatively in the HHRA.

The maximum detected subsurface soil concentrations were also compared to USEPA Generic SSLs for chemical migration from soil to groundwater as presented in Table 6-2. The following chemicals were detected in subsurface soil at maximum concentrations that exceeded the screening levels for migration from soil to groundwater:

- PAHs - benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, carbazole, and chrysene
- Pesticides – alpha-BHC and gamma-BHC
- Inorganics - aluminum, antimony, arsenic, barium, cadmium, chromium, cobalt, manganese, mercury, nickel, silver, thallium, and zinc

None of organic chemicals listed above were detected in groundwater at the site. Of the inorganic chemicals listed above, only aluminum, cobalt, manganese, and zinc were detected in groundwater samples, but the maximum groundwater concentrations of these metals were less than background concentrations and/or screening levels. Based on these data, it appears that chemicals detected in soil at SWMU 16 have not adversely impacted groundwater at the site.

6.1.2.3.3 Selection of COPCs for Groundwater – SWMU 16

Future residential use of groundwater at SWMU 16 is not evaluated in this HHRA because of the nature of the site and the groundwater underlying the site. The area is swampy and the groundwater quality is subject to tidal inundation (refer to Section 3.4.2 and the high tide line depicted on Figure 3-1) causing the groundwater on the site boundaries bordering Goose Creek to be saline (refer to Section 3.2.3, Groundwater Sampling, 4th paragraph). Furthermore, the site lies within the 100-year floodplain. Consequently, it is unlikely that groundwater underlying the site could be used for domestic purposes. However, exposure to COPCs in groundwater is evaluated for construction/excavation workers to account for the possibility that groundwater could be encountered during a future excavation project.

One VOC (TCE), two SVOCs (phthalates), 12 metals, and cyanide were detected in five groundwater samples collected in February and March 2005. The comparisons of the maximum detected groundwater concentrations to screening levels based on the USEPA Region 9 PRGs for ingestion of tap water,

USEPA MCLs, and facility background levels (for metals) are presented in Table 6-3. The following chemicals were retained as COPCs for groundwater at SWMU 16:

- TCE
- BEHP

The groundwater samples collected at SWMU 16 contained elevated concentrations of the essential nutrients magnesium, potassium, and sodium. For example, the maximum concentration of sodium (4,720,000 µg/L) is considerably greater than the health-based advisory value currently recommended by the USEPA (20,000 µg/L) for sensitive individuals (USEPA, Winter 2004). The elevated levels of these inorganics reflect the tidal influence on groundwater quality of the aquifer underlying/downgradient of the SWMU.

6.1.2.3.4 Selection of COPCs for Surface Water – SWMU 16

Two VOCs, three explosives, and 16 metals were detected in seven surface water samples collected in October 2001. The surface water samples were collected from small tributaries located at the periphery of SWMU 16 that drain into Goose Creek.

The following chemicals were retained as COPCs for surface water at SWMU 16:

- PCE
- 2,4-DNT
- Inorganics - aluminum, antimony, iron, lead, manganese, and vanadium

These constituents were identified as COPCs in surface water because the maximum concentrations exceeded one or more of the human health screening levels [i.e., USEPA Region 9 risk-based screening concentrations for tap water and federal Ambient Water Quality Criteria (AWQC) for the consumption of water and organisms] and concentrations in the upgradient sample (23SW08). Drinking water criteria were used as the COPC screening levels for surface water because surface water criteria for human health are currently not available. The use of these criteria for screening and risk assessment is conservative because it is unlikely that the surface water at SWMU 16 would ever be used as a source of drinking water (i.e., potential receptors ingest 2 liters of water per day for 350 days per year). COPC comparisons of surface water concentrations with these criteria are presented in Table 6-4.

6.1.2.3.5 Selection of COPCs for Sediment – SWMU 16

One VOC, 10 PAHs, two PCBs, seven pesticides, and 19 metals were detected in seven sediment samples collected in October 2001.

The following chemicals were retained as COPCs for sediment at SWMU 16:

- PAHs – benzo(a)pyrene and benzo(b)fluoranthene

These constituents were identified as COPCs for sediment because the maximum concentrations exceeded one or more of the COPC screening levels (i.e., based on the USEPA Region 9 PRGs).

The use of screening concentrations based on USEPA Region 9 PRGs for soil to evaluate chemical concentrations in sediment is conservative because these criteria were established assuming residential land use scenarios (e.g., routine daily contact with soils). However, it is anticipated that a human receptor would be exposed to sediment at the site on a less frequent basis than is assumed for a typical residential exposure to soil. Consequently, the use of soil criteria for screening and risk estimation is likely to overestimate potential risks from exposure to sediment. The results of the COPC selection process for sediment are presented in Table 6-5.

6.1.2.3.6 Selection of COPCs for Surface Soil (0 to 1 feet bgs) – SWMU 17

This section discusses the COPC selection for chemicals detected in 29 surface soil samples collected at SWMU 17 in June 2001 and April 2003. Eleven VOCs, 22 SVOCs (mainly PAHs), three PCBs, 12 pesticides, and 21 metals were detected in the surface soil samples. The maximum detected surface soil concentrations were compared to screening levels based on the USEPA Region 9 PRGs for residential land use, USEPA SSLs for migration to groundwater, USEPA SSLs for migration from soil to air, and facility background levels for metals. The following chemicals were retained as COPCs for surface soil at SWMU 17:

- VOCs – cis-1,2-DCE, methylene chloride, and TCE

- PAHs - benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, carbazole, chrysene, and dibenzo(a,h)anthracene

- PCBs - Aroclor-1248, Aroclor-1254, and Aroclor-1260

- Pesticides – alpha-BHC, beta-BHC, and gamma-BHC

- Inorganics - aluminum, antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, and zinc

Some chemicals (i.e., methylene chloride, cis-1,2-DCE, carbazole, chrysene, alpha-BHC, beta-BHC, and gamma-BHC) were identified as COPCs because their maximum concentrations exceeded the migration-to-groundwater SSLs but did not exceed the screening levels based on direct contact with soil.

The COPC selection for surface soil is presented in Table 6-6.

A comparison of the maximum detected surface soil concentrations to USEPA SSLs for chemical migration from soil to air is also presented in Table 6-6. As shown in the table, the maximum detected concentrations of chromium and TCE exceeded the USEPA SSLs for soil to air. Therefore, exposures through inhalation of vapors and fugitive dust emissions from surface soil were quantitatively evaluated for these two COPCs in the HHRA.

The maximum detected surface soil concentrations were also compared to USEPA Generic SSLs for chemical migration from soil to groundwater as presented in Table 6-6. The following chemicals were detected in surface soil at maximum concentrations that exceeded the screening levels for migration from soil to groundwater:

- VOCs – cis-1,2-DCE, methylene chloride, and TCE
- PAHs - benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, carbazole, and chrysene
- Pesticides – alpha-BHC, beta-BHC, and gamma-BHC
- Inorganics - aluminum, arsenic, barium, chromium, manganese, mercury, and zinc

Of the organic chemicals that exceeded the soil-to-groundwater SSLs, VOCs are generally considered mobile in the environment, but PAHs and most pesticides are classified as immobile. At SWMU 17, this is evidenced by the fact that, of the above-listed organic chemicals, only VOCs were detected in groundwater at the site.

6.1.2.3.7 Selection of COPCs for Subsurface Soil (1 to 8 feet bgs) – SWMU 17

This section discusses the COPC selection for chemicals detected in 82 subsurface soil samples collected at SWMU 17 during the field investigations conducted in June 2001, April 2003, and January 2005. Twenty-nine VOCs, 14 SVOCs, one PCB (Aroclor-1254), nine pesticides, one explosive, (2,4,6-TNT), 21 metals, and cyanide were detected in the subsurface soil samples. The maximum detected surface soil concentrations were compared to screening levels based on the USEPA Region 9

PRGs for residential land use, USEPA SSLs for migration to groundwater, USEPA SSLs for migration from soil to air, and facility background levels for metals. The following chemicals were retained as COPCs for subsurface soil at SWMU 17:

- VOCs – 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,2-dichloropropane, acetone, benzene, bromodichloromethane, carbon tetrachloride, chloroform, chloromethane, cis-1,2-DCE, methylene chloride, PCE, TCE, and vinyl chloride

- Explosives – 2,4-DNT and 2,4,6-TNT

- Pentachlorophenol

- Inorganics – aluminum, arsenic, barium, cadmium, chromium, cobalt, nickel, vanadium, and zinc, cyanide

Most of the chemicals were identified as COPCs for subsurface soil because their maximum concentrations exceeded the migration-to-groundwater SSLs but did not exceed the screening levels based on direct contact with soil. For example, the maximum concentrations of only three VOCs (carbon tetrachloride, chloroform, and TCE) exceeded the Region 9 screening levels based on direct contact.

The COPC selection for subsurface soil is presented in Table 6-7.

A comparison of the maximum detected subsurface soil concentrations to USEPA SSLs for chemical migration from soil to air is also presented in Table 6-7. As shown in the table, the maximum detected concentrations of carbon tetrachloride and TCE exceeded the USEPA SSLs for soil to air. Therefore, exposures through inhalation of vapors and fugitive dust emissions from subsurface soil were quantitatively evaluated for these COPCs in the HHRA.

The maximum detected subsurface soil concentrations were also compared to USEPA Generic SSLs for migration from soil to groundwater as presented in Table 6-7. The following chemicals were detected in subsurface soil at maximum concentrations that exceeded the screening levels for migration from soil to groundwater:

- VOCs – 1,1,2,2-tetrachloroethene, 1,1,2-trichloroethene, 1,2-dichloropropane, acetone, benzene, bromodichloromethane, carbon tetrachloride, chloroform, chloromethane, cis-1,2-DCE, methylene chloride, PCE, TCE and vinyl chloride

- Explosives – 2,4-DNT and 2,4,6-TNT

- Pentachlorophenol

- Inorganics – aluminum, arsenic, barium, cadmium, chromium, cobalt, nickel, vanadium, zinc, and cyanide

Of the organic chemicals listed above, only VOCs were detected in groundwater at the site. The subsurface soil and groundwater data indicate that there is a relationship between the VOCs detected in soil (especially subsurface soil) and shallow groundwater. Because of the shallow depth to groundwater at the site and because one source of the VOC contamination may have migrated from SWMU 16 (Section 4.2.1), contaminants in groundwater may have impacted subsurface soil at the site. Explosives and pentachlorophenol were detected very infrequently (i.e., in 1 of 62 subsurface soil samples) and were not detected in any groundwater samples. It is difficult to establish a relationship between inorganics in soil and groundwater. Of the inorganic chemicals that exceeded the migration-to-groundwater SSLs, most (except cadmium and cyanide) were also detected in groundwater samples collected at the site. However, some metals (i.e., aluminum, chromium, and vanadium) in groundwater were determined to be within background levels.

6.1.2.3.8 Selection of COPCs for Groundwater – SWMU 17

Thirty-two VOCs (mainly chlorinated VOCs), four SVOCs, one explosive, 20 metals, bromide, chloride, and cyanide were detected in groundwater samples. Dissolved gases (methane, ethane, ethane) and ions (bromide, chloride, and sulfate) were analyzed only for treatability study samples and were detected in each of these samples. The comparisons of the maximum detected groundwater concentrations to screening levels based on the USEPA Region 9 PRGs for ingestion of tap water, USEPA MCLs, and facility background levels (for metals) are presented in Table 6-8. The following chemicals were retained as COPCs for groundwater at SWMU 17:

- VOCs – 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,1-DCE, 1,2-DCA, 1,2-dichloropropane, benzene, bromodichloromethane, carbon tetrachloride, chloroform, cis-1,2-DCE, dichlorodifluoromethane, methylene chloride, TCE, toluene, total-1,2-DCE, trans-1,2-DCE, TCE, vinyl chloride, and naphthalene
- BEHP
- RDX
- Inorganics – antimony, arsenic, barium, beryllium, cobalt, manganese, nickel, chloride, and sulfate

Groundwater samples collected at SWMU 17 contained elevated concentrations of the essential nutrients, calcium, magnesium, and sodium. For example, the maximum concentration of sodium (2,800,000 µg/L) is considerably greater than the health-based advisory value currently recommended by the USEPA, 20,000 µg/L) for sensitive individuals. The elevated levels of these inorganics reflect the tidal influence on groundwater quality of the aquifer underlying/downgradient of the SWMU. Chloride and sulfate were selected as COPCs because the maximum concentrations were greater than the USEPA Secondary MCLs which are based on taste and odor. However, the concentrations of the ions detected in groundwater are typical values for saline water.

6.1.2.3.9 Selection of COPCs for Surface Water – SWMU 17

Fourteen metals were detected in one surface water sample collected in October 2001 (The sample was analyzed for VOCs, SVOCs, pesticides/PCBs, explosives, metals, and cyanide). Because no surface water bodies exist on SWMU 17, this sample was collected from a small marshy tributary approximately 250 feet east of the site.

The following chemicals were retained as COPCs for surface water at SWMU 17:

- Inorganics – antimony, iron, and manganese

These constituents were identified as COPCs in surface water because the maximum concentrations exceeded one or more of the human health screening levels (i.e., USEPA Region 9 risk-based screening concentrations for tap water and federal AWQCs for the consumption of water and organisms) and concentrations in the upgradient sample (23SW08). Drinking water criteria were used as the COPC screening levels for surface water because surface water criteria for human health are currently not available. The use of these criteria for screening and risk assessment is conservative because it is unlikely that the surface water at SWMU 17 would ever be used as a source of drinking water (i.e., potential receptors ingest 2 liters of water per day for 350 days per year). COPC comparisons of surface water concentrations with these criteria are presented in Table 6-9.

6.1.2.3.10 Selection of COPCs for Sediment – SWMU 17

One VOC, three pesticides, and 17 metals were detected in one sediment sample collected in October 2001 (The sample was analyzed for VOCs, SVOCs, Pesticides/PCBs, explosives, metals, and cyanide).

No chemicals were identified as COPCs in sediment at SWMU 17 because the maximum concentrations were less than COPC screening levels based on USEPA Region 9 risk-based screening concentrations and/or concentrations in the upgradient sample (23SD08).

The COPC selection process for sediment is presented in Table 6-10.

6.1.2.4 Summary

Tables 6-11 and 6-12 summarize the chemicals retained as COPCs for soil, groundwater, surface water, and sediment at SWMUs 16 and 17, respectively. RAGS Part D tables for COPC selection are included in Appendix F.

6.2 EXPOSURE ASSESSMENT

This portion of the risk assessment defines and evaluates, quantitatively or qualitatively, the type and magnitude of human exposure to the chemicals present at or migrating from a site. The exposure assessment is designed to depict the physical setting of the site, to identify potentially exposed populations and applicable exposure pathways, to calculate concentrations of COPCs to which receptors might be exposed, and to estimate chemical intakes under the identified exposure scenarios.

Actual or potential exposures at SWMUs 16 and 17 were determined based on the most likely pathways of contaminant release and transport, as well as human activity patterns. A complete exposure pathway has three components: a source of chemicals that can be released to the environment, a route of contaminant transport through an environmental medium, and an exposure or contact point for a human receptor.

6.2.1 Conceptual Site Model

This section discusses the conceptual site models (CSMs) for SWMUs 16 and 17. A CSM facilitates consistent and comprehensive evaluation of the potential risks to human health by creating a framework for identifying the pathways by which human receptors may come in contact with environmental media contaminated by site activities. A CSM depicts the relationships among the following elements, which are necessary for defining complete exposure pathways:

- Site sources of contamination
- Contaminant release mechanisms and transport/migrstion pathways
- Exposure routes
- Potential receptors

This section summarizes the CSMs for SWMUs 16 and 17 as they apply to the HHRAs presented in this report. Figures 6-1 and 6-2 illustrate the CSMs for SWMUs 16 and SWMU 17, respectively.

The elements of the CSM (contaminant source, release mechanisms, transport/migration pathways, exposure routes, and potential receptors) establish the manner and degree to which a potential receptor may be exposed to chemicals present at the site. The degree of risk incurred by a potential receptor varies according to the means of exposure, the duration of exposure, and the specific chemical to which the receptor is exposed. An exposure, however long in duration, does not necessarily result in an "unacceptable" health or environmental risk, although risks generally increase with increased frequency and/or duration of exposure.

The elements of the CSM, including how they pertain to SWMUs 16 and 17, are discussed below. Sources of contamination, contaminant release mechanisms, transport and migration pathways, exposure routes, and potential receptors are defined. Table 6-13 provides a site-specific summary of the potential receptors evaluated and the exposure routes addressed quantitatively for each receptor.

6.2.1.1 Site Sources of Environmental Contamination

SWMU 16

SWMU 16 is located in the southern part of NWS Charleston. It encompasses an area of approximately 10 acres and is located within the tidal marsh zone north of Goose Creek. The area is covered by trees, grasses, and shrubbery. Various debris, predominantly construction rubble, lies sporadically on the surface. The site was the primary landfill used for disposal of solid and liquid waste generated at NWS Charleston between 1941 and 1978. Solid wastes included household waste, construction and demolition materials, empty containers from shop areas, and metal waste. In addition, approximately 500 mercury batteries were reportedly disposed at random locations in the landfill, and 90 mm shells were discarded at the site, of which approximately 40 were removed in 1980. Liquid wastes included oily wastes and solvents generated by NWS, POMFLANT, and ships. An estimated 5,000 to 15,000 gallons of waste oil and solvents (i.e., toluene, MEK, xylenes, and acetone) were disposed at the site annually.

The site was closed in 1980 and covered with approximately 2 feet of local fill soil. The general intent of the regrading was to cover all rubbish and provide adequate drainage for the site. Rubbish consisting of mainly wood, concrete, metal, and plastic was removed from along the marsh edge, and riprap was installed along the edge of the marsh. All loose combustible material, except for creosoted wood, was burned. Oil drums located in the eastern part of the disposal area were crushed and placed under the soil cover. The ground beneath the drums was reportedly saturated with oil, and therefore, no burning in this area was conducted. The remaining material was compacted, covered, and grassed. All salvageable material was removed from the site.

At SWMU 16 the subsurface materials consists primarily three units. Fill material (sand and silt with varying amounts of clay and waste material) was encountered in the top 5 to 8 feet bgs. Beneath the fill material is interbedded marsh muck (clay and silt) and peat with a combined thickness of approximately 25 to 35 feet. The Ashley Formation of the Cooper Group is inferred to come in contact with the overlying marsh muck. The potentiometric surface mimics the land surface topography. During low tide there was a northeast-southwest oriented groundwater divide or mound in the central portion of the study area between SWMU 16 and 17. At SWMU 17 groundwater was flowing east toward the tributary of Goose Creek, and at the SWMU 16 to the west, southwest and northwest toward Goose Creek. A higher gradient existed on the eastern side of the mound as a result of topography. During high tide a similar flow pattern was as observed during low tide. The groundwater potentiometric surface mimics the land surface topography, and there was a groundwater divide the central portion of the study area. Typically, the first water was encountered just beneath the upper clay unit at the land surface. Surface drainage is south-southwest to several tributaries that feed Goose Creek.

As indicated in Section 4.5.1, in addition to the sources listed above, another source area was identified at SWMU 16 in the debris area at location 16SS02. This area contained elevated levels of PCBs, phthalates, and inorganics, (primarily lead and chromium) and can be considered a "hot spot" with exceedances more than two orders of magnitude in excess of PRGs.

SWMU 17

SWMU 17 is located in the southern part of NWS, immediately east of SWMU 16. The site is rectangular in shape and reportedly 180 feet long and 90 feet wide. However, the actual size was suspected to be larger. The site was used primarily for surface disposal of solid waste between 1950 and 1978, but oils and missile components were also disposed at the site. Solid wastes observed across the site during the IAS in 1984 included rubble, paint cans and buckets, and missile components. An estimated 3,000 to 4,000 gallons of engine oil were reportedly disposed of at the site between 1965 and 1966.

As indicated in Section 4.5.1, three additional source areas were identified at SWMU 17, as follows:

- The center of the depression area (soil boring 17SB17) contaminated primarily with TCE. The area is considered a "hot spot", and TCE impacts to groundwater from this source area are evident.

- The area near an empty rusted drum north of the depression area at location 17SB14 that had subsurface soil primarily contaminated with carbon tetrachloride and chloroform.

- The unvegetated area (soil borings 17SB11 and 17SB12) near Wilkinson Way toward the western site boundary. COPCs from this area included lead, chromium, and PCBs. The surface contamination in this area does not appear to extend to subsurface soil or groundwater.

At SWMU 17, the subsurface materials consists primarily five units above the Ashley Formation of the Cooper Group. A low permeable clay unit at the land surface was encountered throughout the SWMU and extends down to about 5 to 10 feet bgs. Beneath the clay unit is a silt and sand unit which coarsens downward to a shelly sand unit. Both these units were encountered throughout SWMU 17 and have a combine thickness ranging from 17 to 32 feet. Beneath the shelly sand in the west portion of SWMU 17 is a distinct silt and clay unit. The silt and clay unit changes laterally into a sand unit which was encountered beyond the eastern boundary of SWMU 17. The Ashley Formation of the Cooper Group is inferred to underlie both units (silt and clay, and sand). The upper surface of the Ashley Formation of the Cooper Group has a relatively steep slope (2.4%) to the north (16 feet bgs at the southern boundary and 42 feet bgs in the north).

Surface water drains to the marshy area east of the site. The tributary in the marshy area drains to Goose Creek. The potentiometric surface mimics the land surface topography. During low tide there was a northeast-southwest oriented groundwater divide or mound in the central portion of the study area between SWMU 16 and 17. At SWMU 17 groundwater was flowing east toward the tributary of Goose Creek, and at the SWMU 16 to the west, southwest and northwest toward Goose Creek. A higher gradient existed on the eastern side of the mound as a result of topography. During high tide a similar flow pattern was as observed during low tide. The groundwater potentiometric surface mimics the land surface topography, and there was a groundwater divide the central portion of the study area. Typically, the first water is encountered just beneath the upper clay unit that extents down from the land surface to about 5 to 12 feet bgs. After monitoring well completion, the static water level equilibrates at levels above the depth at which saturated material was first noted while drilling.

Based on historical site data and sampling, the following parameters are among the site-related chemical contaminants known to be present or potentially present in environmental media at SWMUs 16 and 17:

<u>SWMU 16</u>

- Phthalates (e.g., BEHP)
- PCBs (Aroclor-1254)
- Chlorinated VOCs (e.g., PCE, TCE)
- Explosives
- Metals (e.g., lead)

SWMU 17

- Chlorinated VOCs (primary site contaminants)
- PAHs
- PCBs
- Explosives (e.g., TNT, RDX)
- Metals (e.g., chromium)

6.2.1.2 Potential Contaminant Release Mechanisms and Transport/Migration Pathways

Based on available historical information for SWMUs 16 and 17, releases of potentially hazardous constituents to environmental media have occurred as a result of historical site operations (i.e., disposal of liquid and solid wastes in both sites). Media of concern at the site include surface and subsurface soil, air, surface water, sediment, and groundwater.

Soil was the original source medium of concern because wastes were disposed (dumped onto surface soils or landfilled) at both sites. The presence of VOCs in the groundwater underlying and downgradient of SWMUs 16 and 17 indicates the migration of contaminants from soils to groundwater. As stated in Section 4.5.2, groundwater results revealed chlorinated VOC plumes migrating outwardly from two source areas. One plume originates from SWMU 16, where former landfill trenches were located, and another originates in the depression area of SWMU 17. Soil contaminants may also migrate from these SWMUs as airborne soil particulates or as vapors (i.e., VOCs were detected in soils at both SWMUs 16 and 17). Chromium, TCE, and carbon tetrachloride were detected in SWMU 16 or 17 surface or subsurface soils at maximum concentrations exceeding USEPA SSLs for the migration of chemicals from soils to air.

Contaminants may migrate from the SWMU 16 source areas to the adjoining surface water bodies as the result of surface water/sediment runoff and the discharge of contaminated groundwater to the various streams and drainageways leading to Goose Creek. However, tidally influenced surface waters from Goose Creek wash over large portions of the site, and there is an intermixing of the surface waters/sediments from the Creek and the soils of SWMU 16. Actual human exposure to both soils and sediments at SWMU 16 is limited by the tidal action in the area.

Exposure to surface water and sediment are not expected to be an important exposure route for SWMU 17 because streams and drainageways do not exist on the site. Risks for surface water and sediment are evaluated for SWMU 17 based on the one sample collected near the site.

The migration of VOCs from underlying groundwater/soils/soil gas into the indoor air of buildings at SWMU 17 may occur if residential or commercial/industrial buildings were to be constructed at the site in the future. The vapor intrusion of VOCs into structures is not considered likely for SWMU 16 because the site is a marshy area subject to tidal inundation, and it is very unlikely that buildings would be constructed in this area, as discussed in Section 6.1.2.3.3. Moreover, the site lies within the 100-year floodplain. However, human exposure to COPCs in the groundwater at SWMU 16 (and SWMU 17) may occur if a construction/excavation worker were to contact contaminated groundwater pooling at the bottom of an excavation pit in a future construction event.

In summary, based on the historical information and the currently available environmental data, plausible contaminant release and migration mechanisms for SWMUs 16 and 17 include the following:

- Transport of surface soil contaminants to subsurface soils and groundwater via infiltration, percolation, and migration within the groundwater aquifer.
- Transport of contaminants in groundwater to subsurface soil by means of direct contact of groundwater in the shallow aquifer with the soil.
- Overland runoff of surface waters, sediments, and surface soil via ditches and drainageways eventually flowing into Goose Creek.
- Migration of contaminants in groundwater (i.e., lateral migration) to potential receptor locations (e.g., surface water bodies) downgradient of the sites.
- Migration of fugitive dusts and VOCs from surface soils and subsurface soils (if future construction and excavation activities occur) into ambient air.
- Migration of vapors from groundwater into ambient air during future construction/excavation activities.
- Migration of vapors from groundwater into buildings constructed on SWMU 17 in the future.

6.2.1.3 Potential Current and Future Receptors of Concern and Exposure Pathways

NWS Charleston is an active naval base and will remain active for the foreseeable future. For purposes of completeness, this baseline HHRA considered receptor exposure under residential and industrial land use scenarios or as a consequence of trespass across the SWMUs. Based on current and potential future

land use, the following potential receptors may be exposed to contaminated environmental media within the study areas:

- **Trespassers** – A plausible receptor under current or future land use. The area around the sites is composed of swamps and marshland and access is difficult. Additionally, there is a chain-link fence on the land sides of SWMU 16. Trespassing is assumed to be limited to older children only and is assumed to occur on an infrequent basis. This receptor may be exposed to potentially contaminated soil (incidental ingestion and dermal contact), air (inhalation), and surface water (incidental ingestion and dermal contact) and sediments (incidental ingestion and dermal contact). Also potential exposures to surface water will be limited to wading because the streams at the sites are not deep enough for swimming. Direct contact with groundwater or subsurface soils is not anticipated for this receptor. Potential exposure to adult trespassers is expected to be similar to adolescent trespassers. Therefore, the potential risks associated with adult trespassers can be inferred by the calculated risks for the adolescent trespasser.

- **Occupational Workers** – A plausible receptor under current and future land use. Although site workers (groundskeepers/maintenance personnel) may be potential receptors under current land use, they are not directly evaluated in the baseline risk assessment. Potential exposure for a site worker is expected to be much less than exposure to occupational workers, who are evaluated in the risk assessment under future land use. Therefore, the potential risks associated with site workers can be inferred by the calculated risks for the occupational worker. This receptor could be exposed to soil (incidental ingestion and dermal contact) and air (inhalation). To account for the possibility (however remote) that a building could be constructed on SWMU 17 in the future, this receptor is also evaluated for inhalation of vapors emitted from groundwater that might migrate into the building through cracks in building foundations and walls. It is anticipated that this receptor would not be routinely exposed to subsurface soil, groundwater, surface water, or sediment.

- **Construction Workers** – A plausible receptor under future land use. No construction activities are currently planned for the study area. Additionally, the shallow depth to groundwater in some sections of the study areas would likely preclude excavation and construction. However, excavation and construction are plausible in other sections of the study areas. Consequently, this receptor could be exposed to surface and subsurface soil (incidental ingestion, dermal contact, and inhalation of vapors/particulates) and groundwater (dermal contact and inhalation of vapors). Routine exposure to surface water and sediments is not expected for the construction worker. Significant exposures by a construction worker to groundwater are unlikely because if a construction worker were to have prolonged contact with groundwater, he/she would most likely wear protective clothing such as rubber boots and/or hip waders, which would limit receptor exposure. Also, if significant groundwater was

encountered during the excavation of a trench or foundation, groundwater would most likely be pumped out of the excavation so that the construction activities could be completed.

- **Hypothetical Future Residents (SWMU 17 only)** – An unlikely receptor under future land use considering that the site lies within the 100-year floodplain. Although this scenario is highly unlikely, a future residential scenario is typically evaluated in a risk assessment for decision-making purposes. For example, the need for deed restrictions at a site may be eliminated prior to site closure if minimal risks are estimated for residential receptors. It is assumed that a hypothetical resident may be exposed to soils (incidental ingestion, dermal contact, and inhalation of vapors/particulates), groundwater (ingestion, dermal contact, and inhalation of vapors), surface water (ingestion and dermal contact), and sediment (incidental ingestion and dermal contact). This receptor is also evaluated for exposure to vapors from groundwater in hypothetical future dwellings.

Typically only construction/excavation workers are assumed to be exposed to subsurface soil. However, to account for the possibility that subsurface soil could be brought to the surface in a future excavation project, potential exposure of future residents and commercial/industrial workers to COPCs in subsurface soil is also evaluated in the HHRAs. The results of the subsurface soil evaluation are presented in Section 6.5.2.

Future residential use of groundwater at SWMU 16 is not evaluated in this HHRA because of the nature of the site and the groundwater underlying the site. The area is swampy and the groundwater quality is subject to tidal inundation (refer to Section 3.4.2 and the high tide line depicted on Figure 3-1), also causing the groundwater on the site boundaries bordering Goose Creek to be saline (refer to Section 3.2.3, Groundwater Sampling, 4th paragraph). Furthermore, the site lies within the 100-year floodplain. Consequently, it is unlikely that groundwater underlying the site could be used for domestic purposes. However, exposure to COPCs in groundwater is evaluated for construction/excavation workers to account for the possibility that groundwater could be encountered during a future excavation project.

Table 6-13 provides a site-specific summary of the potential receptors evaluated and the exposure routes addressed quantitatively for receptor. Details regarding the assumed receptor characteristics (e.g., intake rate, frequency, duration of exposure) are defined in Section 6.2.4.

6.2.2 Central Tendency Exposure versus Reasonable Maximum Exposure

Traditionally, exposures evaluated in the HHRA were based on the concept of a reasonable maximum exposure (RME) only, which is defined as "the maximum exposure that is reasonably expected to occur at a site" (USEPA, December 1989). However, subsequent risk assessment guidance (USEPA, February 1992) indicates the need to address an average case or central tendency exposure (CTE).

To provide a full characterization of potential exposure, both RME and CTE scenarios were evaluated in the HHRAs for SWMUs 16 and 17. The available guidance (USEPA, May 1993) concerning the evaluation of CTE is limited and at times vague. Therefore, professional judgment was exercised when defining CTE conditions for a particular receptor at a site.

6.2.3 Exposure Point Concentrations

The exposure point concentration (EPC), which is calculated for COPCs only, is an estimate of the chemical concentration within an exposure unit (EU) likely to be contacted over time by a receptor and is used to estimate exposure intakes. An EU is defined as the area typically encountered/traversed by a receptor under a particular land use scenario. For example, a residential lot size of ¼ acre to 2 acres is often used for the evaluation of a hypothetical future resident. However, the size of an EU is typically based on the distribution of the chemical concentrations in a medium as well as on presumed receptor activity patterns.

The following guidelines were used to calculate the EPCs for soil, groundwater, surface water and sediment at SWMUs 16 and17:

- If a soil, surface water, or sediment dataset contained fewer than 10 samples, the EPC for the RME and CTE cases was defined as the maximum detected concentration.

- If a soil, surface water, or sediment dataset contained 10 or more samples, the 95-percent upper confidence limit (UCL) on the arithmetic mean, which was based on the distribution of the data set, was selected as the EPC for the RME and CTE cases. EPCs were calculated following USEPA's Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (USEPA, December 2002) using the USEPA's ProUCL software and guidance (Singh, A., et al., April 2004). In general, the concentration selected for the EPC is the value recommended by the ProUCL software, subject to final review of a statistician.

- USEPA Region 4 (USEPA, May 2000) makes an exception to the use of the UCL as the EPC for groundwater. According to the Region 4 guidance, groundwater EPCs should be the arithmetic average of the wells in the highly concentrated area of the plume. To be conservative, this risk assessment uses maximum detected concentrations as the EPCs for groundwater. The uncertainty associated with using maximum concentrations is discussed in Sections 6.4.3.2 and 6.5.

Tables 6-11 and 6-12 summarize the EPCs used in the HHRAs for SWMUs 16 and 17, respectively. The RAGS Part D Table 3s in Appendix F present the EPCs and additional statistical information, including the rationale for the selection of each EPC value.

6.2.4 Chemical Intake Estimation

The methodologies and techniques used to estimate exposure intakes are presented in this section. Intakes for the identified potential receptor groups were calculated using current USEPA risk assessment guidance (e.g., USEPA, December 1989, August 1997, and July 2004) and presented in the risk assessment spreadsheets. Quantitative risk assessment results are presented in RAGS Part D format tables (Appendix F).

Noncarcinogenic intakes were estimated using the concept of an average annual exposure. Carcinogenic intakes were calculated as an incremental lifetime exposure, which assumed a life expectancy of 70 years. Assumptions regarding exposure are presented in Tables 6-14 and 6-15 for the RME and CTE scenarios, respectively. The majority of the exposure assumptions used to estimate chemical intakes were based on default assumptions described in several USEPA guidance documents (e.g., USEPA Region 4, May 2000 and July 2004). The following paragraphs discuss the non-default receptor-specific exposure assumptions used in the risk assessments.

6.2.4.1 Dermal Contact with Soil/Sediment

Direct physical contact with soil and sediment may result in the dermal absorption of chemicals. Exposures associated with the dermal route are estimated in the following manner (USEPA July 2004):

$$\text{Intake}_{si} = \frac{(C_{si})(SA)(AF)(ABS)(CF)(EF)(ED)}{(BW)(AT)}$$

where:

Intake_{si}	=	amount of chemical "i" absorbed during contact with soil/sediment (mg/kg/day)
C_{si}	=	concentration of chemical "i" in soil/sediment (mg/kg)
SA	=	skin surface area available for contact (cm^2/day)
AF	=	skin adherence factor (mg/cm^2)
ABS	=	absorption factor (dimensionless)
CF	=	conversion factor (1×10^{-6} kg/mg)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (year)
BW	=	body weight (kg)

AT = averaging time (days);
for noncarcinogens, AT = ED x 365 days/year;
for carcinogens, AT = 70 years x 365 days/year

Exposed surface areas of the body available for dermal contact are determined on a receptor-specific basis because they correspond with assumed human activities and clothing worn during exposure events. Current guidance documents (USEPA, August 1997 and July 2004) were used to develop the default assumptions concerning the amount of skin surface area available for contact for a receptor. To maintain consistency from project to project, input parameters previously used for other NWS Charleston risk assessments were reviewed when developing the exposed surface areas. The rationales used to determine the exposed skin areas were as follows:

- For construction/excavation workers and occupational workers exposed to surface soil or sediment, the surface area available for contact was assumed to be the head, hands, and forearms. The skin surface area is 3,300 square centimeters (cm^2) for the CTE and RME scenarios. These values represent the 50th-percentile areas for the head, hands, and forearms (USEPA, July 2004).

- For adolescent trespassers, 25 percent of the total body surface area for an adolescent (aged 7 to 16) was assumed to be available for surface soil and/or sediment contact. A value of 3,820 cm^2 for the RME and CTE was derived from the 95th-percentile surface area data, as provided in Table 6-6 of the Exposure Factors Handbook (USEPA, August 1997).

- For adult residents exposed to surface soil/sediment, the exposed surface area available for contact is the USEPA recommended value of 5,700 cm^2 for the RME and CTE scenarios (USEPA July 2004). This value assumes that the adult resident is wearing a short-sleeved shirt, shorts, and shoes; therefore, the exposed skin surface is limited to the head, hands, forearms, and lower legs.

- For child residents, the recommended value of 2,800 cm^2 was used as the exposed skin surface area for the RME and CTE scenarios (USEPA, July 2004). This value assumes that the child resident is wearing a short-sleeved shirt, shorts, and no shoes; therefore, the exposed skin surface area is limited to the head, hands, forearms, lower legs, and feet.

The following values of soil adherence factors provided in RAGS Part E (USEPA, July 2004) were used to evaluate risks from exposure to soil and sediment:

- Construction/excavation workers - 0.3 mg/cm^2 for the RME and 0.1 mg/cm^2 for the CTE. These values are the 95th-percentile and geometric mean values for construction workers, respectively.

- Occupational workers - 0.2 mg/cm^2 for the RME and 0.02 mg/cm^2 for the CTE.

- Adolescent trespassers and child residents - 0.2 mg/cm^2 for the RME and 0.04 mg/cm^2 for the CTE. These values are the 95th-percentile and geometric mean values presented for soccer players (teens) playing in moist conditions.

- Adult residents - 0.07 mg/cm^2 for the RME and 0.01 mg/cm^2 for the CTE.

For the constituents identified as COPCs in soil, the following absorption factors were used (USEPA, July 2004):

- PAHs – 0.13
- PCBs – 0.14
- gamma-BHC (Lindane) – 0.04
- Arsenic – 0.03
- Cadmium – 0.001
- Semivolatile organics – 0.1
- Explosives
  2,4-DNT – 0.102
  RDX – 0.015

As indicated in RAGS Part E, absorption factors for volatiles and other metals have not been developed due to insufficient data to support a default value. Therefore, risks from dermal absorption of volatiles and metals (other than arsenic and cadmium) from soil were not quantified in this risk assessment. The uncertainty associated with the omission of these constituents is discussed in the uncertainty analysis. Exposure frequencies and durations for occupational workers and residents are default values set by the USEPA and USEPA Region 4. Exposure frequency and duration for trespassers (30 days per year for 10 years) are based on Region 4 guidance and previous risk assessments performed for NWS Charleston. Exposure frequency and duration for excavation/construction workers (30 days per year for 1 year) are based on previous risk assessments performed at NWS Charleston (ABB-ES, January 1995). Exposure frequencies, durations, and times for potential receptors are presented in Tables 6-14 and 6-15, for the RME and CTE, respectively.

6.2.4.2 Incidental Ingestion of Soil and Sediment

Incidental ingestion of soil and sediment by potential receptors coincides with dermal exposure. Exposures associated with incidental ingestion were estimated in the following manner (USEPA, December 1989):

$$Intake_{si} = \frac{(C_{si})(IR_s)(FI)(EF)(ED)(CF)}{(BW)(AT)}$$

where:

$Intake_{si}$	=	intake of contaminant "i" from soil or sediment (mg/kg/day)
C_{si}	=	concentration of contaminant "i" in soil or sediment (mg/kg)
IR_s	=	ingestion rate (mg/day)
FI	=	fraction ingested from contaminated source (dimensionless)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (year)
CF	=	conversion factor (1×10^{-6} kg/mg)
BW	=	body weight (kg)
AT	=	averaging time (days);
		for noncarcinogens, AT = ED x 365 days/year;
		for carcinogens, AT = 70 years x 365 days/year

The same exposure frequencies and durations used in the estimation of dermal intakes were used to estimate exposure via incidental ingestion. Default values of 1.0 were used for the fraction of soil ingested from the source for both the RME and CTE scenarios. Sediment ingestion rates were assumed to be the same as soil ingestion rates.

6.2.4.3 Inhalation of Air Containing Fugitive Dust/Volatiles Emitted from Soil

As stated previously, the inhalation pathway is quantitatively evaluated for chemicals identified as COPCs in the HHRAs because concentrations of several compounds (i.e., carbon tetrachloride, TCE, and chromium) exceeded USEPA Generic SSLs for migration from soil to air. The chemical intakes for inhalation exposures are determined using the concentration of the contaminant in air. Intakes of both particulates and vapors from soil were calculated using the same equation, as follows (USEPA, December 1991 and July 1996):

$$Intake_{ai} = [C_{si} \times IR_a \times ET \times EF \times ED \times (1/PEF + 1/VF)] / (BW \times AT)$$

where:	$Intake_{ai}$	=	intake of chemical "i" from air via inhalation (mg/kg/day)
	C_{si}	=	concentration of chemical "i" in soil (mg/kg)

IR_a	=	inhalation rate (m^3/hour or day)
ET	=	exposure time (hours/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (year)
PEF	=	particulate emission factor (m^3/kg)
VF	=	volatilization factor (chemical-specific) (m^3/kg)
BW	=	body weight (kg)
AT	=	averaging time (days);
		for noncarcinogens, AT = ED x 365 days/year;
		for carcinogens, AT = 70 yr x 365 days/year

The concentration of a chemical in air is calculated using the methodology provided in the USEPA's Soil Screening Guidance (USEPA, July 1996 and December 2002) and measured soil concentrations, chemical-specific data, and model default values. The following inhalation rates are used to calculate the inhalation intakes: for construction/excavation workers, 2.5 cubic meters (m^3) per hour for the RME and 1.5 m^3 per hour for the CTE (USEPA, August 1997 and December 2002), for occupational workers, 2.5 m^3 per hour for the RME and CTE (USEPA Region 4, May 2000), for adolescent trespassers, 1.9 m^3 per hour for the RME and 1.2 m^3 per hour for the CTE (USEPA, August 1997), 20 m^3 per day for adult residents for the RME and CTE (USEPA Region 4, May 2000), and 15 m^3 per day for child residents 6 years of age (USEPA Region 4, August 1997) for the CTE and RME. Chemical-specific volatilization factors (VFs) were calculated on the USEPA's Soil Screening Guidance website (http://risk.lsd.ornl.gov/calc_start.shtml). The particulate emission factor (PEF) for occupational workers, adolescent trespassers, and child and adult residents (1.36×10^9 m^3/kg) was obtained from the Soil Screening Guidance (USEPA, December 2002). The PEF for the construction/excavation worker (1.27×10^6 m^3/kg) was calculated using equations and input factors from the Soil Screening Guidance (USEPA, December 2002). The calculation of the PEF for the construction worker is presented in Appendix F.

6.2.4.4 Dermal Contact with Groundwater and Surface Water

The same equation was used to estimate intakes for dermal contact with groundwater and surface water. As stated previously, future residential use of groundwater is not evaluated for SWMU 16 because it is highly unlikely that the site could ever be developed for residential land use and because the groundwater at the site is not potable (due to salinity). Hypothetical future residential use of groundwater is evaluated at SWMU 17 to account for the possibility that NWS Charleston could close in the future and be developed for residential purposes. Direct contact with groundwater is limited to exposure that would occur under residential and typical industrial and construction scenarios. Hypothetical future on-base residential receptors were assumed to use groundwater for domestic purposes (i.e., bathing, showering, dish washing) that can result in dermal exposure. Short-term dermal exposure to groundwater is

assumed to occur for construction/excavation workers during excavation activities. Dermal contact with surface water may occur while receptors are involved in certain activities such as trespassing or recreational uses (e.g., hiking, wading, etc.).

The following equation was used to assess exposures resulting from dermal contact with water (USEPA, July 2004):

$$DAD_{wi} = \frac{(DA_{event})(EV)(ED)(EF)(A)}{(BW)(AT)}$$

where:

DAD_{wi}	=	dermally absorbed dose of chemical "i" from water (mg/kg/day)
DA_{event}	=	absorbed dose per event (mg/cm^2-event)
EV	=	event frequency (events/day)
ED	=	exposure duration (year)
EF	=	exposure frequency (days/year)
A	=	skin surface area available for contact (cm^2)
BW	=	body weight (kg)
AT	=	averaging time (days);
		for noncarcinogens, AT = ED x 365 days/year;
		for carcinogens, AT = 70 years x 365 days/year

Exposure for hypothetical future on-base residential receptors using the groundwater as a domestic water supply is assumed to occur on a daily basis. Exposure to groundwater for construction workers and exposure to surface water for trespassers and future residents were also assumed to occur each day the receptor visits the study area. Dermal intakes for residents while showering or bathing assumed total body exposure. For construction workers exposed to groundwater and receptors exposed to surface water, the exposed surface area of the body available for contact was based on assumed activities and was similar to the assumptions outlined for dermal contact with soil and sediment.

The absorbed dose per event (DA_{event}) was estimated using a non-steady-state approach for organic compounds and a traditional steady-state approach for inorganics. For organics, the following equations apply:

$$\text{If } t_{event} < t^*, \text{ then: } DA_{event} = (2)(K_p)(FA)(C_w)(CF)\left(\sqrt{\frac{6\,\tau\, t_{event}}{\pi}}\right)$$

$$\text{If } t_{event} > t^*, \text{ then: } DA_{event} = (K_p)(FA)(C_w)(CF)\left(\frac{t_{event}}{1+B} + 2\tau\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right)$$

where:

t_{event}	=	duration of event (hour/event)
t^*	=	time it takes to reach steady-state conditions (hour)
K_p	=	permeability coefficient from water through skin (cm/hour)
FA	=	chemical-specific fraction absorbed (dimensionless)
C_{wi}	=	concentration of chemical "i" in water (mg/L)
τ	=	lag time (hour)
π	=	Pi (dimensionless; equal to 3.1416)
CF	=	conversion factor (0.001 L/cm^3)
B	=	dimensionless ratio of the permeability of the stratum corneum relative to the permeability across the viable epidermis.

Values for the chemical-specific parameters (t^*, K_p, τ, FA, and B) were obtained from RAGS Part E, the current dermal guidance (USEPA, July 2004) and are presented in the risk calculation tables in Appendix F. If no published values were available for a particular compound, they were calculated using equations provided in this guidance.

The following non-steady-state equation was used to estimate DA_{event} for inorganics:

$$DA_{event} = (K_p)(C_{wi})(t_{event})$$

In general, the recommended default value of 0.001 was used for the dermal permeability of inorganic constituents. For most metals, dermal absorption is not a significant pathway because penetration through the skin is minimal.

6.2.4.5 Direct Ingestion of Groundwater and Incidental Ingestion of Surface Water

Future residents may be exposed to groundwater via direct ingestion. In addition, trespassers and future residents may incidentally ingest surface water. Intakes associated with ingestion of water were evaluated using the following general equation (USEPA, December 1989):

$$Intake_{wi} = \frac{(C_{wi})(IR_{gw} \text{ or } IR_{sw})(EF)(ED)}{(BW)(AT)}$$

where:

$Intake_{wi}$	=	intake of chemical "i" from water (mg/kg/day)
C_{wi}	=	concentration of chemical "i" in water (mg/L)
IR_{gw}	=	ingestion rate for groundwater (L/day)

IR_{sw}	=	ingestion rate for surface water (L/day) = (CR)(ET)
		CR = contact rate for surface water (L/hour)
		ET = exposure time for surface water (hour/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (year)
BW	=	body weight (kg)
AT	=	averaging time (days);
		for noncarcinogens, AT = ED x 365 days/year;
		for carcinogens, AT = 70 years x 365 days/year

For groundwater, the ingestion rate for the RME scenario was 2 liters per day for adults and 1 liter per day for children (USEPA Region 4, May 2000). Regional guidance (USEPA, Region 4, May 2000) was used to select the contact rate for surface water for the RME scenario. A value of 0.01 liter per hour is used for the future adult resident and adolescent trespasser, and 0.05 liter per hour is used for the future child resident. For surface water exposure, the exposure time was set at 1.5 hours per day under the RME scenario and 1 hour per day for all receptors for the CTE (USEPA, August 1997). The same exposure times, frequencies, and durations used to assess dermal exposure to water were used to estimate intakes for ingestion of water.

6.2.4.6 Inhalation of Volatiles from Groundwater Inside Buildings by Vapor Intrusion

Volatilization of chemicals from groundwater into indoor air may occur if buildings were constructed on a site in the future, thereby exposing individuals inside buildings or dwellings. Therefore, potential risks associated with chemical concentrations in indoor air as a result of vapor migration from impacted groundwater were evaluated for hypothetical future on-site residents and workers. The Johnson and Ettinger Vapor Intrusion Model (USEPA, February 2004) was used to determine the indoor air concentration of a chemical that is present in groundwater. The model assumes that vapors of volatile chemicals are emitted from groundwater, migrate through cracks in building foundations, and accumulate in air inside buildings. The Johnson and Ettinger Model assumes that residential dwellings or commercial buildings have been constructed on the site and that the building dimensions and ventilation rates are typical of residential and commercial buildings in the United States.

The volatility of a chemical largely determines the significance of this route of exposure. Indoor air concentrations of a chemical are influenced by the physical and chemical properties of the substance, especially solubility and vapor pressure. Low aqueous solubilities and high vapor pressures increase the likelihood that organic compounds found in water will also be found in indoor air. Additionally, the physical properties of the soil can have a great influence on the rate of diffusion of chemicals through the soil.

The following equation is used to assess intakes for inhalation of indoor air:

$$\text{Intake} = \frac{C_{building} \times IR_a \times EF \times ED}{AT \times BW}$$

where: Intake = intake of chemical from air (mg/kg-day)

$C_{building}$ = vapor concentration in the building (mg/m^3) as calculated by the model (Appendix F)

IR_a = inhalation rate (m^3/day)

EF = exposure frequency (days/year)

ED = exposure duration (year)

AT = averaging time (days)
for noncarcinogens, AT = ED x 365 days/year
for carcinogens, AT = 70 years x 365 days/year

BW = body weight (kg)

Uncertainties associated with the use of the Johnson and Ettinger Model are discussed in the uncertainty section of the risk assessment. Additional assumptions are contained in Section 5 of the Model Users Guide (USEPA, February 2004). Indoor inhalation rates are set at 20 m^3 per day for adult residents and occupational workers and 15 m^3 per day for child residents (USEPA Region 4, May 2000).

6.2.4.7 Exposure of Workers to Volatiles in a Construction/Utility Trench

There are no well-established models available for estimating migration of volatiles from groundwater into a construction/utility trench. To evaluate worker exposure to vapors in a trench, the risk assessments followed an approach suggested by the Virginia Department of Environmental Quality (VDEQ) Voluntary Remediation Program that is based on a combination of a vadose zone model to estimate volatilization of gases from contaminated groundwater into a trench and a box model to estimate dispersion of the contaminants from the air inside the trench into the above-ground atmosphere to estimate the EPC for air in a construction trench. The VDEQ methodology is described in the following sections. Vapor concentrations of a contaminant in a trench were estimated using the following equation:

$$C_{trench} = C_{GW} \times VF$$

where: C_{trench} = air concentration of contaminant in the trench (µg/m^3)

C_{GW} = concentration of contaminant in groundwater (µg/L)

VF = volatilization factor (L/m^3)

The model used in this risk assessment assumed that a construction project could result in an excavation 15 feet bgs or less. If the depth to groundwater at a site was less than 15 feet, the VDEQ model assumed that a worker would encounter groundwater when digging an excavation or a trench. The worker would then have direct exposure to the groundwater. The worker would also be exposed to contaminants in the air inside the trench that would result from volatilization from the groundwater pooling at the bottom of the trench.

The following equation was used to calculate the VF for a trench less than 15 feet deep:

$$VF = (Ki \times A \times F \times 10^{-3} \times 10^{4} \times 3{,}600) / (ACH \times V)$$

where:

K_i	=	overall mass transfer coefficient of contaminant (cm/s)
A	=	area of the trench (m^2)
F	=	fraction of floor through which contaminant can enter (unitless)
ACH	=	air changes per hour (h^{-1} = 360 h^{-1})
V	=	volume of trench (m^3)
10^{-3}	=	conversion factor (L/cm^3)
10^4	=	conversion factor (cm^2/m^2)
3,600	=	conversion factor (seconds/hour)

Studies of urban canyons suggest that if the ratio of trench width relative to wind direction to trench depth is less than or equal to one, a circulation cell or cells will be set up within the trench that limits the degree of gas exchange with the atmosphere. In this case, the air exchange per hour (ACH) is assumed to be two based upon measured ventilation rates of buildings. If the ratio of trench width to trench depth is greater than one, air exchange between the trench and above-ground atmosphere is not restricted, and the ACH is assumed to be 360, based on the ratio of trench depth to the average wind speed. The risk assessments assumed that the width to trench depth ratio was greater than one. Therefore, the ACH was assumed to be 360.

The following equation was used to calculate the overall mass transfer coefficient of (K_i):

$$K_i = 1 / \{(1/k_iL) + [(RT) / (H_i\, k_iG)]\}$$

where:

k_iL	=	liquid-phase mass transfer coefficient of i (cm/s)
R	=	ideal gas constant (atm-m^3/mole-°K = 8.2 x 10^{-5})
T	=	average system absolute temperature °K (Default = 298°K)
H_i	=	Henry's Law constant of i (atm-m^3/mol)
K_iG	=	gas-phase mass transfer coefficient of i (cm/s)

$$kiL = (MWO_2/MWi)^{0.5} \times (T/298) \times kL,O_2$$

where:

k_iL	=	liquid-phase mass transfer coefficient of component i (cm/s)
MWO_2	=	molecular weight of O_2 (g/mol)
MW_i	=	molecular weight of component i (g/mol)
kL, O_2	=	liquid-phase mass transfer coefficient of oxygen at 25°C (cm/s)

The value of kL, O_2 is 0.002 centimeters per second (cm/s).

$$k_iG = (MWH_2O/MW_i)^{0.335} \times (T/298)^{1.005} \times kG, H_2O$$

where:

kiG	=	gas-phase mass transfer coefficient of component i (cm/s)
MWH_2O	=	molecular weight of water (g/mol)
kG,H_2O	=	gas-phase mass transfer coefficient of water vapor at 25°C (cm/s)

The value of kG, H_2O is 0.833 cm/s (USEPA, April 1988)

Exposures associated with the inhalation route for construction workers were estimated in the following manner (USEPA, 1989):

$$\text{Intake}_{ai} = \frac{(C_{ai})(IR_a)(ET)(EF)(ED)}{(BW)(AT)}$$

where:

$Intake_{ai}$	=	intake of chemical "i" from air via inhalation (mg/kg/day)
C_{ai}	=	concentration of chemical "i" in air (mg/m^3)
IR_a	=	inhalation rate (m^3/hr)
ET	=	exposure time (hours/day)
EF	=	exposure frequency (days/year)

ED	=	exposure duration (year)
BW	=	body weight (kg)
AT	=	averaging time (days);
		for noncarcinogens, AT = ED x 365 days/year;
		for carcinogens, AT = 70 years x 365 days/year

Input assumptions for the volatilization from groundwater to outdoor air model are presented in Appendix F. Site-specific values were used whenever possible. Model default values were used when they were believed to be representative of site conditions. Chemical properties were obtained from the Soil Screening Guidance: User's Guide (USEPA, July 1996) and are presented in the model calculations in Appendix F.

6.2.4.7 Summary of Exposure Parameters

A summary of the exposure input parameters for all exposure pathways are presented in Tables 6-14 and 6-15 for the identified potential receptor groups. In general, standard default parameters (e.g., USEPA Region 4, May 2000 and USEPA August 1997), which combine mid-range and upper-end exposure factors, are used to assess RME conditions. CTE was assessed primarily by the use of mid-range exposure factors presented in current risk assessment guidance (USEPA, December 1989 and May 1993).

6.2.5 Exposure to Lead

The equations and methodology presented in the previous sections cannot be used to evaluate exposure to lead because of the absence of published dose-response parameters. Exposure to lead was assessed using the following models:

- The latest version of the USEPA's Integrated Exposure Uptake Biokinetic (IEUBK) Model for lead (May 2002). This model is typically used to evaluate exposure to lead in various media (e.g., soil, water, air) assuming a residential land use scenario.

- The USEPA's Technical Review Workgroup (TRW) Lead Adult Lead Model (ALM) (January 2003). This model is typically used to evaluate exposure to lead in soil only assuming a non-residential land use scenario.

The IEUBK Model for lead (USEPA, May 2002) is designed to estimate blood levels of lead in children (under 7 years of age) based on either default or site-specific input values for air, drinking water, diet, dust, and soil exposure. Studies indicate that infants and young children are extremely susceptible to

adverse effects from exposure to lead. Considerable behavioral and developmental impairments have been noted in children with elevated blood-lead levels. The threshold for toxic effects from this chemical is believed to be in the range of 10 to 15 micrograms per deciliter (µg/dL). Blood-lead levels greater than 10 µg/dL are considered to be a "concern."

The IEUBK Model for lead was used to address exposure to lead in children when detected groundwater concentrations exceed the 15 µg/L federal Action Level promulgated under the SDWA and when detected soil concentrations exceed the OSWER soil screening level of 400 mg/kg for residential land use (USEPA, July 1994). Average chemical concentrations, as well as default parameters for some input parameters, were used in the evaluation. Estimated blood-lead levels and probability density histograms are presented as support documentation for this analysis in Appendix F.

Non-residential adult exposure to lead in soil was evaluated using USEPA's TRW for Model for lead (USEPA, January 2003). In this model, adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood-lead concentration in the developing fetuses of adult women. The adult lead model generates a spreadsheet for each exposure scenario that is evaluated (i.e., industrial, recreational). The output of the spreadsheet is the probability that the blood-lead concentrations in the fetus exceeds 10 µg/L. The probability that the fetal blood-lead level will exceed 10 µg/L was calculated in accordance with the following USEPA guidelines:

- Use of the TRW Interim Adult Lead Methodology in Risk Assessment (USEPA, April 1999).
- Frequently Asked Questions (FAQs) on the Adult Lead Model (USEPA, online, August 2005).

No models are currently available to evaluate the periodic exposure of adolescent trespassers/recreational users to lead. Therefore, the results of the IEUBK Model for children are used to qualitatively assess exposure of this receptor because the potential adverse effects from exposure to lead are expected to be of a lesser magnitude for adolescent trespassers than for children.

6.3 TOXICITY ASSESSMENT

The objective of the toxicity assessment is to identify the potential health hazards and adverse effects in exposed populations. Quantitative estimates of the relationship between the magnitude and type of exposures and the severity or probability of human health effects are defined for the identified COPCs. Quantitative toxicity values determined during this component of the risk assessments were integrated with outputs of the exposure assessments to characterize the potential for the occurrence of adverse health effects for each receptor group.

The toxicity value used to evaluate noncarcinogenic health effects is the RfD; carcinogenic effects are quantified using the CSF.

6.3.1 Toxicity Criteria

RfDs and CSFs used in the HHRAs for SWMUs 16 and 17 were obtained from the following primary literature sources:

- Integrated Risk Information System (IRIS) (USEPA online, August 2005).
- USEPA Provisional Peer Reviewed Toxicity Values (PPRTVs) – The Office of Research and Development/National Center for Environmental Assessment (NCEA) Superfund Health Risk Technical Support Center develops PPRTVs on a chemical-specific basis when requested by USEPA's Superfund program.
- Other Toxicity Values – These sources include but are not limited to California Environmental Protection Agency (Cal EPA) toxicity values, the Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs), and the Annual Health Effects Assessment Summary Tables (HEAST) (USEPA, July 1997).

Although RfDs and CSFs can be found in several toxicological sources, USEPA's IRIS online database is the preferred source of toxicity values. This database is continuously updated and values presented have been verified by USEPA. The USEPA Region 9 PRG Tables and Region 3 RBC Tables were also used as a source of toxicity criteria when these criteria were not available from the aforementioned references. The oral and inhalation RfDs and CSFs for the constituents selected as COPCs for SWMUs 16 and 17 are presented in Tables 6-16 through 6-19.

6.3.2 Toxicity Criteria for Dermal Exposure

RfDs and CSFs found in literature are typically expressed as administered doses; therefore, these values are considered inappropriate for estimating the risks associated with dermal routes of exposure. Oral dose-response parameters based on administered doses must be adjusted to absorbed doses before the evaluation of estimated dermal exposure intakes is made.

The adjustment from administered to absorbed dose was made using chemical-specific absorption efficiencies published in available guidance [i.e., USEPA, July 2004 (the primary reference), IRIS, ATSDR toxicological profiles, etc.] and the following equations:

$$RfD_{dermal} = (RfD_{oral})(ABS_{GI})$$

$$CSF_{dermal} = (CSF_{oral}) / (ABS_{GI})$$

where: ABS_{GI} = absorption efficiency in the gastrointestinal tract.

Absorption efficiencies used in the risk assessments reflect USEPA's current dermal assessment guidance (USEPA, July 2004).

6.3.3 Toxicity Criteria for Carcinogenic Effects of PAHs

Limited toxicity values are available to evaluate the carcinogenic effects from exposure to PAHs. The most extensively studied PAH is benzo(a)pyrene, which is classified by USEPA as a probable human carcinogen. Although CSFs are available for benzo(a)pyrene, insufficient data are available to calculate CSFs for other carcinogenic PAHs. Toxic effects for these chemicals were evaluated using the concept of estimated orders of potential potency, which relates the potency of the other potentially carcinogenic PAHs to the potency of benzo(a)pyrene, as presented in current USEPA guidance (USEPA Region 4, May 2000 and USEPA, July 1993). The equivalent oral and inhalation CSFs for these chemicals were derived by multiplying the CSFs for benzo(a)pyrene by the orders of potential potency.

6.3.4 Toxicity Criteria for Chromium

Toxicity criteria are available for different forms of chromium, which is considered to be more toxic in the hexavalent state. Because there is no evidence to support the conclusion that hexavalent chromium is present at the sites, speciation analyses was not performed for SWMUs 16 and 17. However, risks associated with this chemical were assessed by conservatively assuming that 100 percent of the reported total chromium result is attributable to hexavalent chromium.

6.4 RISK CHARACTERIZATION

This section provides a characterization of potential human health risks associated with potential exposures to COPCs at SWMUs 16 and 17. Section 6.4.1 outlines the methods used to quantitatively estimate the type and magnitude of potential risks for human receptors. Summaries of the risk characterization for SWMUs 16 and 17 are provided in Section 6.4.3.

6.4.1 Quantitative Analysis

Quantitative estimates of risk were calculated according to risk assessment methods outlined in USEPA guidance (USEPA, December 1989). Lifetime cancer risks are expressed in the form of dimensionless

probabilities, referred to as ILCRs, based on CSFs. Noncarcinogenic risk estimates are presented in the form of HQs determined through a comparison of intakes with published RfDs.

ILCR estimates were generated for each COPC using estimated exposure intakes and published CSFs, as follows:

$$ILCR = (\text{Estimated Exposure Intake})(CSF)$$

If the above equation resulted in an ILCR greater than 0.01, the following equation was used:

$$ILCR = 1-[\exp(-\text{Estimated Exposure Intake})(CSF)]$$

An ILCR of 1×10^{-6} indicates that the exposed receptor has a one-in-one-million chance of developing cancer under the defined exposure scenario. Alternatively, such a risk may be interpreted as representing one additional case of cancer in an exposed population of one million persons.

As mentioned previously, noncarcinogenic risks were assessed using the concepts of HQs and HIs. The HQ for a COPC is the ratio of the estimated intake to the RfD, as follows:

$$HQ = (\text{Estimated Exposure Intake}) / (RfD)$$

An HI was generated by summing the individual HQs for all COPCs. The HI is not a mathematical prediction of the severity of toxic effects and therefore is not a true "risk"; it is simply a numerical indicator of the possibility of the occurrence of noncarcinogenic (threshold) effects.

6.4.2 Comparison of Quantitative Risk Estimates to Benchmarks

To interpret the quantitative risks and to aid risk managers in determining the need for remediation at a site, quantitative risk estimates were compared to typical benchmarks. Calculated ILCRs were interpreted using the USEPA's "target range" (1×10^{-6} to 1×10^{-4}), and HIs were evaluated using a value of 1.0.

USEPA has defined the range of 1×10^{-6} to 1×10^{-4} as the ILCR "target range" for most hazardous waste facilities addressed under CERCLA and RCRA. Individual or cumulative ILCRs greater than 1×10^{-4} are typically not considered as protective of human health, and ILCRs less than 1×10^{-6} are regarded as protective. Risk management decisions are necessary when the ILCR is within the 1×10^{-4} to 1×10^{-6} cancer risk range.

An HI exceeding unity (1.0) indicates that there may be potential noncarcinogenic health risks associated with exposure. If an HI exceeded unity, a segregation of target organ effects associated with exposure to

COPCs was performed. Only those chemicals that affect the same target organ(s) or exhibit similar critical effect(s) were regarded as truly additive. Consequently, it may be possible for a cumulative HI to exceed 1.0, but no adverse health effects are anticipated if the COPCs do not affect the same target organ or exhibit the same critical effect.

6.4.3 Results of the Risk Characterization

This section contains a summary of the results of the risk characterization for SWMUs 16 and 17. Results for SWMU 16 are presented in Section 6.4.3.1, and results for SWMU 17 are presented in Section 6.4.3.2. Quantitative risk estimates for potential human receptors are developed for those chemicals identified as COPCs. Uncertainties associated with the risk estimates are discussed in Section 6.5. The methodology used to calculate the risks presented in this section is provided in Sections 6.2 and 6.3.

For SWMU 16, potential cancer risks and HIs were calculated for current/future adolescent trespassers, future construction/excavation workers, and occupational workers under the RME and CTE scenarios.

For SWMU 17, potential cancer risks and HIs were calculated for current/future adolescent trespassers, future construction/excavation workers, occupational workers, and hypothetical on-site residents under the RME and CTE scenarios.

Sample calculations are presented in Appendix F, and the results of the risk assessment in RAGS Part D format are included in Appendix F.

6.4.3.1 Risk Characterization Results for SWMU 16 - RME

This section presents risks associated with exposure to soil, groundwater, surface water, and sediment at SWMU 16. Risks were evaluated for construction workers, occupational workers, and adolescent trespassers. Because SWMU 16 is a swampy area affected by tidal influences, a future residential scenario is not considered likely for the site and is not evaluated in this HHRA.

Noncarcinogenic Risks – SWMU 16- RME

Noncarcinogenic risks (RME case) for SWMU 16 are presented in Table 6-20. The cumulative HIs for construction/excavation workers and adolescent trespassers under the RME scenario were less than unity (1.0) when evaluated on a target organ/effect basis (i.e., the HIs developed on a target-organ-specific basis did not exceed 1), indicating that adverse noncarcinogenic health effects are not anticipated for these receptors under the defined exposure conditions. It can be inferred from the results for the adolescent trespasser that the HI for an adult trespasser would also be acceptable (because

noncarcinogenic risks calculated adolescents are generally greater than risks for adults). Cumulative HIs for occupational workers exceeded unity.

The cumulative HI for the occupational worker was 6. The major contributor (HI greater than 1) to this HI was Aroclor-1254 in surface soil (HQ = 5). The fulltime occupational worker (exposed 250 days per year) is not considered to be a likely receptor at SWMU 16 but, as stated in Section 6.2.1.3, this receptor was conservatively evaluated to account for worker exposures that might occur at the site. A more reasonable receptor might be a maintenance worker who is expected to be exposed on a less frequent basis. For example, if a maintenance worker entered the site once a week and was assumed to be exposed 50 days per year, the HQ for Aroclor-1254 would be less than unity.

Carcinogenic Risks – SWMU 16 - RME

Carcinogenic risks for the RME at SWMU 16 are presented in Table 6-20. Cumulative ILCRs for all receptors evaluated (construction/excavation workers, occupational workers, and adolescent trespassers) were within the USEPA risk management range, $1x10^{-6}$ to $1x10^{-4}$, although for the occupational worker risks were at the end of the range at $1x10^{-4}$. Primary contributors (ILCRs between 10^{-5} and 10^{-4}) to the risks were Aroclor-1254 and BEHP.

6.4.3.2 Risk Characterization Results for SWMU 17 - RME

Noncarcinogenic Risks – SWMU 17 - RME

Noncarcinogenic risks (RME case) for SWMU 17 are presented in Table 6-21. Cumulative HIs for excavation/construction workers, occupational workers, and adolescent trespassers under the RME scenario were less than unity (1.0), indicating that no toxic effects are anticipated for these receptors under the defined exposure conditions. Cumulative HIs for future adult and child residents exceeded unity.

Elevated HIs for future adult and child residents (HIs = 154 and 65 respectively) were mainly due to exposure to groundwater by ingestion and inhalation (of vapors during showering and as a result of vapor intrusion). According to USEPA Region 4 risk assessment guidance (USEPA Region 4, May 2000), the risk estimates for inhalation during showering were assumed to be equal to those estimated for the ingestion of water. Chlorinated VOCs in groundwater were the major contributors to the total HIs. Other contributors to the groundwater HIs (HI greater than 1) were arsenic, beryllium, cobalt, manganese, and nickel. As noted previously, the HIs for groundwater were based on the maximum detected concentrations of each COPC. Target organ-specific HIs for exposure to surface soil, subsurface soil, surface water and sediment were less than unity for all receptors.

Carcinogenic Risks – SWMU 17 - RME

Carcinogenic risks for the RME scenario are presented in Table 6-21. Cumulative ILCRs for the construction worker, occupational worker, and adolescent trespasser were within the USEPA target risk range, $1x10^{-6}$ to $1x10^{-4}$. Total ILCRs for future residents (child + adult) exceed the target risk range.

The primary contributors to the elevated ILCRs (ILCRs greater than 10^{-4}) for residents were chlorinated VOCs and arsenic in groundwater (by ingestion and inhalation). The ILCRs for VOCs in groundwater account for approximately 99 percent of the total site ILCRs. Total ILCRs for residential exposure to surface soil were within the USEPA's target risk range. No carcinogens were identified as COPCs for surface water and sediment.

The HIs and ILCRs calculated for exposure to soil, groundwater, surface water, and sediment at SWMU 17 are subject to the following significant sources of uncertainty:

- The HIs and ILCRs for groundwater were based on exposure to maximum concentrations of each COPC. This greatly overestimates the risks for groundwater because it assumes that receptors are exposed (350 days a year for 30 years) to the maximum concentration of a COPC across the site regardless of the location of the maximum concentration.

- Even though risk estimates for future residents from exposure to arsenic in groundwater exceeded $1.0x10^{-4}$, the average concentration of arsenic (detected in 11 of 43 groundwater samples) was 3.7 µg/L, which is less than the USEPA MCL (10 µg/L) and the NWS Charleston facility background screening level (4.4 µg/L). It should be noted that exposure to the MCL for arsenic results in an ILCR greater that 1×10^{-4}.

- Groundwater is not currently used at the site nor is it expected to be used in the future.

- Similar to groundwater, the EPCs determined for other media at SWMU 17 (and SWMU 16) were often the maximum detected concentrations because: (1) there were less than 10 samples in a dataset, (2) the calculated UCL was greater than the maximum concentration, or (3) there was an insufficient number of positive detections in a dataset.

- As per USEPA Region 4 guidance, risks for inhalation of vapors while showering with groundwater are set equal to the risks for ingesting 2 liters of groundwater per day. This, in effect, means that risks for ingestion of VOCs are doubled when calculating the cumulative risk estimates for a given receptor. This

approach increases the uncertainty in the calculated risks because the risks for inhalation while showering are not based on chemical-specific factors (e.g., Henry's Law Constants).

6.4.3.3 IEUBK and ALM Results

Lead was identified as a COPC for surface soil at SWMUs 16 and 17 because the maximum lead concentrations (12,400 mg/kg and 667 mg/kg, respectively) exceeded the 400 mg/kg OSWER soil screening level for residential land use. Lead was also identified as a COPC for surface water at SWMU 16 because the maximum detected concentration (15.5 µg/l) exceeded the USEPA SDWA Action Level at the tap (15 µg/L).

As discussed in Section 6.2.5, the methodology used to calculate the risks presented in Sections 6.4.3.1 through 6.4.3.2 cannot be used to evaluate exposure to lead because of the absence of published dose-response parameters. Exposure to lead was assessed using the USEPA's IEUBK Model for lead, (USEPA, May 2002) and the USEPA's TRW ALM (USEPA, January 2003). The IEUBK model is typically used to evaluate lead exposure assuming a residential land use scenario, and the TRW model is used to evaluate lead exposure for non-residential land use scenarios.

The blood-lead concentration of a receptor is considered a key indicator of the potential for adverse health effects. The IEUBK and TRW models calculate the probability of a receptor's blood-lead level exceeding 10 µg/dL. The USEPA goal is to limit the childhood risk of exceeding a 10 µg/dL blood-lead concentration to 5 percent.

Current USEPA guidance (USEPA, online, August 2005) recommends using the average concentration to evaluate exposure to lead. Therefore, the average lead concentrations in surface soil (2,760 mg/kg at SWMU 16 and 94 mg/kg at SWMU 17), the average concentration in surface water at SWMU 16 (4.4 µg/L), and model default values for other model parameters were used in the IEUBK and TRW model analyses.

6.4.3.3.1 Lead Model Results for SWMU 16

Child Lead Model (IEUBK) Results – SWMU 16

This section presents the IEUBK Model results for exposure to surface soil at SWMU 16 by adolescent trespassers. This is a conservative use of the model because it is designed to evaluate residential child exposure to lead and, as stated previously, a residential exposure scenario is not evaluated at SWMU 16. Moreover, there is a security chain-link fence around SWMU 16 on the land side. Because no models are

available to evaluate the periodic exposure of adolescent trespassers to lead in environmental media, the IEUBK Model is used to conservatively assess exposure for the trespasser.

The results of the IEUBK model evaluation for surface soil at SWMU 16 indicate that the estimated geometric mean blood-lead level for a child resident is 18.7 µg/dL. This blood-lead level exceeds the USEPA established level of concern (10 µg/dL). Approximately 90.9 percent of children are expected to experience blood-lead levels greater than 10 µg/dL. This estimate is greater than USEPA's goal of limiting exposure to lead so that no more than 5 percent of the exposed children have an estimated blood-lead level greater than the established level of concern (i.e., 10 µg/dL). The analytical data for lead in surface soil at SWMU 16 indicate that a 'hotspot" situation exists at the site because the maximum concentration (12,400 mg/kg) in Sample 16-S-02-00 is several orders of magnitude greater than concentrations in the other surface soil samples. In order to evaluate the effects of the hotspot, the IEUBK Model was also run using the maximum concentration and the average concentration of the other samples with the hotspot removed. The results of the three model runs are presented in the following table.

IEUBK Model Analysis of "Hotspot" in Surface Soil at SWMU 16

Lead Concentration	Predicted Geometric Mean Blood-Lead Level (µg/dL)	Probability of the Child Blood-Lead Level Exceeding 10 µg/dL (percent)
11,000 mg/kg (Maximum) (average of duplicate pair)	42.3	99.8
2,760 mg/kg (Average of All Samples)	18.7	90.8
10.2 mg/kg) Average of Samples with Maximum Removed)	1.7	0.007

As indicated in the above table, there is a considerable difference in predicted child blood lead levels when Sample 16-S-02-00 is removed from the data set. The predicted blood-lead levels and probabilities of exceeding the USEPA goal of 10 µg/dL are unacceptable when exposure to the maximum and to the average (of all samples) is assumed. The predicted blood-lead levels and probabilities are well below the USEPA goals when the lead concentration in Sample 16-S-02-00 is removed.

No models are currently available to evaluate the periodic exposure of children to lead in surface water. However, if the average concentration of lead in surface water (4.4 µg/L) was evaluated in the IEUBK model, the predicted blood-lead levels and probabilities of exceeding the blood-lead levels would be acceptable (the predicted child blood lead level is 3.4 µg/dL (geometric mean) and the probability of exceeding the level of concern would be 1.16). This evaluation is conservative because the IEUBK Model assumes daily residential exposure to lead in soil and drinking water as opposed to the periodic exposure expected for surface water and sediment.

As stated above, the results of the IEUBK Model for children were used to qualitatively assess exposure of the adolescent trespasser. Because the risks for a small child assumed to be exposed to lead at SWMU 16 on a daily basis exceeded USEPA benchmarks, the risks to an older child exposed to surface soil at the site may also be unacceptable. However, the older trespasser would be exposed less often than the child resident, and the risks for the trespasser are likely to be significantly less for adolescent trespassers than those predicted for residential children.

Adult Lead Model Results – SWMU 16

The central estimate blood-lead levels for construction workers exposed (30 days per year) to the average concentration of lead in surface soil (2,760 mg/kg) ranged from 5.9 to 6.1 µg/dL. The probabilities that blood-lead levels of fetuses of adult workers would be greater than 10 µg of lead per deciliter of blood ranged from 19.8 to 23.7 percent. These estimates exceed the USEPA's goal of limiting exposure to lead so that no more than 5 percent of the exposed receptors have an estimated blood-lead level greater than the established level of concern (i.e., 10 µg/dL).

The central estimate blood-lead levels for occupational workers exposed (250 days per year) to the average concentration of lead in surface soil (2,760 mg/kg) ranged from 6.0 to 6.2 µg/dL. The probabilities that blood-lead levels of fetuses of adult workers would be greater than 10 µg of lead per deciliter of blood ranged from 20.5 to 24.4 percent. These estimates exceed the USEPA's goal of limiting exposure to lead so that no more than 5 percent of the exposed receptors have an estimated blood-lead level greater than the established level of concern (i.e., 10 µg/dL).

Summary of Lead Model Evaluation for SWMU 16

The IEUBK and ALM analysis of lead in surface soil at SWMU 16 indicated that risks from exposure to the average concentration of lead (2,760 mg/kg) would result in unacceptable child and fetus (of workers) blood lead levels. Also, the probabilities that the blood-lead levels of fetuses of adult workers would be greater than 10 µg of lead per deciliter of blood exceeded USEPA goals. As discussed previously, these risks are due to the lead concentration in sample 16-S-02-00 (12,400 mg/kg), which is located within the debris area in the southern portion of the site. Lead concentrations in the other three nearby surface soil samples (7.8, 11.8, and 11.1 mg/kg) are several orders of magnitude lower than the maximum concentration and significantly less than screening criteria. This sample also contains concentrations of antimony, barium, cadmium, chromium, and zinc more than an order of magnitude greater than the other nearby samples. Therefore, this location (16SS02) probably represents a "hotspot" at the site.

6.4.3.3.2 Lead Model Results for SWMU 17

Child Lead Model (IEUBK) Results – SWMU 17

The results of the IEUBK model evaluation for surface soil at SWMU 17 indicate that the estimated geometric mean blood-lead level for a child resident is 2.46 µg/dL which is less than the established level of concern (10 µg/dL). Approximately 0.14 percent of children are expected to experience blood-lead levels greater than 10 µg/dL. This estimate is less than USEPA's goal of limiting exposure to lead so that no more than 5 percent of exposed children have an estimated blood-lead level greater than the established level of concern (i.e., 10 µg/dL).

As discussed above, no models are currently available to evaluate the periodic exposure of adolescent trespassers to lead in environmental media. Therefore, the results of the IEUBK Model for children were used to qualitatively assess exposure of this receptor. Because the risks for a small child assumed to be exposed to lead at SWMU 17 on a daily basis were found to be acceptable, it can be assumed that the risks to an older child exposed to the same medium periodically are also acceptable. Evaluating the trespasser using the IEUBK Model is considered to be a conservative approach because potential adverse effects from exposure to lead are expected to be of a lesser magnitude for adolescent trespassers than for residential children.

Adult Lead Model Results – SWMU 17

The central estimate blood-lead levels for construction workers exposed to the average concentration of lead in surface soil (94 mg/kg) ranged from 1.7 to 1.9 µg/dL. The probabilities that blood-lead levels of fetuses of adult workers would be greater than 10 µg lead/dL of blood ranged from 0.5 to 1.6 percent. These estimates are less than the USEPA's goal of limiting exposure to lead so that no more than 5 percent of exposed receptors have an estimated blood-lead level greater than the established level of concern (i.e., 10 µg/dL).

The central estimate blood-lead levels for occupational workers exposed to the average concentration of lead in surface soil (94 mg/kg) ranged from 1.7 µg/dL to 1.9 µg/dL. The probabilities that blood-lead levels of fetuses of adult workers would be greater than 10 µg lead/dL of blood ranged from 0.5 to 1.6 percent. These estimates are also less than the USEPA's goal of limiting exposure to lead so that no more than five percent of the exposed receptors have an estimated blood-lead level greater than the established level of concern (i.e., 10 µg/dL).

Summary of Lead Model Evaluation for SWMU 17

The IEUBK and ALM analysis of lead concentrations in surface soil at SWMU 17 indicated that predicted blood levels for children, potential construction, and occupational workers and their fetuses were acceptable (i.e., within USEPA's goals and the probabilities of exceeding these goals from exposure to lead in soil were less than the USEPA goal of 5 percent).

The results of the IEUBK and ALM modeling are presented in Appendix F.

6.4.3.4 Risk Characterization Results for SWMU 16 - CTE

This section summarizes the results of the CTE evaluations for SWMU 16 using the exposure parameters presented in Table 6-15.

Noncarcinogenic Risks – SWMU 16 - CTE

Cumulative HIs for construction/excavation workers, occupational workers, and adolescent trespassers under the CTE scenario were equal to or less than unity (1.0) when evaluated on a target organ/effect basis, indicating that no toxic effects are anticipated for these receptors under the defined exposure conditions.

Carcinogenic Risks – SWMU 16 - CTE

Cumulative ILCRs for all receptors (i.e., construction workers, occupational workers, and adolescent trespassers were within the USEPA target risk range, $1x10^{-6}$ to $1x10^{-4}$.

The HIs and ILCRs for the CTE case at SWMU 16 are presented in Table 6-22.

6.4.3.5 Risk Characterization Results for SWMU 17 - CTE

Noncarcinogenic Risks – SWMU 17 - CTE

Cumulative HIs for construction/excavation workers, occupational workers, and adolescent trespassers under the CTE scenario were less than unity (1.0), indicating that adverse noncarcinogenic health effects are not anticipated for these receptors under the defined exposure conditions. Cumulative HIs for future adult residents and future child residents exceeded unity.

Elevated HIs for future adult and child residents (HIs = 70 and 31, respectively) were mainly due to exposure to groundwater by ingestion and inhalation (via showering and vapor intrusion). According to

USEPA Region 4 risk assessment guidance (USEPA Region 4, May 2000), the risk estimates for inhalation during showering are assumed to be equal to those estimated for the ingestion of water. Chlorinated VOCs in groundwater were the major contributors to the total HIs. Other contributors to the groundwater HIs (HI greater than 1) were arsenic, cobalt, and manganese. As noted previously, the HIs for groundwater were based on the maximum detected concentrations of each COPC. HIs for exposure to surface soil, subsurface soil, surface water and sediment were less than unity for all receptors.

Carcinogenic Risks – SWMU 17 - CTE

Cumulative ILCRs for the construction worker, occupational worker, and adolescent trespasser were within the USEPA target risk range, $1x10^{-6}$ to $1x10^{-4}$. Total ILCRs for future resident (child + adult) exceeded the target risk range.

The primary contributors to the elevated ILCRs (ILCRs greater than 10^{-4}) for hypothetical future residents were chlorinated VOCs (especially, PCE and TCE) in groundwater (by ingestion and inhalation). Total residential ILCRs for soil, surface water, and sediment were with USEPA's target risk range.

The HIs and ILCRs for the CTE case for SWMU 17 are presented in Table 6-23.

6.5 UNCERTAINTY ANALYSIS

This section presents a summary of uncertainties inherent in the risk assessment and includes a discussion of how they may affect the quantitative risk estimates and conclusions of the risk analysis. The baseline HHRAs for SWMUs 16 and 17 was performed in accordance with current USEPA guidance. However, there are varying degrees of uncertainty associated with the baseline HHRA. The following sections discuss general uncertainties in risk assessment and uncertainties specific to the risk assessments for SWMUs 16 and 17.

Uncertainty in the selection of COPCs was related to the current status of the predictive databases, the grouping of samples, the numbers, types and distributions of samples, data quality, and the procedures used to include or exclude constituents as COPCs. Uncertainty associated with the exposure assessment included the values used as input variables for a given intake route or scenario, the assumptions made to determine EPCs, and the predictions regarding future land use and population characteristics. Uncertainty in the toxicity assessment included the quality of the existing toxicity data needed to support dose-response relationships and the weight-of-evidence used to determine the carcinogenicity of COPCs. Uncertainty in risk characterization was associated with exposure to multiple chemicals and the cumulative uncertainty from combining conservative assumptions made in earlier steps of the risk assessment process.

Whereas there were various sources of random uncertainty and bias, the magnitude of bias and uncertainty and the direction of bias were influenced by the assumptions made throughout the risk assessment including selection of COPCs and selection of values for dose-response relationships. Throughout the entire risk assessment, assumptions that considered safety factors were made so that the final calculated risks were overestimated.

Generally, risk assessments involve two types of uncertainty, measurement and informational uncertainty. Measurement uncertainty refers to the usual variance that accompanies scientific measurements. For example, this type of uncertainty is associated with analytical data collected for each site. The risk assessment reflects the accumulated variances of the individual values used.

Informational uncertainty stems from inadequate availability of information needed to complete the toxicity and exposure assessments. Often, this gap is significant, such as the absence of information on the effects of human exposure to low doses of a chemical, the biological mechanism of action of a chemical, or the behavior of a chemical in soil.

After the risk assessment is complete, the results must be reviewed and evaluated to identify the type and magnitude of uncertainty involved. Reliance on results from a risk assessment without consideration of uncertainties, limitations, and assumptions inherent in the process can be misleading. For example, to account for uncertainties in the development of exposure assumptions, conservative estimates were made to ensure that the particular assumptions were protective of sensitive subpopulations or the maximum exposed individuals. If a number of conservative assumptions are combined in an exposure model, the resulting calculations can propagate the uncertainties associated with those assumptions, thereby producing a much larger uncertainty for the final results. This uncertainty is biased toward overpredicting both carcinogenic and noncarcinogenic risks. Thus, both the results of the risk assessment and the uncertainties associated with those results must be considered when making risk management decisions.

This interpretation of uncertainty is especially relevant when the risks exceed the point of departure for defining "acceptable" risk. For example, when risks calculated using a high degree of uncertainty are less than an acceptable risk level (i.e., 10^{-6}), the interpretation of no significant risk is typically straightforward. However, when risks calculated using a high degree of uncertainty exceed an acceptable risk level (i.e., 10^{-4}), a conclusion can be difficult unless uncertainty is considered.

6.5.1 Uncertainty in Selection of COPCs

The most significant issues related to uncertainty in COPC selection at SWMUs 16 and 17 are the usability of existing databases, the screening levels used, the inclusion of chemicals potentially attributable to background in the quantitative risk assessment, the selection of COPCs using USEPA generic SSLs for transfers from soil to groundwater, the selection of arsenic as a COPC, and the absence of screening levels for a few chemicals detected in the site media. A brief discussion of each of these issues is provided in the remainder of this section.

Usability and Completeness of Existing Databases

Data from samples collected from investigations conducted from 2001 to 2005 were used to assess risks to potential human receptors. The TtNUS data were validated according to USEPA data validation guidelines. The database was supplemented with VOC data (unvalidated) collected by Solutions-IES in establishing baseline conditions for their pilot-scale treatability study. Fixed-base analytical results only were used in the quantitative risk evaluation. Data regarded as unreliable (i.e., qualified as "R" during the data validation process) were not used in the quantitative risk assessment. The elimination of data qualified as "R" may increase the uncertainty in the risk assessment. However, the chemicals qualified as "R" are typically not constituents of concern at SWMUs 16 and 17 (e.g., hexachlorophene) or the unreliable results occurred in only a few samples. In addition, most of the results qualified as unreliable were detection limits of non-detects (qualified "UR"). Therefore, it is unlikely that risks have been underestimated by the removal of the unreliable data from the datasets.

In some cases, the sizes of the databases are somewhat limited and this may increase the uncertainty in the calculated risks. For example, only one surface water and sediment sample were collected at SWMU 17. No surface water bodies exist on SWMU 17; this sample was collected from a marshy area, not on the site, and the risks calculated at this location were acceptable. Because surface water bodies do not actually exist on the site, the uncertainty associated with the small datasets is probably not meaningful.

The surface soil dataset for SWMU 16 consisted of four samples. The surface soil sampling program at SWMU 16 was limited because the existing soil cover was not believed to be contaminated. The site was closed in 1980 and covered with approximately 2 feet of local fill soil. One surface soil sample location (16SS01) was included in the SWMU 16 sampling program to determine the chemical characteristics of the 2-foot soil cover fill material; there were no exceedances of criteria reported for the sample. In addition, three surface soil samples were collected within an appreciable debris pile area located in the southern area of SWMU 16. It is believed the debris pile originated after soil cover placement in 1980. One location (16SS02) had chemicals with criteria exceedances and is considered a hotspot. The risks were based on the maximum detected concentrations in this area (at location 16SS02). Because the

sampling was biased and risks were based on maximum concentrations, it is likely that the risks calculated for surface soil at SWMU 16 are overestimated. An additional issue at SWMU 16 is the fact that a large portion of the site is marshy and subject to tidal influences, and it may not be possible to distinguish between true surface soil and sediment (seven samples classified as sediment were also collected at the site).

Considering that SWMU 16 was an industrial landfill, it would be difficult to adequately characterize its contents with certainty. The purpose of the investigation was to identify "hot spots" of contamination. Four soil borings (16SB01 through 16SB04 with up to three subsurface soil samples per boring) were included in the SWMU 16 field program, and were located in anomalous areas based on the geophysical survey and were considered as likely biased high concentration sampling locations and were considered likely waste disposal areas. Additional borings were planned to investigate the suspected former trench locations and to refine contamination at the debris pile area and waste oil tank area. Five permanent monitoring wells were installed and groundwater sampled at SWMU 16. The wells intercept groundwater flowing to Goose Creek and were placed as far outward as site conditions allowed to serve as perimeter wells. Moreover, additional temporary wells and permanent monitoring wells were planned in and around the suspected former trench locations and the waste oil tank area. Unfortunately, the work was not conducted; clearance for drilling was not granted because the readings from the magnetometer used for UXO clearance indicated the potential presence of buried metal (possible ordnance). Therefore, the risk assessment is base on an incomplete characterization of the landfill contents and underlying groundwater.

Numerous soil samples were collected at SWMU 17. The soil borings were generally located in a grid pattern across the site, extending past the site perimeter and placed to address geophysical survey anomalies and field observations such as the presence of empty drums at the ground surface. Several of the soil borings were placed in a depression area where dumping of drums was suspected because of elevated soil and groundwater concentrations in that area. However, the characterization of SWMU 17 cannot be considered complete because of the random nature of the historical disposal operation.

Elimination of Inorganic Chemicals Potentially Attributable to Background

As per USEPA Region 4 guidance, some metals were eliminated from the quantitative risk assessment because their maximum concentrations were less than facility background levels for soil and groundwater. The following metals were eliminated as COPCs on the basis of background:

SWMU 16 Surface Soil – aluminum, arsenic, cobalt, iron, mercury, selenium, and vanadium
SWMU 16 Subsurface Soil – none
SWMU 16 Groundwater – barium and manganese

SWMU 16 Surface Water – arsenic

SWMU 16 Sediment – aluminum, arsenic, iron, manganese, and vanadium

SWMU 17 Surface Soil – iron and vanadium

SWMU 17 Subsurface Soil – iron, mercury, and thallium

SWMU 17 Groundwater – aluminum, chromium, iron, and vanadium

SWMU 17 Surface Water – arsenic and vanadium

SWMU 17 Sediment – aluminum, arsenic, iron, manganese, and vanadium

The elimination of these metals from the quantitative risk assessment could result in an underestimation of risk. However, in most cases, the underestimation is likely to be negligible because, although the maximum concentrations exceeded the Region 9 risk-based screening levels based on an HI of 0.1, the concentrations were less than the Region 9 PRGs based on an HI of 1. For example, the maximum concentration of aluminum in surface soil at SWMU 16 (14,200 mg/kg) exceeded the risk-based screening concentration (7,600 mg/kg). This concentration is less than the residential PRG value of 76,000 mg/kg and corresponds to an HQ of approximately 0.2, which is less than the HI benchmark of 1. In addition, a number of metals eliminated as COPCs on the basis of background exceeded USEPA SSLs for migration to groundwater but not Region 9 risk-based screening levels. An example of this is cobalt in surface soil at SWMU 16. The maximum concentration of cobalt (1.1 mg/kg) exceeded the soil-to-groundwater SSL (0.17 mg/kg) but was less than the risk-based screening level (140 mg/kg) and significantly less than the Region 9 PRG value (1,400 mg/kg). The calculated HQ for cobalt would be 0.0008 (1.1/1400), which is much less than 1. Based on these facts, the elimination of most metals on the basis of background has a minimal impact on the calculated risks.

A notable exception to the above discussion is iron in groundwater at SWMU 17. The maximum site concentration of iron was 360,000 µg/L, the background screening level is 521,000 µg/L, the risk-based screening level is 1,100 µg/L, and the Region 9 Tap Water PRG is 11,000 µg/L. The HQ associated with the SWMU 17 groundwater concentration of iron is approximately 33. Therefore, the total noncarcinogenic risks for exposure to groundwater at SWMU 17 could be underestimated by the elimination of iron as a COPC. However, it should be noted that the risk associated with the background concentration of iron is greater than the risk for the site concentration.

As stated above, according to USEPA Region 4 guidance, only naturally occurring inorganics (i.e., metals) were eliminated as COPCs on the basis of background. However, Navy guidance (Navy, January 2004) recommends that anthropogenic organic compounds (i.e., manmade compounds such as pesticides and PAHs) also be considered in the background evaluation. Table ES-1 of the NWS, Charleston Baseline Background Study, (TtNUS, March 2002) provides facility background

concentrations for PAHs and pesticides in hydric soil and nonhydric soil. As shown in Table ES-1, most PAHs and pesticides were detected in nonhydric background soil samples and only one organic compound (4,4'-DDE) was detected in hydric soil samples. The distribution of the organic compounds in the background samples is consistent with the sampling locations for the hydric and nonhydric soils background data sets. Hydric soils were collected in undisturbed remote locations, whereas nonhydric soils were collected in more developed areas of the facility where typical anthropogenic activities (e.g., the widespread use of fuels, pesticides, and roadways) occurred.

Comparisons of the representative facility background concentrations for PAHs and pesticides (nonhydric and hydric soils) with concentrations detected in SWMU 16 and 17 soil samples are provided in Tables 6-1, 6-2, 6-6, and 6-7. The background concentrations and comparisons are presented for informational purposes only and are not used for COPC screening. The background concentration of 4,4'-DDE (0.021 mg/kg) presented in the tables is the value for hydric soil. The background concentrations of all other organic compounds shown in the tables are the values for nonhydric soils. An examination of the comparisons in the tables indicates that if background screening had been performed for PAHs and pesticides, only benzo(a)anthracene in SWMU 16 subsurface soil (Table 6-2) and gamma-chlordane in SWMU 17 surface soil (Table 6-6) would not have been selected as COPCs. The ILCRs calculated for exposure to these compounds (See RAGS-Part D tables in Appendix F) were less than $1x10^{-8}$. Therefore, the results and conclusions of the risk assessment are not affected by not eliminating organic chemicals as COPCs on the basis of background.

COPC Screening Levels

The use of risk-based screening values based on conservative land use scenarios (i.e., residential land use for soil and sediment and ingestion of tap water for groundwater and surface water) corresponding to an ILCR of 10^{-6} and HI of 0.1 ensured that all the significant contributors to risk from a site were evaluated. The elimination of chemicals present at concentrations that correspond to an ILCR less than 10^{-6} and an HI less than 0.1 should not have affected the final conclusions of the risk assessment because those chemicals were not expected to cause a potential health concern at the detected concentrations.

In the COPC screening of soil and groundwater, "CAL-Modified PRGs" for TCE (i.e., 1.4 µg/L for groundwater and 2.9 mg/kg for soil) were used as screening values for TCE instead of the USEPA Region 9 PRGs (0.028 µg/L and 0.053 mg/kg, respectively) which are based on a provisional NCEA CSF. This approach is consistent US Navy policy. However, because TCE was not eliminated as a COPC in any media, the effect of using the alternate PRGs is negligible.

Use of USEPA Generic SSLs for Transfers from Soil to Groundwater for COPC Selection

A number of chemicals were selected as COPCs for the quantitative risk assessment only because the maximum concentrations exceeded USEPA generic SSLs for migration from soil to groundwater [assuming a dilution and attenuation factor of (DAF=1)] but were less than risk-based screening concentrations. These SSLs are not risk-based concentrations for the direct exposure pathways and are generally lower (i.e., more conservative) that the Region 9 risk-based screening levels. The inclusion of these chemicals in the quantitative risk assessment increases the number of COPCs and may result in a slight overestimation of risk. The overestimation is not considered significant because, in these instances, the maximum concentrations were less than the risk-based screening levels based on a target cancer risk of $1x10^{-6}$ or an HQ of 0.1.

Note that the USEPA's Soil Screening Guidance (USEPA, July 1996) recommends a default DAF of 20 for evaluating the migration from soil to groundwater pathway stating "The EPA has selected a default DAF of 20 to account for contaminant dilution and attenuation during transport through the saturated zone to a compliance point (i.e., receptor well). If a DAF of 20 had been used in the COPC selection process, some compounds, for example, 1,2-dichloropropane, acetone, methylene chloride, and PCE in SWMU 17 subsurface soil, would not have been selected as COPCs. At most sites, this adjustment will more accurately reflect a contaminant's threat to ground water resources than assuming a DAF of 1 (i.e., no dilution or attenuation)." However, because of the shallow groundwater table in the study areas, a DAF of one may be more appropriate for SWMUs 16 and 17. As discussed in Section 6.1.2.3.7, the analytical data indicate that VOC contamination in subsurface soil has impacted groundwater (or vice versa). The data do not indicate a relationship between other contaminants (e.g., SVOCs and metals). The use of a DAF of 1 for screening is not expected to significantly affect the results of the risk assessment because the risks calculated for COPCs selected by a SSL (assuming a DAF of 1) were minimal.

Chemicals without Established Screening Levels

Risk-based screening levels are currently not available for some constituents detected at SWMUs 16 and 17 [e.g., 2-methynaphthalene, benzo(g,h,i)perylene, and phenanthrene]. Appropriate surrogates were selected for these chemicals based on similar chemical structures, if available. For example, pyrene was selected as a surrogate for benzo(g,h,i)perylene and phenanthrene. Applying toxicity values of one compound to another increase the uncertainty in the risk assessment both in regard to the selection of COPCs and the calculated risks. The direction of the uncertainty is not known.

Selection of Arsenic as a COPC

Arsenic was selected as a COPC for soil, groundwater, surface water, and sediment and was identified as a major contributor to risk in groundwater at SWMU 17. The maximum groundwater concentration of arsenic (22.7 µg/l) also exceeded the facility background concentration (4.4 µg/l). However, arsenic was positively detected in only 11 of 43 groundwater samples at SWMU 17 (and was not detected in any groundwater samples at SWMU 16) with an average concentration of 3.7 µg/L which is less than the background screening level and the current USEPA MCL (10 µg/L). Furthermore, the most elevated concentrations were not detected on site but at locations east of the SWMU 17 border approaching marshland. Also, arsenic was found to be within background levels in surface water and sediment at SWMU 16 and SWMU 17 and in surface soil at SWMU 16. These data indicate that the levels of arsenic at the sites may be naturally occurring and the cumulative risks for the sites may be overestimated by the selection of arsenic as a COPC.

6.5.2 Uncertainty in the Exposure Assessment

Uncertainty in the exposure assessment arose because of the methods used to calculate EPCs, the determination of land use conditions, the selection of receptors and scenarios, and the selection of exposure parameters. Each of these is discussed below.

Land Use

The current land use patterns at NWS Charleston are well established, thereby limiting the uncertainty associated with land use assumptions. Land use at SWMUs 16 and 17 is currently limited and is expected to be limited in the future, as long as NWS Charleston remains open (potential and infrequent trespassers are the only current and likely future receptors at the site). To be conservative, risks to potential and future construction workers, maintenance workers, occupational workers, recreational users, and on-site residents were evaluated.

Exposure Point Concentrations

Uncertainty is associated with the use of the 95-percent UCL on the mean concentration as the EPC. As a result of using the 95-percent UCL, the estimations of potential risk for the RME scenario were most likely overstated because this is a representation of the upper limit that potential receptors would be exposed to over the entire exposure period. In a number of cases (because datasets contained fewer than 10 samples or because the UCL was greater than the maximum concentration), the maximum concentration was used as the EPC. Use of the maximum concentration as the EPC tends to overestimate potential risks because receptors are assumed to be exposed continuously to the maximum concentration for the entire exposure period. Uncertainty was also introduced when the non-detect

results were assigned a value of one-half the non-detect quantitation limit in the calculation of the EPC. This may have either overstated or understated the risks to the receptors.

As discussed in Section 6.2.3, USEPA Region 4 guidance states that the average concentrations of contaminants in the most highly contaminated area of the groundwater plume should be used as the EPCs when calculating receptor risk to COPCs in groundwater. To be conservative, the maximum concentration of each COPC was used as the EPC for groundwater. This is an extremely conservative assumption because it assumes that potential receptors are exposed to each COPC at the location of its maximum concentration simultaneously for 30 years. Because of this, the risks calculated for groundwater are likely to be greatly overestimated. Conversely, the source area of the northern plume emanating from SWMU 16 could not be investigated and risks could be greatly underestimated and as discussed previously, residential exposure is not likely to occur at the site regardless.

There was also uncertainty in assuming that current groundwater concentrations will not change in the future, and this introduced additional uncertainty in the EPCs, and risks for any groundwater or surface water COPC. Concentrations in groundwater may diminish over time due to natural attenuation processes involving source depletion and dilution.

Uncertainty also exists in the EPCs calculated for soil, particularly for SWMU 16, because of uncertainties in the site characterization. SWMU 16 was a landfill containing industrial waste and SWMU 17 was likely subjected to the sporadic draining of drums. This leads to variability in types and concentrations of contaminants and locations of detections, and also leads to uncertainties in the evaluation of the data.

EPCs for VOCs in air were estimated by various models (the Johnson and Ettinger Model for emissions from groundwater into indoor air, a USEPA Soil Screening model for vapors emitted into ambient air from soil, and a VDEQ model for exposure of construction workers to vapors in a trench). Site-specific parameters, such as groundwater concentrations were used in the model. However, it was necessary to use model default values for most of the other input parameters because site-specific data were not available. The use of model default values tends to increase the uncertainty in the calculated risks. The direction of the uncertainty was not known, although the model default values are generally conservative and tend to overestimate air concentrations.

Exposure Routes and Receptor Identification

The determination of various receptor groups and exposure routes of potential concern was based on current land use observed at the site and the anticipated future land use. Therefore, the uncertainty associated with the selection of exposure routes and potential receptors was minimal because they were considered to be well defined. Although residential use of groundwater was evaluated as an exposure

scenario at SWMU 17, groundwater is not currently used at the site nor is it expected to be used in the future; moreover, groundwater on the eastern side of the study area is saline. Therefore, the evaluation of direct exposure to groundwater performed in the HHRAs was included primarily to aid in risk management decision making.

Exposure Parameters

Each exposure factor (for RME and CTE scenarios) selected for use in the risk assessment had some associated uncertainty. Generally, exposure factors were based on surveys of physiological and lifestyle profiles across the United States. The attributes and activities studied in these surveys generally had a broad distribution. To avoid underestimation of exposure, in most cases, the USEPA guidelines for the RME receptor were used, which generally specify the use of the 95th percentile value for most parameters. Therefore, the selected values for the RME receptor represented an upper bound of the observed or expected habits of the majority of the population. Many of these parameters were determined from statistical analyses on human population characteristics. Often, the database used to summarize a particular exposure parameter (i.e., body weight) is quite large. Consequently, the values chosen for such variables in the RME scenario have low uncertainty.

For many parameters for which limited information exists (i.e., dermal absorption of chemicals from soil), greater uncertainty exists. For example, current USEPA dermal guidance (USEPA, July 2004) does not provide dermal absorption factors for exposure to most metals (except arsenic and cadmium) in soil. Therefore, risks for dermal contact from soil were not evaluated for most metals in this risk assessment. Consequently, risks from exposure to soil may have been underestimated.

To address these issues, USEPA (USEPA, February 1992) has suggested the use of the CTE receptor, whose intake variables are often set at approximately the 50th percentile of the distribution. The risks for this receptor seek to incorporate the range of uncertainty associated with various intake assumptions. Some of the parameters presented in this risk assessment were estimated using professional judgment, although USEPA does provide limited guidance for the CTE evaluation (USEPA, May 1993).

The results of the CTE evaluation are presented in Sections 6.4.3.4 and 6.4.3.5.

Uncertainty Associated with the Johnson and Ettinger Model

As stated above, EPCs for the estimation of potential risks from exposure to VOCs migrating from groundwater/soil gas into the indoor air of a building were developed using the Johnson and Ettinger Vapor Intrusion Model. Site-specific parameters were used in the model whenever possible. For example, site-specific values were used for depth to the water table and soil type. Model default values

for soil bulk density and soil porosity were found to be within the range of values measured at the site and were used in model calculations. Site-specific values for building dimensions, soil-building pressure differential, seam crack width, and air-exchange rates were not available. Therefore, model default values were used for these parameters. Model default values were also used for residential dwelling dimensions based on owner-occupied and rental single-family detached residences in the United States. The use of model default values tends to increase the uncertainty in the calculated risks. The direction of the uncertainty is not known, although the model default values are generally conservative and tend to overestimate air concentrations. The default model air-exchange rate (0.45 per hr) was used to evaluate residential risks. As discussed in the model guidance, this air-exchange rate was based on typical residential building dimensions and ventilation rates.

The default building parameters for the Johnson and Ettinger Model assume that the dimensions of buildings and ventilation rates are typical of residential dwellings in the United States. These include an air exchange rate of 0.45 per hour and residential building dimensions of 961 cm long by 961 cm wide by 488 cm high (approximately 16,000 cubic feet). In order to estimate air concentrations for industrial/commercial buildings, values for a typical commercial building in the United States were obtained from an American Society for Testing and Materials (ASTM) study of ventilation in commercial buildings titled A Study of Ventilation Measurement in an Office Building, (ASTM, 1995). This document indicates that the American Society of Heating, Refrigerating, and Air-Conditioning Engineers air exchange standard for a person in an office building corresponds to an air-exchange rate of 0.72 per hour and that a typical office building has a volume of 4,730,000 cubic feet. The commercial air-exchange rate and building dimensions were used in the Johnson and Ettinger Model to estimate indoor air concentrations for the commercial/industrial scenarios. The direction of the uncertainty introduced by using these values is not known.

Residential and Commercial Evaluation of Subsurface Soil

As explained in Section 6.2.1.3, in the risk assessment results presented in Section 6.4.3 and in Tables 6-22 through 6-25, only construction/excavation workers were assumed to be exposed to COPCs in subsurface soil. To account for the possibility that subsurface soil could be brought to the surface in a future excavation project, the potential exposure of future residents and commercial/industrial workers to COPCs in subsurface soil were also evaluated. Risk estimates for the RME case are presented in the following table.

Risk Estimates for Exposure of Future Residents and Occupational Worker to COPCs in Subsurface Soil

Receptor	Hazard Index (HI)	Incremental Lifetime Cancer Risk (ILCR)
SWMU 16		
Occupational Worker	0.7	$2x10^{-5}$
SWMU 17		
Occupational Worker	0.4	$1x10^{-4}$
Future Child Resident	3	---
Future Adult Resident	0.6	---
Total Residential (Child + Adult)	NA	$4x10^{-4}$

The primary contributor to the cumulative HIs and ILCRs is TCE, mainly by inhalation of vapors from subsurface soil (i.e., the indoor air exposure scenario). The cancer and non-cancer risk estimates were calculated using the maximum TCE concentration (910 mg/kg, in sample 17-B-17-03) as the EPC. TCE was detected in 24 of 82 subsurface soil samples, with an average concentration of 14 mg/kg and a UCL of 32 mg/kg (assuming that the dataset followed a normal distribution). The maximum concentration was detected at location 17SB17 at a depth of 3 to 5 feet bgs. Elevated concentrations of TCE were also detected at other depths at this location (32 mg/kg at 1 to 3 feet bgs and 170 mg/kg at 5 to 7 feet bgs). The surface soil sample collected at this location also contained the maximum TCE concentration reported in surface soil (3.2 mg/kg). The concentrations of TCE at this location are several orders of magnitude greater than concentrations in other samples, and this location likely represents a "hot spot" area for soil at the site.

6.5.3 Uncertainty in the Toxicological Evaluation

Uncertainties associated with the toxicity assessment (determination of RfDs and CSFs and use of available criteria) are presented in this section.

Derivation of Toxicity Criteria

Uncertainty associated with the toxicity assessment was associated with hazard assessment and dose-response evaluations for the COPCs. The hazard assessment dealt with characterizing the nature and strength of the evidence of causation or the likelihood that a chemical that induces adverse effects in animals will also induce adverse effects in humans. Hazard assessment of carcinogenicity was evaluated as a weight-of-evidence determination using USEPA methods. Positive animal cancer test data suggest that humans contain tissue(s) that may manifest a carcinogenic response; however, the animal data cannot necessarily be used to predict the target tissue in humans. In the hazard assessment of noncancer effects, however, positive animal data often suggest the nature of the effects (i.e., the target tissues and type of effects) anticipated in humans.

Uncertainty in hazard assessment arose from the nature and quality of the animal and human data. Uncertainty was reduced when similar effects were observed across species, strain, sex, and exposure route; when the magnitude of the response was clearly dose related; when pharmacokinetic data indicated a similar fate in humans and animals; when postulated mechanisms of toxicity were similar for humans and animals; and when the chemical of concern was structurally similar to other chemicals for which the toxicity is more completely characterized.

Uncertainty in the dose-response evaluation included the determination of a CSF for the carcinogenic assessment and derivation of an RfD for the noncarcinogenic assessment. Uncertainty was introduced from interspecies (animal to human) extrapolation, which, in the absence of quantitative pharmacokinetic or mechanistic data, is usually based on consideration of interspecies differences in basal metabolic rate. Uncertainty also resulted from intraspecies variation. Most toxicity experiments are performed with animals that are very similar in age and genotype, so intragroup biological variation is minimal, but the human population of concern may reflect a great deal of heterogeneity, including unusual sensitivity or tolerance to the COPC. Even toxicity data from human occupational exposure reflect a bias because only those individuals sufficiently healthy to attend work regularly (the "healthy worker effect") and those not unusually sensitive to the chemical are likely to be occupationally exposed. Finally, uncertainty arises from the quality of the key study from which the quantitative estimate was derived and the database used. For cancer effects, the uncertainty associated with dose-response factors was mitigated by assuming the 95-percent upper bound for the slope factor. Another source of uncertainty in carcinogenic assessment is the method by which data from high doses in animal studies are extrapolated to the dose range expected for environmentally exposed humans. The linearized multistage model, which is used in nearly all quantitative estimations of human risk from animal data, is based on a nonthreshold assumption of carcinogenesis. Evidence suggests, however, that epigenetic carcinogens, as well as many genotoxic carcinogens, have a threshold below which they are noncarcinogenic. Therefore, the use of the linearized multistage model was conservative for chemicals that exhibited a threshold for carcinogenicity.

For noncancer effects, additional uncertainty factors may have been applied in the derivation of the RfD to mitigate poor quality of the key study or gaps in the database. Additional uncertainty for noncancer effects arose from the use of an effect level in the estimation of an RfD, because this estimation was predicated on the assumption of a threshold less than which adverse effects were not expected. Therefore, an uncertainty factor is usually applied to estimate a no-effect level. Additional uncertainty arose in estimation of an RfD for chronic exposure from subchronic data. Unless empirical data indicated that effects did not worsen with increasing duration of exposure, an additional uncertainty factor was applied to the no-effect level in the subchronic study. Uncertainty in the derivation of RfDs was mitigated

by the use of uncertainty and modifying factors that normally ranged between 3 and 10. The resulting combination of uncertainty and modifying factors may be 1,000 or more.

The derivation of dermal RfDs and CSFs from oral values may have caused uncertainty. This was particularly the case when no gastrointestinal absorption rates were available in the literature or when only qualitative statements regarding absorption were available.

Uncertainty Associated with Evaluation of the Dermal Exposure Pathway

According to RAGS Part E (USEPA, July 2004), risks for dermal absorption of chemicals in soil are quantitatively evaluated for arsenic, cadmium, chlordane, 2,4-dichlorophenoxyacetic acid, DDT, TCDD (and other dioxins), gamma-BHC (Lindane), PAHs, PCBs, pentachlorophenol, and SVOCs only because of the limited information guidance available to evaluate dermal exposure to other constituents. Therefore, risks from dermal exposure to metals and VOCs in soil and sediment (except for arsenic and cadmium) were not quantified in the risk assessment. Consequently, potential risks may have been underestimated by excluding these constituents from the dermal risk assessment calculations.

Use of Aluminum and Iron Toxicity Criteria

NCEA provisional RfDs were used to evaluate noncarcinogenic effects from exposure to aluminum and iron. The provisional RfDs for these chemicals are based on allowable intakes rather than adverse effect levels. Therefore, there was some degree of uncertainty associated with the use of the RfDs. Some USEPA regions (e.g., Region 1) consider the use of the oral RfD for aluminum and iron inappropriate and recommend that these metals not be evaluated quantitatively in risk assessments.

Alternate RfD for Manganese

The oral RfD for manganese listed in the Region 9 PRG table (0.024 mg per kg per day) was used to calculate risks for ingestion of groundwater at SWMU 17. This value includes a modification factor of 3 and an adjustment factor for the dietary contribution which is applied to the non-dietary reference dose (0.14 mg per kg per day) presented in IRIS. IRIS indicates that an adjustment for the dietary contribution should be subtracted from this allowable intake. Using the modified and adjusted RfD results in risk estimates six times greater than if the non-dietary reference dose was used. However, the HI for the future child resident assumed to be exposed to the maximum concentration of manganese in SWMU 17 groundwater would still exceed the goal of unity if the non-dietary reference dose was used.

Uncertainty in the Toxicity of Arsenic

Although the more restrictive basis for evaluating risk associated with exposure to arsenic is to assume it is a carcinogen, carcinogenic effects are not the primary health effects expected to be manifested upon exposure to arsenic. The preponderance of scientific information indicates that humans are capable of metabolizing arsenic to expedite its elimination from the body. Its elimination from the body obviously mitigates the possibility for arsenic to manifest carcinogenic effects. Therefore, evaluating arsenic as a noncarcinogen would be more appropriate. Specifically, the body methylates the arsenic to form monomethyl arsenic and dimethyl arsenic. There is a limited capacity for the body to metabolize methylate arsenic, but this limit is generally only reached when the body's intake of arsenic approximately exceeds 500 µg per day. The maximum detected concentration of arsenic in groundwater at SWMU 17 was 22.7 µg/L with an average concentration of 3.7 µg/L. Assuming a water ingestion rate of 2 liters per day, exposure to the maximum concentration corresponds to approximate intakes of 45 µg per day. This concentration results in an arsenic intake that is well within the body's ability to metabolize arsenic. Although some humans may be more sensitive to arsenic, in that they are "poor methylators," the maximum exposure concentration for the site is approximately two orders of magnitude less than the normal limit of metabolic saturation and is most likely less than levels that would trigger responses in sensitive individuals.

Uncertainty in the Toxicity Criteria for Chromium

Toxicity criteria are available for different forms of chromium, which is considered to be more toxic in the hexavalent state. Because there is no evidence to support the conclusion that hexavalent chromium is present at SWMUs 16 and 17, speciation analysis was not performed. However, risks associated with this chemical were assessed by conservatively assuming that 100 percent of the reported total chromium result is attributable to hexavalent chromium. Therefore, the risks calculated for chromium in soil at SWMUs 16 and 17 are likely overestimated. However, because the HQs calculated for chromium in these media were less than unity, the uncertainty introduced into the risk assessments is minimal.

6.5.4 Uncertainty in the Risk Characterization

Uncertainty in risk characterization resulted from assumptions made regarding additivity of effects from exposure to multiple COPCs from various exposure routes. High uncertainty exists when summing noncancer risks for several substances across different exposure pathways. This assumes that each substance has a similar effect and/or mode of action. Even when compounds affect the same target organs, they may have different mechanisms of action or differ in their fate in the body, so additivity may not have been an appropriate assumption. However, the assumption of additivity was considered in the HHRAs because in most cases it represents a conservative estimate of risk.

Risks to any individual may also have been overestimated by summing multiple assumed exposure pathway risks for any single receptor. Although every effort was made to develop reasonable scenarios, not all individual receptors may have been exposed via all pathways considered.

Finally, the risk characterization did not consider antagonistic or synergistic effects. Little or no information was available to determine the potential for antagonism or synergism for the COPCs. Because chemical-specific interactions can not be predicted, the likelihood for risks to be overpredicted or underpredicted can not be defined, but the methodology used was based on current USEPA guidance.

6.6 SUMMARIES

For SWMU 16, human health risks were estimated for potential receptors under current and future land use. Elevated risks were calculated for future construction and occupational workers, primarily due to exposure to lead in surface soil at location 16SS02. Minor contributors to the risks were BEHP, Aroclor-1254, and, to a lesser extent, chromium based on concentrations detected at the same location. Risks estimated for subsurface soil, groundwater, surface water, and sediment were less than USEPA benchmarks. A residential exposure scenario was not evaluated for SWMU 16.

For SWMU 17, no significant potential health risks for human receptors were determined under current land use. Under future industrial land use, minimal risks were calculated for excavation/construction workers for exposure to VOCs in groundwater. Under future residential land use, elevated noncarcinogenic and carcinogenic risks were calculated for potential exposure to volatile chlorinated hydrocarbons and several metals in groundwater and subsurface soil. The elevated risks for groundwater and subsurface soil were based on exposure to the maximum detected concentrations. Risks estimated for surface soil and surface water were less than USEPA benchmarks. No COPCs were identified for sediment.

TABLE 6-1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Volatile Organics (mg/kg)																
67-64-1	Acetone	1.3	J	1.7	J	mg/kg	16-S-04-00	2/4	0.0017 - 0.12	1.7	NA	1400 N	6.6 NA	SSL-MIGR SSL-INH	No	BSL
Semivolatile Organics (mg/kg)																
100-52-7	Benzaldehyde	0.45		0.46		mg/kg	16-S-03-00	2/4	0.4 - 7.6	0.46	NA	610 N	0.86 NA	SSL-MIGR SSL-INH	No	BSL
117-81-7	Bis(2-Ethylhexyl)phthalate	0.24	J	6100		mg/kg	16-S-02-00-D	3/4	0.4	6100	NA	35 C	180 NA	SSL-MIGR SSL-INH	Yes	ASL
85-68-7	Butyl Benzyl Phthalate	9.4		16		mg/kg	16-S-02-00-D	1/4	0.4 - 0.43	16	NA	1200 N	840 NA	SSL-MIGR SSL-INH	No	BSL
84-74-2	Di-n-butyl phthalate	14		26		mg/kg	16-S-02-00-D	1/4	0.4 - 0.43	26	NA	610 N	250 NA	SSL-MIGR SSL-INH	No	BSL
117-84-0	Di-n-octyl phthalate	34	J	70	J	mg/kg	16-S-02-00-D	1/4	0.4 - 0.43	70	NA	240 N	240000 NA	SSL-MIGR SSL-INH	No	BSL
84-66-2	Diethyl Phthalate	0.87	J	1.9	J	mg/kg	16-S-02-00-D	1/4	0.4 - 0.43	1.9	NA	4900 N	23 NA	SSL-MIGR SSL-INH	No	BSL
Pesticides/PCBs (mg/kg)																
72-54-8	4,4'-DDD	0.0014	J	0.0014	J	mg/kg	16-S-03-00	1/4	0.0039 - 0.77	0.0014	0.1	2.4 C	0.71 NA	SSL-MIGR SSL-INH	No	BSL
72-55-9	4,4'-DDE	0.0031	J	0.0046		mg/kg	16-S-04-00	2/4	0.0039 - 0.77	0.0046	0.021	1.7 C	2.2 NA	SSL-MIGR SSL-INH	No	BSL
50-29-3	4,4'-DDT	0.0048		0.0048		mg/kg	16-S-04-00	1/4	0.0039 - 0.77	0.0048	0.059	1.7 C	1.3 750	SSL-MIGR SSL-INH	No	BSL
11097-69-1	Aroclor-1254	40		59		mg/kg	16-S-02-00	1/4	0.02 - 0.022	59	NA	0.22 C	NA NA	SSL-MIGR SSL-INH	Yes	ASL
Inorganics (mg/kg)																
7429-90-5	Aluminum	3030		14200		mg/kg	16-S-01-00	4/4	---	14200	16900	7600 N	8.3 6860000	SSL-MIGR SSL-INH	No	BKG
7440-36-0	Antimony	98.3		122		mg/kg	16-S-02-00-D	1/4	0.18 - 0.41	122	0.33	3.1 N	0.27 NA	SSL-MIGR SSL-INH	Yes	ASL
7440-38-2	Arsenic	1.1		3.9		mg/kg	16-S-01-00	4/4	10.7	3.9	9.45	0.39 C	0.29 745	SSL-MIGR SSL-INH	No	BKG
7440-39-3	Barium	13.5		207		mg/kg	16-S-02-00-D	4/4	---	207	64.5	540 N	82 686000	SSL-MIGR SSL-INH	Yes	ASL
7440-43-9	Cadmium	0.16		60.7		mg/kg	16-S-02-00	3/4	0.32	60.7	0.12	3.7 N	0.38 1780	SSL-MIGR SSL-INH	Yes	ASL
7440-70-2	Calcium	274		1440		mg/kg	16-S-02-00	4/4	---	1440	6120	NA N	NA NA	SSL-MIGR SSL-INH	No	NUT, BKG
7440-47-3	Chromium	11		667		mg/kg	16-S-02-00-D	4/4	---	667	42.9	210 C	2.1 267	SSL-MIGR SSL-INH	Yes	ASL
7440-48-4	Cobalt	0.52		1.1		mg/kg	16-S-01-00	3/4	0.76 - 0.82	1.1	2.71	140 N	0.17 1140	SSL-MIGR SSL-INH	No	BKG
7440-50-8	Copper	2.4		58.1		mg/kg	16-S-02-00-D	4/4	---	58.1	3.23	310 N	560 NA	SSL-MIGR SSL-INH	No	BSL
7439-89-6	Iron	1520	J	15800	J	mg/kg	16-S-01-00	4/4	---	15800	67900	2300 N	NA NA	SSL-MIGR SSL-INH	No	BKG
7439-92-1	Lead	7.8		12400		mg/kg	16-S-02-00-D	4/4	---	12400	15.5	400	NA NA	SSL-MIGR SSL-INH	Yes	ASL
7439-95-4	Magnesium	626		1230		mg/kg	16-S-01-00	4/4	---	1230	746	NA N	NA NA	SSL-MIGR SSL-INH	No	NUT

TABLE 6-1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
7439-96-5	Manganese	9.4		41.4	J	mg/kg	16-S-04-00	4/4	---	41.4	25.1	180	N	110 68600	SSL-MIGR SSL-INH	No	BSL
7439-97-6	Mercury	0.02		0.11		mg/kg	16-S-02-00-D	4/4	---	0.11	0.21	2.3	N	0.1 2.9	SSL-MIGR SSL-INH	No	BKG
7440-02-0	Nickel	1.6		4.7		mg/kg	16-S-04-00	4/4	---	4.7	12.1	160	N	14 NA	SSL-MIGR SSL-INH	No	BSL,BKG
7440-09-7	Potassium	236		641		mg/kg	16-S-01-00	4/4	---	641	225	NA	N	NA NA	SSL-MIGR SSL-INH	No	NUT
7782-49-2	Selenium	0.67		0.69		mg/kg	16-S-04-00	2/4	0.49 - 12.9	0.69	2.84	39	N	0.26 NA	SSL-MIGR SSL-INH	No	BKG
7440-23-5	Sodium	1590		4160		mg/kg	16-S-01-00	4/4	---	4160	370	NA	N	NA NA	SSL-MIGR SSL-INH	No	NUT
7440-62-2	Vanadium	3.8		34.1		mg/kg	16-S-01-00	4/4	---	34.1	66.3	7.8	N	260 NA	SSL-MIGR SSL-INH	No	BKG
7440-66-6	Zinc	5.4		157		mg/kg	16-S-02-00	4/4	---	157	20.5	2,300	N	680 NA	SSL-MIGR SSL-INH	No	BSL

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 If the maximum inorganic concentration is greater than the Charleston NWS background concentration, (Baseline Background Study. Naval Weapons Station, Charleston, SC. TtNUS, March 2002), that inorganic is not selected as a COPC .
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).

Surrogate Chemicals

The PRG for chromium represents a 1:6 ratio of Cr VI:Cr III (USEPA Region 9, October 2004).

Associated Samples:

16-S-01-00
16-S-02-00
16-S-02-00-D
16-S-03-00
16-S-04-00

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BKG = Within background levels
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient
NTX = No Toxicity Information

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
N = Noncarcinogen
NA = Not Applicable.
SSL-INH = Soil Screening Level for transfers from soil to air (inhalation) calculated online at http://risk.lsd.ornl.gov/calc_start.shtml by the USEPA's Soil Screenng Guidance (USEPA, July 1996).
SSL-MIGR = Soil Screening Level for transfers from soil to groundwater for a Dilution and Attenuation Factor of 1 calculated online at http://risk.lsd.ornl.gov/calc_start.shtml (USEPA July 1996)

TABLE 6-2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Volatile Organics (mg/kg)																	
78-93-3	2-Butanone	0.004	J	0.004	J	mg/kg	16-B-03-01-D	1/11	0.005 - 1.2	0.004	NA	2200	N	4.4 24000	SSL-MIGR SSL-INH	No	BSL
67-64-1	Acetone	0.1	J	0.12	J	mg/kg	16-B-04-03-D	2/11	0.042 - 6	0.12	NA	1400	N	6.6 NA	SSL-MIGR SSL-INH	No	BSL
75-15-0	Carbon Disulfide	0.001	J	0.05		mg/kg	16-B-02-05	4/11	0.005 - 0.95	0.05	NA	36	N	1.5 720	SSL-MIGR SSL-INH	No	BSL
75-71-8	Dichlorodifluoromethane	0.002	J	0.002	J	mg/kg	16-B-04-05	1/11	0.005 - 0.95	0.002	NA	9.4	N	28 250	SSL-MIGR SSL-INH	No	BSL
79-20-9	Methyl Acetate	0.33		2.3	J	mg/kg	16-B-01-05	4/9	0.005 - 0.034	2.3	NA	2200	N	7.4 NA	SSL-MIGR SSL-INH	No	BSL
Semivolatile Organics (mg/kg)																	
91-57-6	2-Methylnaphthalene	0.2	J	0.3	J	mg/kg	16-B-02-05	2/11	0.04 - 1.5	0.3	NA	5.6	N	NA NA	SSL-MIGR SSL-INH	No	BSL
83-32-9	Acenaphthene	0.3	J	1.2		mg/kg	16-B-02-05	2/11	0.04 - 1.5	1.2	NA	370	N	31 NA	SSL-MIGR SSL-INH	No	BSL
120-12-7	Anthracene	0.08	J	0.4	J	mg/kg	16-B-02-05	3/11	0.04 - 1.5	0.4	0.253	2200	N	650 NA	SSL-MIGR SSL-INH	No	BSL
56-55-3	Benzo(a)anthracene	0.02	J	0.4	J	mg/kg	16-B-02-05	9/11	0.04 - 1.5	0.4	0.43	0.62	C	0.16 NA	SSL-MIGR SSL-INH	Yes	ASL
50-32-8	Benzo(a)pyrene	0.05	J	0.5	J	mg/kg	16-B-03-03	7/11	0.04 - 1.5	0.5	0.48	0.062	C	0.41 NA	SSL-MIGR SSL-INH	Yes	ASL
205-99-2	Benzo(b)fluoranthene	0.06	J	0.7	J	mg/kg	16-B-03-03	8/11	0.04 - 1.4	0.7	0.6	0.62	C	0.49 NA	SSL-MIGR SSL-INH	Yes	ASL
191-24-2	Benzo(g,h,i)perylene	0.03	J	0.3	J	mg/kg	16-B-03-03	6/11	0.04 - 1.5	0.3	0.31	230	N	NA NA	SSL-MIGR SSL-INH	No	BSL
207-08-9	Benzo(k)fluoranthene	0.04	J	0.3	J	mg/kg	16-B-03-03	3/11	0.04 - 1.5	0.3	0.27	6.2	C	0.49 NA	SSL-MIGR SSL-INH	No	BSL
117-81-7	Bis(2-Ethylhexyl)phthalate	0.5	J	0.9	J	mg/kg	16-B-03-03	4/11	0.04 - 1.5	0.9	NA	35	C	180 NA	SSL-MIGR SSL-INH	No	BSL
86-74-8	Carbazole	0.07	J	0.2	J	mg/kg	16-B-02-05	2/9	0.04 - 1.5	0.2	0.11	24	C	0.03 NA	SSL-MIGR SSL-INH	Yes	ASL
218-01-9	Chrysene	0.07	J	0.5	J	mg/kg	16-B-03-03	6/11	0.04 - 1.5	0.5	0.47	62	C	0.16 7500	SSL-MIGR SSL-INH	Yes	ASL
84-74-2	Di-n-butyl phthalate	0.2	J	0.2	J	mg/kg	16-B-02-01	2/11	0.04 - 1.5	0.2	NA	610	N	250 NA	SSL-MIGR SSL-INH	No	BSL
117-84-0	Di-n-octyl phthalate	0.2	J	0.2	J	mg/kg	16-B-01-05	1/11	0.04 - 1.4	0.2	NA	240	N	240000 NA	SSL-MIGR SSL-INH	No	BSL
132-64-9	Dibenzofuran	0.1	J	0.5	J	mg/kg	16-B-02-05	2/11	0.04 - 1.5	0.5	NA	15	N	2.4 NA	SSL-MIGR SSL-INH	No	BSL
206-44-0	Fluoranthene	0.08	J	2		mg/kg	16-B-02-05	8/11	0.04 - 1.5	2	1.3	230	N	310 NA	SSL-MIGR SSL-INH	No	BSL
86-73-7	Fluorene	0.2	J	0.7	J	mg/kg	16-B-02-05	2/11	0.04 - 1.5	0.7	0.055	270	N	41 NA	SSL-MIGR SSL-INH	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.04	J	0.3	J	mg/kg	16-B-03-03	6/11	0.04 - 1.5	0.3	0.31	0.62	C	1.4 NA	SSL-MIGR SSL-INH	No	BSL
91-20-3	Naphthalene	0.46		0.7	J	mg/kg	16-B-02-05	2/11	0.04 - 1.5	0.7	NA	5.6	N	3.1 170	SSL-MIGR SSL-INH	No	BSL
85-01-8	Phenanthrene	0.05	J	2.7		mg/kg	16-B-02-05	5/11	0.04 - 1.5	2.7	0.75	230	N	NA NA	SSL-MIGR SSL-INH	No	BSL

TABLE 6-2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Suburface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
129-00-0	Pyrene	0.08	J	1.3		mg/kg	16-B-02-05	9/11	0.4 - 0.46	1.3	0.85	230	N	230 NA	SSL-MIGR SSL-INH	No	BSL
Pesticides/PCBs (mg/kg)																	
72-54-8	4,4'-DDD	0.00042	J	0.38		mg/kg	16-B-03-05	5/11	0.004 - 0.015	0.38	0.1	2.4	C	0.71 NA	SSL-MIGR SSL-INH	No	BSL
72-55-9	4,4'-DDE	0.00014	J	0.029	J	mg/kg	16-B-03-03	6/11	0.004 - 0.08	0.029	0.021	1.7	C	2.2 NA	SSL-MIGR SSL-INH	No	BSL
50-29-3	4,4'-DDT	0.00017	J	0.22		mg/kg	16-B-03-03	5/11	0.004 - 0.015	0.22	0.591	1.7	C	1.3 750	SSL-MIGR SSL-INH	No	BSL
5103-71-9	Alpha-Chlordane	0.0015	J	0.0015	J	mg/kg	16-B-02-05	1/11	0.002 - 0.045	0.0015	1.88	1.6	C	0.48 72	SSL-MIGR SSL-INH	No	BSL
11097-69-1	Aroclor-1254	0.066	J	1		mg/kg	16-B-02-01	2/11	0.021 - 0.076	1	NA	0.22	C	NA NA	SSL-MIGR SSL-INH	Yes	ASL
11096-82-5	Aroclor-1260	0.036	J	0.32		mg/kg	16-B-03-03	2/11	0.021 - 0.076	0.32	NA	0.22	C	NA NA	SSL-MIGR SSL-INH	Yes	ASL
959-98-8	Endosulfan I	0.012	J	0.012	J	mg/kg	16-B-03-03	1/11	0.002 - 0.041	0.012	NA	37	N	0.98 NA	SSL-MIGR SSL-INH	No	BSL
33213-65-9	Endosulfan II	0.0025	J	0.0025	J	mg/kg	16-B-03-03	1/11	0.002 - 0.08	0.0025	NA	37	N	0.98 NA	SSL-MIGR SSL-INH	No	BSL
1031-07-8	Endosulfan Sulfate	0.0018	J	0.0033	J	mg/kg	16-B-03-03	3/11	0.002 - 0.08	0.0033	NA	37	N	NA NA	SSL-MIGR SSL-INH	No	BSL
7421-93-4	Endrin Aldehyde	0.004	J	0.004	J	mg/kg	16-B-01-05	1/11	0.002 - 0.08	0.004	NA	1.8	N	NA NA	SSL-MIGR SSL-INH	No	BSL
53494-70-5	Endrin Ketone	0.0011	J	0.0039	J	mg/kg	16-B-03-03	3/11	0.002 - 0.08	0.0039	NA	1.8	N	NA NA	SSL-MIGR SSL-INH	No	BSL
5103-74-2	Gamma-Chlordane	0.00014	J	0.011	J	mg/kg	16-B-03-03	2/11	0.002 - 0.041	0.011	0.0145	1.6	C	0.48 72	SSL-MIGR SSL-INH	No	BSL
76-44-8	Heptachlor	0.00058	J	0.00058	J	mg/kg	16-B-04-05	1/11	0.002 - 0.045	0.00058	NA	0.11	C	1.1 4.2	SSL-MIGR SSL-INH	No	BSL
1024-57-3	Heptachlor Epoxide	0.0015	J	0.012	J	mg/kg	16-B-03-03	2/11	0.002 - 0.045	0.012	NA	0.053	C	0.033 4.8	SSL-MIGR SSL-INH	No	BSL
72-43-5	Methoxychlor	0.0029	J	0.0029	J	mg/kg	16-B-02-01	1/11	0.0039 - 0.41	0.0029	NA	31	N	7.8 NA	SSL-MIGR SSL-INH	No	BSL
319-84-6	alpha-BHC	0.0007	J	0.0033	J	mg/kg	16-B-03-05	2/11	0.002 - 0.045	0.0033	NA	0.09	C	0.000036 0.76	SSL-MIGR SSL-INH	Yes	ASL
58-89-9	gamma-BHC (Lindane)	0.002	J	0.002	J	mg/kg	16-B-04-03-D	1/11	0.002 - 0.045	0.002	NA	0.44	C	0.00047 NA	SSL-MIGR SSL-INH	Yes	ASL
Inorganics (mg/kg)																	
7429-90-5	Aluminum	8820		55800	J	mg/kg	16-B-01-03	11/11	---	55800	16900	7600	N	8.3 6860000	SSL-MIGR SSL-INH	Yes	ASL
7440-36-0	Antimony	2.2		11		mg/kg	16-B-04-05	2/11	0.28 - 4.6	11	0.33	3.1	N	0.27 NA	SSL-MIGR SSL-INH	Yes	ASL
7440-38-2	Arsenic	4.8		34	J	mg/kg	16-B-01-05	10/11	1.8	34	9.45	0.39	C	0.29 745	SSL-MIGR SSL-INH	Yes	ASL
7440-39-3	Barium	20.4		580		mg/kg	16-B-04-05	11/11	---	580	64.5	540	N	82 686000	SSL-MIGR SSL-INH	Yes	ASL
7440-41-7	Beryllium	0.32		2.4	J	mg/kg	16-B-01-03	9/11	0.26 - 1	2.4	0.58	15	N	32 1330	SSL-MIGR SSL-INH	No	BSL
7440-43-9	Cadmium	1.1		17.3		mg/kg	16-B-04-05	2/11	0.02 - 0.57	17.3	0.12	3.7	N	0.38 1780	SSL-MIGR SSL-INH	Yes	ASL

TABLE 6-2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
7440-70-2	Calcium	632		15900		mg/kg	16-B-02-01	11/11	---	15900	NA	NA	NA NA	SSL-MIGR SSL-INH	No	NUT, BKG
7440-47-3	Chromium	23.2		132		mg/kg	16-B-03-03	11/11	---	132	42.9	210 C	2.1 267	SSL-MIGR SSL-INH	Yes	ASL
7440-48-4	Cobalt	1.8		17		mg/kg	16-B-03-03	11/11	---	17	2.71	140 N	0.17 1140	SSL-MIGR SSL-INH	Yes	ASL
7440-50-8	Copper	2		992		mg/kg	16-B-04-05	11/11	1.6	992	3.23	310 N	560 NA	SSL-MIGR SSL-INH	Yes	ASL
7439-89-6	Iron	10900		76000		mg/kg	16-B-04-05	11/11	---	76000	67900	2300 N	NA NA	SSL-MIGR SSL-INH	Yes	ASL
7439-92-1	Lead	6.4		398		mg/kg	16-B-04-05	11/11	---	398	15.5	400	NA NA	SSL-MIGR SSL-INH	No	BSL
7439-95-4	Magnesium	1540		9640	J	mg/kg	16-B-01-05	11/11	---	9640	746	NA	NA NA	SSL-MIGR SSL-INH	No	NUT
7439-96-5	Manganese	19.1		494		mg/kg	16-B-03-03	11/11	---	494	25.1	180 N	110 68600	SSL-MIGR SSL-INH	Yes	ASL
7439-97-6	Mercury	0.02		0.32		mg/kg	16-B-04-05	11/11	---	0.32	0.21	2.3 N	0.1 2.9	SSL-MIGR SSL-INH	Yes	ASL
7440-02-0	Nickel	3.6		114		mg/kg	16-B-03-03	11/11	---	114	12.1	160 N	14 NA	SSL-MIGR SSL-INH	Yes	ASL
7440-09-7	Potassium	530		5060	J	mg/kg	16-B-01-05	11/11	---	5060	225	NA	NA NA	SSL-MIGR SSL-INH	No	NUT
7440-22-4	Silver	14.8		14.8		mg/kg	16-B-04-05	1/11	0.08 - 0.63	14.8	3.2	39 N	1.6 NA	SSL-MIGR SSL-INH	Yes	ASL
7440-23-5	Sodium	1010		15700	J	mg/kg	16-B-01-05	11/11	---	15700	370	NA	NA NA	SSL-MIGR SSL-INH	No	NUT
7440-28-0	Thallium	0.68		2.6		mg/kg	16-B-02-05	6/11	0.37 - 2.25	2.6	1.63	0.52 N	0.056 NA	SSL-MIGR SSL-INH	Yes	ASL
7440-62-2	Vanadium	15.4		108	J	mg/kg	16-B-01-03	11/11	---	108	66.3	7.8 N	260 NA	SSL-MIGR SSL-INH	Yes	ASL
7440-66-6	Zinc	10.5		15700		mg/kg	16-B-04-05	11/11	---	15700	20.5	2,300 N	680 NA	SSL-MIGR SSL-INH	Yes	ASL

TABLE 6-2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 If the maximum inorganic concentration is greater than the Charleston NWS background concentration, (Baseline Background Study. Naval Weapons Station, Charleston, SC. TtNUS, March 2002), that inorganic is not selected as a COPC .
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).

Surrogate Chemicals

Naphthalene is used as a surrogate for 2-methylnaphthalene
Pyrene is used as a surrogate for benzo(ghi)perylene, and phenanthrene.
Endosulfan is used as surrogate for endosulfan I, endosulfan II, and endosulfan sulfate
Endrin is used as a surrogate for endrin aldehyde and endrin ketone.
Chlordane is used a surrogate for gamma-chlordane.
The PRG for chromium represents a 1:6 ratio of Cr VI:Cr III (USEPA Region 9, October 2004).

Associated Samples:

16-B-01-01	16-B-03-03
16-B-01-03	16-B-03-05
16-B-01-05	16-B-04-01
16-B-02-01	16-B-04-03
16-B-02-05	16-B-04-03-D
16-B-03-01	16-B-04-05
16-B-03-01-D	

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BKG = Within background levels
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient
NTX = No Toxicity Information

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
N = Noncarcinogen
NA = Not Applicable.
SSL-INH = Soil Screening Level for transfers from soil to air (Inhalation) calculated online at http://risk.lsd.ornl.gov/calc_start.shtml by the USEPA's Soil Screening Guidance (USEPA, July 1996).
SSL-MIGR = Soil Screening Level for transfers from soil to groundwater for a Dilution and Attenuation Factor of 1 calculated online at http://risk.lsd.ornl.gov/calc_start.shtml (USEPA July 1996)

TABLE 6-3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Volatile Organics (ug/L)																	
79-01-6	TRICHLOROETHENE(7)	32		32		ug/L	16-G-02S-0205	1/5	0.4 - 5	32	NA	1.4	C	5	FED-MCL	Yes	ASL
Semivolatile Organics (ug/L)																	
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	11		11		ug/L	16-G-04S-0205	1/5	10	11	NA	4.8	C	6	FED-MCL	Yes	ASL
84-74-2	DI-N-BUTYL PHTHALATE	3	J	3	J	ug/L	16-G-05S-0205	1/5	10	3	NA	360	N	NA	FED-MCL	No	BSL
Inorganics (ug/L)																	
7429-90-5	ALUMINUM	657		657		ug/L	16-G-01S-0305	1/5	36.6 - 127	657	1150000	3600	N	50	FED-SMCL	No	BKG
7440-39-3	BARIUM	30.9		294		ug/L	16-G-01S-0305	5/5	---	294	300	260	N	2000	FED-MCL	No	BKG
7440-41-7	BERYLLIUM	0.45		0.47		ug/L	16-G-03S-0205	2/5	0.4 - 1.8	0.47	2.3	7.3	N	4	FED-MCL	No	BSL,BKG
7440-70-2	CALCIUM	23600		228000		ug/L	16-G-02S-0205	5/5	---	228000	583000	NA	N	NA	FED-MCL	No	NUT. BKG
7440-48-4	COBALT	17.9		17.9		ug/L	16-G-01S-0305	1/5	4.3	17.9	16	73	N	NA	FED-MCL	No	BSL
7440-50-8	COPPER	2.8		2.8		ug/L	16-G-01S-0305	1/5	2.52	2.8	7	150	N	1300	FED-AL	No	BSL,BKG
7439-89-6	IRON	376		376		ug/L	16-G-01S-0305	1/5	7.73 - 36.2	376	521000	1100	N	300	FED-SMCL	No	BKG
7439-95-4	MAGNESIUM	15800		588000		ug/L	16-G-03S-0205	5/5	---	588000	11700	NA	N	NA	FED-MCL	No	NUT
7439-96-5	MANGANESE	130		722		ug/L	16-G-03S-0205	5/5	---	722	2580	88	N	50	FED-SMCL	No	BKG
7440-09-7	POTASSIUM	4820		178000		ug/L	16-G-02S-0205	5/5	---	178000	5200	NA	N	NA	FED-MCL	No	NUT
7440-23-5	SODIUM	56000		4720000		ug/L	16-G-02S-0205	5/5	---	4720000	208000	NA		NA	FED-MCL	No	NUT
7440-66-6	ZINC	22		22		ug/L	16-G-01S-0305	1/5	1.42 - 3.1	22	153	1100	N	5000	FED-SMCL	No	BSL,BKG
57-12-5	CYANIDE	3.8	J	3.8	J	ug/L	16-G-03S-0205	1/5	10	3.8	NA	73	N	200	FED-MCL	No	BSL

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 If the maximum inorganic concentration is greater than the Charleston NWS background concentration, (Baseline Background Study. Naval Weapons Station, Charleston, SC. TtNUS, March 2002), that inorganic is not selected as a COPC .
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 The "CAL- Modified PRG" is used as the screening value for trichloroethene (USEPA, Region 9, October 2004).

Associated Samples:

16-G-01S-0305,20050310
16-G-02S-0205,20050225
16-G-03S-0205,20050223
16-G-04S-0205,20050225
16-G-05S-0205,20050223

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BKG = Within background levels
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient
NTX = No Toxicity Information

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
N = Noncarcinogen
NA = Not Applicable.
FED-MCL = Federal Maximum Contaminant Level (USEPA, Winter 2004)
FED-SMCL = Federal Secondary Maximum Contaminant Level (USEPA, Winter 2004)
FED-AL = Federal Action Level (USEPA, Winter 2004)

TABLE 6-4

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE WATER
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Volatile Organics (ug/L)																	
78-83-1	ISOBUTANOL	6	J	6	J	ug/L	16-W-02-1001	1/1	---	6	NA	180	N	NA	FED-AWQC	No	BSL
127-18-4	TETRACHLOROETHENE	0.7	J	0.7	J	ug/L	16-W-07-1001	1/7	5	0.7	NA	0.1	C	0.69	FED-AWQC	Yes	ASL
Explosives (ug/L)																	
118-96-7	2,4,6-TRINITROTOLUENE	0.21		0.21		ug/L	16-W-07-1001	1/7	0.2	0.21	NA	1.8	N	NA	FED-AWQC	No	BSL
121-14-2	2,4-DINITROTOLUENE	0.66	J	0.66	J	ug/L	16-W-01-1001	1/7	0.2 - 10	0.66	NA	7.3	N	0.11	FED-AWQC	Yes	ASL
606-20-2	2,6-DINITROTOLUENE	0.41	J	0.41	J	ug/L	16-W-01-1001	1/7	0.2 - 10	0.41	NA	3.6	N	NA	FED-AWQC	No	BSL
Inorganics (ug/L)																	
7429-90-5	ALUMINUM	524		11000		ug/L	16-W-05-1001	6/7	173	11000	3520	3600	N	NA	FED-AWQC	Yes	ASL
7440-36-0	ANTIMONY	11.2		11.8		ug/L	16-W-04-1001	2/7	3.65	11.8	ND	1.5	N	5.6	FED-AWQC	Yes	ASL
7440-38-2	ARSENIC	3.9		4.5		ug/L	16-W-01-1001-D	1/7	2.53 - 8.5	4.5	6.8	0.045	C	0.018	FED-AWQC	No	BKG
7440-39-3	BARIUM	17.6		63.4		ug/L	16-W-05-1001	7/7	---	63.4	46.6	260	N	1000	FED-AWQC	No	BSL
7440-70-2	CALCIUM	142000		186000		ug/L	16-W-02-1001	7/7	---	186000	226000	NA	N	NA	FED-AWQC	No	NUT
7440-50-8	COPPER	11.7		12.8		ug/L	16-W-02-1001	2/7	0.84 - 6.4	12.8	ND	150	N	1000	FED-AWQC	No	BSL
7439-89-6	IRON	704		9980		ug/L	16-W-05-1001	6/7	49.38	9980	2480	1100	N	300	FED-AWQC	Yes	ASL
7439-92-1	LEAD	2.1		15.5		ug/L	16-W-05-1001	4/7	1.48 - 6.4	15.5	ND	15	N	NA	FED-AWQC	Yes	ASL
7439-95-4	MAGNESIUM	419000		512000		ug/L	16-W-02-1001	7/7	---	512000	610000	NA	N	NA	FED-AWQC	No	NUT
7439-96-5	MANGANESE	1.5		388		ug/L	16-W-07-1001	7/7	---	388	106	88	N	50	FED-AWQC	Yes	ASL
7439-97-6	MERCURY	0.05		0.09		ug/L	16-W-05-1001	2/7	0.03 - 0.06	0.09	ND	1.1	N	NA	FED-AWQC	No	BSL
7440-09-7	POTASSIUM	138000		160000		ug/L	16-W-01-1001	7/7	---	160000	354000	NA	N	NA	FED-AWQC	No	NUT
7440-22-4	SILVER	1.2		1.2		ug/L	16-W-01-1001	1/7	1.03 - 4.15	1.2	ND	18	N	NA	FED-AWQC	No	BSL
7440-23-5	SODIUM	3250000		4270000		ug/L	16-W-01-1001	7/7	---	4270000	4300000	NA	N	NA	FED-AWQC	No	NUT
7440-62-2	VANADIUM	2.1		24.2		ug/L	16-W-05-1001	6/7	4.66	24.2	11	3.6	N	NA	FED-AWQC	Yes	ASL
7440-66-6	ZINC	2		71		ug/L	16-W-02-1001	5/7	7.2 - 14.9	71	ND	1100	N	7400	FED-AWQC	No	BSL

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 If the maximum inorganic concentration is greater than the concentration at the upgradient location, 23SW/SD08, that inorganic is not selected as a COPC .
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).

Associated Samples:

16-W-01-1001	16-W-04-1001
16-W-01-1001-D	16-W-05-1001
16-W-02-1001	16-W-06-1001
16-W-03-1001	16-W-07-1001

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BKG = Within background levels
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient
NTX = No Toxicity Information

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
N = Noncarcinogen
NA = Not Applicable.
FED-AWQC = Nationl Recommended Water Quality Criteria for Priority Toxic Pollutants, Human Health for Consumption of Water and Organisms (USEPA, 2004).

TABLE 6-5

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SEDIMENT
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Volatile Organics (mg/kg)																	
75-15-0	CARBON DISULFIDE	0.002	J	0.017	J	mg/kg	16-D-03-1001	5/7	0.020 - 0.028	0.017	NA	36	N	NA	NA	No	BSL
Semivolatile Organics (mg/kg)																	
120-12-7	ANTHRACENE	0.068	J	0.068	J	mg/kg	16-D-03-1001	1/7	0.43 - 1.4	0.068	NA	2200	N	NA	NA	No	BSL
56-55-3	BENZO(A)ANTHRACENE	0.044	J	0.2	J	mg/kg	16-D-03-1001	4/7	0.43 - 1.4	0.2	NA	0.62	C	NA	NA	No	BSL
50-32-8	BENZO(A)PYRENE	0.019	J	0.16	J	mg/kg	16-D-03-1001	3/7	0.43 - 1.4	0.16	NA	0.062	C	NA	NA	Yes	ASL
205-99-2	BENZO(B)FLUORANTHENE	0.021	J	1.1	J	mg/kg	16-D-02-1001	4/7	0.43 - 1.4	1.1	NA	0.62	C	NA	NA	Yes	ASL
191-24-2	BENZO(G,H,I)PERYLENE	0.13	J	0.13	J	mg/kg	16-D-03-1001	1/7	0.43 - 1.4	0.13	NA	230	N	NA	NA	No	BSL
218-01-9	CHRYSENE	0.19	J	0.71	J	mg/kg	16-D-02-1001	2/7	0.43 - 1.4	0.71	NA	62	C	NA	NA	No	BSL
206-44-0	FLUORANTHENE	0.042	J	0.35	J	mg/kg	16-D-03-1001	4/7	0.43 - 1.4	0.35	NA	230	N	NA	NA	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.12	J	0.12	J	mg/kg	16-D-03-1001	1/7	0.43 - 1.4	0.12	NA	0.62	C	NA	NA	No	BSL
85-01-8	PHENANTHRENE	0.19	J	0.19	J	mg/kg	16-D-03-1001	1/7	0.43 - 1.4	0.19	NA	230	N	NA	NA	No	BSL
129-00-0	PYRENE	0.081	J	0.94	J	mg/kg	16-D-02-1001	3/7	0.43 - 1.4	0.94	NA	230	N	NA	NA	No	BSL
Pesticides/PCBs (mg/kg)																	
72-54-8	4,4'-DDD	0.0014	J	0.0053	J	mg/kg	16-D-06-1001	3/7	0.01 - 0.017	0.0053	NA	2.4	C	NA	NA	No	BSL
72-55-9	4,4'-DDE	0.0022	J	0.0042	J	mg/kg	16-D-03-1001	6/7	0.014	0.0042	NA	1.7	C	NA	NA	No	BSL
50-29-3	4,4'-DDT	0.001	J	0.0044	J	mg/kg	16-D-06-1001	4/7	0.01 - 0.017	0.0044	NA	1.7	C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	0.0037	J	0.0037	J	mg/kg	16-D-02-1001	1/7	0.0022 - 0.0086	0.0037	NA	1.6	C	NA	NA	No	BSL
11097-69-1	AROCLOR-1254	0.16	J	0.16	J	mg/kg	16-D-02-1001	1/7	0.022 - 0.086	0.16	NA	0.22	C	NA	NA	No	BSL
11096-82-5	AROCLOR-1260	0.026	J	0.026	J	mg/kg	16-D-02-1001	1/7	0.022 - 0.086	0.026	NA	0.22	C	NA	NA	No	BSL
5103-74-2	GAMMA-CHLORDANE	0.0033	J	0.0033	J	mg/kg	16-D-02-1001	1/7	0.0022 - 0.0086	0.0033	NA	1.6	C	NA	NA	No	BSL
319-84-6	ALPHA-BHC	0.007	J	0.014	J	mg/kg	16-D-03-1001	3/7	0.0022 - 0.0086	0.014	NA	0.09	C	NA	NA	No	BSL
58-89-9	GAMMA-BHC (LINDANE)	0.005	J	0.0064	J	mg/kg	16-D-03-1001	3/7	0.0022 - 0.0086	0.0064	NA	0.44	C	NA	NA	No	BSL
Inorganics (mg/kg)																	
7429-90-5	ALUMINUM	3640		45100	J	mg/kg	16-D-05-1001	7/7	---	45100	52800	7600	N	NA	NA	No	BKG
7440-38-2	ARSENIC	14.6	J	20.6	J	mg/kg	16-D-05-1001	6/7	1.2 - 1.6	20.6	36.6	0.39	C	NA	NA	No	BKG
7440-39-3	BARIUM	5.7		49.6	J	mg/kg	16-D-05-1001	7/7	---	49.6	72.4	540	N	NA	NA	No	BSL,BKG
7440-41-7	BERYLLIUM	0.18		1.8	J	mg/kg	16-D-03-1001	7/7	0.13	1.8	3.2	15	N	NA	NA	No	BSL,BKG
7440-70-2	CALCIUM	714		3240	J	mg/kg	16-D-03-1001	7/7	---	3240	14760	NA	N	NA	NA	No	NUT, BKG
7440-47-3	CHROMIUM	6.9		71.6	J	mg/kg	16-D-04-1001	7/7	5.6	71.6	113.6	210	C	NA	NA	No	BSL,BKG
7440-48-4	COBALT	0.69		14.1	J	mg/kg	16-D-06-1001	7/7	0.47	14.1	22.6	140	N	NA	NA	No	BSL,BKG
7440-50-8	COPPER	1.2		100	J	mg/kg	16-D-02-1001	7/7	---	100	57.4	310	N	NA	NA	No	BSL
7439-89-6	IRON	3720		51400	J	mg/kg	16-D-05-1001	7/7	---	51400	69200	2300	N	NA	NA	No	BKG
7439-92-1	LEAD	5.4		46.5	J	mg/kg	16-D-02-1001	7/7	---	46.5	53.6	400		NA	NA	No	BSL,BKG
7439-95-4	MAGNESIUM	486		7960	J	mg/kg	16-D-03-1001	7/7	---	7960	13100	NA	N	NA	NA	No	NUT
7439-96-5	MANGANESE	12.8		234	J	mg/kg	16-D-05-1001	7/7	---	234	704	180	N	NA	NA	No	BKG
7439-97-6	MERCURY	0.29	J	0.29	J	mg/kg	16-D-05-1001	1/7	0.01 - 0.16	0.29	0.28	2.3	N	NA	NA	No	BSL
7440-02-0	NICKEL	19.2	J	29.1	J	mg/kg	16-D-02-1001	4/7	1.5 - 16.6	29.1	32	160	N	NA	NA	No	BSL,BKG
7440-09-7	POTASSIUM	284		3980	J	mg/kg	16-D-03-1001	7/7	---	3980	6960	NA	N	NA	NA	No	NUT
7782-49-2	SELENIUM	1		2.6	J	mg/kg	16-D-05-1001	4/7	0.35 - 1.45	2.6	9.2	39	N	NA	NA	No	BSL,BKG
7440-23-5	SODIUM	1480		18500	J	mg/kg	16-D-03-1001	7/7	---	18500	15200	NA	N	NA	NA	No	NUT
7440-62-2	VANADIUM	7.1		79.4	J	mg/kg	16-D-04-1001	7/7	---	79.4	127.4	7.8	N	NA	NA	No	BKG
7440-66-6	ZINC	8.4		158	J	mg/kg	16-D-02-1001	7/7	---	158	162.2	2300	N	NA	NA	No	BSL,BKG

TABLE 6-5

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SEDIMENT
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 If the maximum inorganic concentration is greater than the concentration at the upgradient location, 23SW/SD08, that inorganic is not selected as a COPC .
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).

Surrogate Chemicals

Pyrene is used as a surrogate for benzo(ghi)perylene, and phenanthrene.
Chlordane is used a surrogatge for alpha- and gamma-chlordane.
The PRG for chromium represents a 1:6 ratio of Cr VI:Cr III (USEPA Region 9, October 2004).

Associated Samples:

16-D-01-1001	16-D-04-1001
16-D-01-1001-D	16-D-05-1001
16-D-02-1001	16-D-06-1001
16-D-03-1001	16-D-07-1001

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BKG = Within background levels
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
N = Noncarcinogen
NA = Not Applicable.

TABLE 6-6

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Volatile Organics (mg/kg)																	
78-93-3	2-BUTANONE	0.004	J	0.006	J	mg/kg	17-B-06-00	3/29	0.005 - 0.42	0.006	NA	2200	N	4.4 24000	SSL-MIGR SSL-INH	No	BSL
67-64-1	ACETONE	0.021	J	0.065		mg/kg	17-B-15-00-D	3/29	0.007 - 0.69	0.065	NA	1400	N	6.6 NA	SSL-MIGR SSL-INH	No	BSL
74-83-9	BROMOMETHANE	0.003	J	0.003	J	mg/kg	17-B-26-00	1/29	0.005 - 0.21	0.003	NA	0.39	N	0.012 9.5	SSL-MIGR SSL-INH	No	BSL
75-00-3	CHLOROETHANE	0.002	J	0.002	J	mg/kg	17-B-19-00	1/29	0.005 - 0.21	0.002	NA	3	C	NA 1200	SSL-MIGR SSL-INH	No	BSL
67-66-3	CHLOROFORM	0.003	J	0.023		mg/kg	17-B-14-00	2/29	0.005 - 0.21	0.023	NA	0.22	C	0.029 0.28	SSL-MIGR SSL-INH	No	BSL
79-20-9	METHYL ACETATE	0.016		0.016		mg/kg	17-B-07-00	1/27	0.005 - 0.008	0.016	NA	2200	N	7.4 NA	SSL-MIGR SSL-INH	No	BSL
75-09-2	METHYLENE CHLORIDE	0.011	J	0.014	J	mg/kg	17-B-26-00	4/29	0.005 - 0.21	0.014	NA	9.1	C	0.0012 13	SSL-MIGR SSL-INH	Yes	ASL
100-42-5	STYRENE	0.002	J	0.002	J	mg/kg	17-B-06-00	1/29	0.005 - 0.21	0.002	NA	1700	sat	0.18 1500	SSL-MIGR SSL-INH	No	BSL
79-01-6	TRICHLOROETHENE(7)	0.005		3.2		mg/kg	17-B-17-00	4/29	0.005 - 0.21	3.2	NA	2.9	C	0.0028 0.071	SSL-MIGR SSL-INH	Yes	ASL
75-69-4	TRICHLOROFLUOROMETHANE	0.006		0.047		mg/kg	17-B-26-00	10/29	0.005 - 0.21	0.047	NA	39	N	8 1100	SSL-MIGR SSL-INH	No	BSL
156-59-2	CIS-1,2-DICHLOROETHENE	0.007		0.025		mg/kg	17-B-17-00	1/29	0.005 - 0.21	0.025	NA	4.3	N	0.02 NA	SSL-MIGR SSL-INH	Yes	ASL
Semivolatile Organics (mg/kg)																	
106-44-5	4-METHYLPHENOL	0.042	J	0.042	J	mg/kg	17-B-11-00	1/17	0.36 - 2.2	0.042	NA	31	N	0.066 NA	SSL-MIGR SSL-INH	No	BSL
83-32-9	ACENAPHTHENE	0.17	J	0.17	J	mg/kg	17-B-02-00	1/19	0.36 - 0.82	0.17	NA	370	N	31 NA	SSL-MIGR SSL-INH	No	BSL
208-96-8	ACENAPHTHYLENE	0.052	J	0.052	J	mg/kg	17-B-11-00	1/19	0.36 - 2.2	0.052	NA	370	N	NA NA	SSL-MIGR SSL-INH	No	BSL
120-12-7	ANTHRACENE	0.066	J	0.45	J	mg/kg	17-B-02-00	2/19	0.36 - 0.82	0.45	0.253	2200	N	650 NA	SSL-MIGR SSL-INH	No	BSL
100-52-7	BENZALDEHYDE	0.46		0.46		mg/kg	17-B-05-00	1/17	0.36 - 2.2	0.46	NA	610	N	0.86 NA	SSL-MIGR SSL-INH	No	BSL
56-55-3	BENZO(A)ANTHRACENE	0.028	J	1	J	mg/kg	17-B-02-00	4/19	0.36 - 0.82	1	0.43	0.62	C	0.16 NA	SSL-MIGR SSL-INH	Yes	ASL
50-32-8	BENZO(A)PYRENE	0.02	J	0.74	J	mg/kg	17-B-02-00	4/19	0.36 - 0.82	0.74	0.48	0.062	C	0.41 NA	SSL-MIGR SSL-INH	Yes	ASL
205-99-2	BENZO(B)FLUORANTHENE	0.036	J	1.1	J	mg/kg	17-B-02-00	5/19	0.36 - 0.82	1.1	0.6	0.62	C	0.49 NA	SSL-MIGR SSL-INH	Yes	ASL
191-24-2	BENZO(G,H,I)PERYLENE	0.023	J	0.37	J	mg/kg	17-B-02-00	3/19	0.36 - 0.82	0.37	0.31	230	N	NA NA	SSL-MIGR SSL-INH	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	0.033	J	0.34	J	mg/kg	17-B-02-00	3/19	0.36 - 0.82	0.34	0.27	6.2	C	0.49 NA	SSL-MIGR SSL-INH	No	BSL
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	1.1	J	1.1	J	mg/kg	17-B-02-00	1/19	0.36 - 0.82	1.1	NA	35	C	180 NA	SSL-MIGR SSL-INH	No	BSL
85-68-7	BUTYL BENZYL PHTHALATE	0.08	J	0.08	J	mg/kg	17-B-11-00	1/19	0.36 - 2.2	0.08	NA	1200	N	840 NA	SSL-MIGR SSL-INH	No	BSL
86-74-8	CARBAZOLE	0.45	J	0.45	J	mg/kg	17-B-02-00	1/17	0.36 - 0.82	0.45	0.11	24	C	0.03 NA	SSL-MIGR SSL-INH	Yes	ASL

TABLE 6-6

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
218-01-9	CHRYSENE	0.026	J	0.91	J	mg/kg	17-B-02-00	4/19	0.36 - 0.82	0.91	0.47	62	C	0.16 7500	SSL-MIGR SSL-INH	Yes	ASL
53-70-3	DIBENZO(A,H)ANTHRACENE	0.09	J	0.13	J	mg/kg	17-B-02-00	2/19	0.36 - 0.82	0.13	NA	0.062	C	1.5 NA	SSL-MIGR SSL-INH	Yes	ASL
132-64-9	DIBENZOFURAN	0.074	J	0.074	J	mg/kg	17-B-02-00	1/19	0.36 - 0.82	0.074	NA	15	N	2.4 NA	SSL-MIGR SSL-INH	No	BSL
206-44-0	FLUORANTHENE	0.026	J	1.7	J	mg/kg	17-B-02-00	4/19	0.36 - 0.82	1.7	1.3	230	N	310 NA	SSL-MIGR SSL-INH	No	BSL
86-73-7	FLUORENE	0.17	J	0.17	J	mg/kg	17-B-02-00	1/19	0.36 - 0.82	0.17	0.055	270	N	41 NA	SSL-MIGR SSL-INH	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.023	J	0.41	J	mg/kg	17-B-02-00	3/19	0.36 - 0.82	0.41	0.31	0.62	C	1.4 NA	SSL-MIGR SSL-INH	No	BSL
91-20-3	NAPHTHALENE	0.092	J	0.092	J	mg/kg	17-B-02-00	1/19	0.36 - 0.82	0.092	NA	5.6	N	3.1 170	SSL-MIGR SSL-INH	No	BSL
85-01-8	PHENANTHRENE	0.019	J	1.4	J	mg/kg	17-B-02-00	3/19	0.36 - 0.82	1.4	0.75	230	N	NA NA	SSL-MIGR SSL-INH	No	BSL
129-00-0	PYRENE	0.041	J	1.7	J	mg/kg	17-B-02-00	5/19	0.36 - 0.82	1.7	0.85	230	N	230 NA	SSL-MIGR SSL-INH	No	BSL
Pesticides/PCBs (mg/kg)																	
72-54-8	4,4'-DDD	0.0036	J	0.037		mg/kg	17-B-12-00	2/18	0.0018 -	0.037	0.1	2.4	C	0.71 NA	SSL-MIGR SSL-INH	No	BSL
72-55-9	4,4'-DDE	0.00054	J	0.0092		mg/kg	17-B-14-00	5/18	0.0035 -	0.0092	0.021	1.7	C	2.2 NA	SSL-MIGR SSL-INH	No	BSL
50-29-3	4,4'-DDT	0.00065	J	0.02		mg/kg	17-B-14-00	8/19	0.0035 -	0.02	0.059	1.7	C	1.3 750	SSL-MIGR SSL-INH	No	BSL
309-00-2	ALDRIN	0.0022	J	0.0022	J	mg/kg	17-B-12-00	1/19	0.0018 -	0.0022	NA	0.029	C	0.025 3.4	SSL-MIGR SSL-INH	No	BSL
5103-71-9	ALPHA-CHLORDANE	0.00055	J	0.00055	J	mg/kg	17-B-07-00	1/19	0.0018 -	0.00055	1.88	1.6	C	0.48 72	SSL-MIGR SSL-INH	No	BSL
12672-29-6	AROCLOR-1248	0.57		0.57		mg/kg	17-B-11-00	1/19	0.018 - 0.024	0.57	NA	0.22	C	NA NA	SSL-MIGR SSL-INH	Yes	ASL
11097-69-1	AROCLOR-1254	0.0051	J	0.87		mg/kg	17-B-11-00	4/19	0.018 - 0.024	0.87	NA	0.22	C	NA NA	SSL-MIGR SSL-INH	Yes	ASL
11096-82-5	AROCLOR-1260	0.17		0.35		mg/kg	17-B-11-00	2/19	0.018 - 0.024	0.35	NA	0.22	C	NA NA	SSL-MIGR SSL-INH	Yes	ASL
7421-93-4	ENDRIN ALDEHYDE	0.0013	J	0.0013	J	mg/kg	17-B-01-00	1/19	0.0018 -	0.0013	NA	1.8	N	NA NA	SSL-MIGR SSL-INH	No	BSL
53494-70-5	ENDRIN KETONE	0.00026	J	0.0054		mg/kg	17-B-12-00	4/18	0.0035 -	0.0054	NA	1.8	N	NA NA	SSL-MIGR SSL-INH	No	BSL
76-44-8	HEPTACHLOR	0.00048	J	0.0028	J	mg/kg	17-B-11-00	2/19	0.0018 -	0.0028	NA	0.11	C	1.1 4.2	SSL-MIGR SSL-INH	No	BSL
319-84-6	ALPHA-BHC	0.00067	J	0.00067	J	mg/kg	17-B-13-00	1/19	0.0018 -	0.00067	NA	0.09	C	0.000036 0.76	SSL-MIGR SSL-INH	Yes	ASL
319-85-7	BETA-BHC	0.0009	J	0.0009	J	mg/kg	17-B-04-00	1/19	0.0018 -	0.0009	NA	0.32	C	0.00013 6	SSL-MIGR SSL-INH	Yes	ASL
319-86-8	DELTA-BHC	0.0018	J	0.0018	J	mg/kg	17-B-16-00-D	1/19	0.0018 -	0.0018	NA	0.09	C	NA NA	SSL-MIGR SSL-INH	No	BSL
58-89-9	GAMMA-BHC (LINDANE)	0.00087	J	0.00087	J	mg/kg	17-B-13-00	1/19	0.0018 -	0.00087	0.0145	0.44	C	0.00047 NA	SSL-MIGR SSL-INH	Yes	ASL

TABLE 6-6

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Inorganics (mg/kg)																	
7429-90-5	Aluminum	3370		31800		mg/kg	17-B-07-00	19/19	---	31800	16900	7600	N	8.3 6860000	SSL-MIGR SSL-INH	Yes	ASL
7440-36-0	Antimony	26.6		31.4		mg/kg	17-B-11-00	2/19	0.3 - 0.76	31.4	0.33	3.1	N	0.27 NA	SSL-MIGR SSL-INH	Yes	ASL
7440-38-2	Arsenic	1.5		11.5		mg/kg	17-B-07-00	15/19	1.4 - 2.5	11.5	9.45	0.39	C	0.29 745	SSL-MIGR SSL-INH	Yes	ASL
7440-39-3	Barium	19		244		mg/kg	17-B-11-00	19/19	---	244	64.5	540	N	82 686000	SSL-MIGR SSL-INH	Yes	ASL
7440-41-7	Beryllium	0.47		1.7		mg/kg	17-B-16-00	12/19	0.27 - 0.46	1.7	0.58	15	N	32 1330	SSL-MIGR SSL-INH	No	BSL
7440-43-9	Cadmium	0.96		12.5		mg/kg	17-B-12-00	4/19	0.03 - 0.41	12.5	0.12	3.7	N	0.38 1780	SSL-MIGR SSL-INH	Yes	ASL
7440-70-2	Calcium	171		4840		mg/kg	17-B-02-00-D	19/19	---	4840	6120	NA		NA NA	SSL-MIGR SSL-INH	No	NUT, BKG
7440-47-3	Chromium	4.5		392		mg/kg	17-B-11-00	19/19	---	392	42.9	210	C	2.1 267	SSL-MIGR SSL-INH	Yes	ASL
7440-48-4	Cobalt	0.9		12.8		mg/kg	17-B-11-00	15/19	0.46 - 1.3	12.8	2.71	140	N	0.17 1140	SSL-MIGR SSL-INH	Yes	ASL
7440-50-8	Copper	2.1		1930		mg/kg	17-B-12-00	19/19	---	1930	3.23	310	N	560 NA	SSL-MIGR SSL-INH	Yes	ASL
7439-89-6	Iron	2810		45500		mg/kg	17-B-12-00	19/19	---	45500	67900	2300	N	NA NA	SSL-MIGR SSL-INH	No	BKG
7439-92-1	Lead	10.3		670		mg/kg	17-B-12-00	19/19	---	670	15.5	400		NA NA	SSL-MIGR SSL-INH	Yes	ASL
7439-95-4	Magnesium	226		1920		mg/kg	17-B-17-00	19/19	---	1920	746	NA		NA NA	SSL-MIGR SSL-INH	No	NUT
7439-96-5	Manganese	22.6	J	378		mg/kg	17-B-11-00	19/19	---	378	25.1	180	N	110 68600	SSL-MIGR SSL-INH	Yes	ASL
7439-97-6	Mercury	0.04		1.8		mg/kg	17-B-17-00-D	13/19	0.02 - 0.05	1.8	0.21	2.3	N	0.1 2.9	SSL-MIGR SSL-INH	Yes	ASL
7440-02-0	Nickel	2.4		348		mg/kg	17-B-11-00	18/19	1.2	348	12.1	160	N	14 NA	SSL-MIGR SSL-INH	Yes	ASL
7440-09-7	Potassium	160		1110		mg/kg	17-B-07-00	19/19	---	1110	225	NA		NA NA	SSL-MIGR SSL-INH	No	NUT
7440-23-5	Sodium	25.1		343		mg/kg	17-B-11-00	3/19	25.8 - 139	343	370	NA		NA NA	SSL-MIGR SSL-INH	No	NUT, BKG
7440-62-2	Vanadium	6.9		51.8		mg/kg	17-B-07-00	19/19	---	51.8	66.3	7.8	N	260 NA	SSL-MIGR SSL-INH	No	BKG
7440-66-6	Zinc	9.2		1510		mg/kg	17-B-11-00	18/19	8.3	1510	20.5	2300	N	680 NA	SSL-MIGR SSL-INH	Yes	ASL

TABLE 6-8

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 If the maximum inorganic concentration is greater than the Charleston NWS background concentration, (Baseline Background Study. Naval Weapons Station, Charleston, SC. TtNUS, March 2002), that inorganic is not selected as a COPC .
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 The "CAL- Modified PRG" is used as the screening value for trichloroethene (USEPA, Region 9, October 2004).

Surrogate Chemicals

Acenaphthene is used as a surrogate for acenaphthylene.
Pyrene is used as a surrogate for benzo(ghi)perylene, and phenanthrene.
Alpha-BHC is used as surrogate for delta-BHC.
Endrin is used as a surrogate for endrin aldehyde and endrin ketone.
Chlordane is used a surrogate for alpha and gamma-chlordane.
The PRG for chromium represents a 1:6 ratio of Cr VI:Cr III (USEPA Region 9, October 2004).

Associated Samples:

17-B-01-00	17-B-06-00	17-B-11-00	17-B-16-00
17-B-02-00	17-B-07-00	17-B-12-00	17-B-16-00-D
17-B-02-00-D	17-B-08-00	17-B-13-00	17-B-17-00
17-B-03-00	17-B-09-00	17-B-14-00	17-B-17-00-D
17-B-04-00	17-B-09-00-D	17-B-15-00	17-B-18-00
17-B-05-00	17-B-10-00	17-B-15-00-D	

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BKG = Within background levels
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient
NTX = No Toxicity Information

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
N = Noncarcinogen
NA = Not Applicable.
SSL-INH = Soil Screening Level for transfers from soil to air (Inhalation) calculated online at http://risk.lsd.ornl.gov/calc_start.shtml by the USEPA's Soil Screenng Guidance (USEPA, July 1996).
SSL-MIGR = Soil Screening Level for transfers from soil to groundwater for a Dilution and Attenuation Factor of 1 calculated online at http://risk.lsd.ornl.gov/calc_start.shtml (USEPA July 1996)

TABLE 6-7

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Suburface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Volatile Organics (mg/kg)																	
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.002	J	0.21		mg/kg	17-B-14-03	6/81	0.005 - 0.15	0.21	NA	0.41	C	0.00017 0.59	SSL-MIGR SSL-INH	Yes	ASL
79-00-5	1,1,2-TRICHLOROETHANE	0.001	J	0.27	J	mg/kg	17-B-17-05	12/82	0.005 - 0.15	0.27	NA	0.73	C	0.00091 0.98	SSL-MIGR SSL-INH	Yes	ASL
120-82-1	1,2,4-TRICHLOROBENZENE	0.002	J	0.002	J	mg/kg	17-B-17-05	1/76	0.005 - 0.16	0.002	NA	6.2	N	0.26 180	SSL-MIGR SSL-INH	No	BSL
95-63-6	1,2,4-TRIMETHYLBENZENE	0.005	J	0.005	J	mg/kg	17-B-25-03	1/20	0.005 - 0.007	0.005	NA	5.2	N	14 130	SSL-MIGR SSL-INH	No	BSL
95-50-1	1,2-DICHLOROBENZENE	0.002	J	0.002	J	mg/kg	17-B-17-05	1/76	0.005 - 0.16	0.002	NA	600	sat	0.86 600	SSL-MIGR SSL-INH	No	BSL
78-87-5	1,2-DICHLOROPROPANE	0.004	J	0.004	J	mg/kg	17-B-17-05	1/82	0.005 - 0.16	0.004	NA	0.34	C	0.0015 15	SSL-MIGR SSL-INH	Yes	ASL
541-73-1	1,3-DICHLOROBENZENE	0.003	J	0.003	J	mg/kg	17-B-17-05	1/76	0.005 - 0.16	0.003	NA	53	N	NA NA	SSL-MIGR SSL-INH	No	BSL
106-46-7	1,4-DICHLOROBENZENE	0.002	J	0.002	J	mg/kg	17-B-17-05	1/76	0.005 - 0.16	0.002	NA	3.4	C	0.11 11000	SSL-MIGR SSL-INH	No	BSL
78-93-3	2-BUTANONE	0.013	J	0.013	J	mg/kg	17-B-33-03	1/82	0.005 - 0.28	0.013	NA	2200	N	4.4 24000	SSL-MIGR SSL-INH	No	BSL
67-64-1	ACETONE	0.012	J	16		mg/kg	17-B-14-01	42/82	0.006 - 1.3	16	NA	1400	N	6.6	SSL-MIGR SSL-INH	Yes	ASL
71-43-2	BENZENE	0.002	J	0.002	J	mg/kg	17-B-17-05	2/82	0.005 - 0.16	0.002	NA	0.64	C	0.0017 0.84	SSL-MIGR SSL-INH	Yes	ASL
75-27-4	BROMODICHLOROMETHANE	0.004	J	0.16	J	mg/kg	17-B-14-03	3/82	0.005 - 0.15	0.16	NA	0.82	C	0.032 NA	SSL-MIGR SSL-INH	Yes	ASL
74-83-9	BROMOMETHANE	0.001	J	0.001	J	mg/kg	17-B-29-01	1/82	0.005 - 0.16	0.001	NA	0.39	N	0.012 9.5	SSL-MIGR SSL-INH	No	BSL
75-15-0	CARBON DISULFIDE	0.002	J	0.002	J	mg/kg	17-B-17-05	1/82	0.005 - 0.16	0.002	NA	36	N	1.5 720	SSL-MIGR SSL-INH	No	BSL
56-23-5	CARBON TETRACHLORIDE	0.018		5.2		mg/kg	17-B-14-03	3/82	0.005 - 0.15	5.2	NA	0.22	C	0.0033 0.33	SSL-MIGR SSL-INH	Yes	ASL
75-00-3	CHLOROETHANE	0.002	J	0.002	J	mg/kg	17-B-08-01	3/82	0.005 - 0.16	0.002	NA	3	C	NA 1200	SSL-MIGR SSL-INH	No	BSL
67-66-3	CHLOROFORM	0.002	J	9.1		mg/kg	17-B-14-03	10/82	0.005 - 0.14	9.1	NA	0.22	C	0.029 0.028	SSL-MIGR SSL-INH	Yes	ASL
74-87-3	CHLOROMETHANE	0.055	J	0.088	J	mg/kg	17-B-14-03	2/82	0.002 - 0.15	0.088	NA	4.7	N	0.002 2.1	SSL-MIGR SSL-INH	Yes	ASL
75-71-8	DICHLORODIFLUOROMETHANE	0.002	J	0.002	J	mg/kg	17-B-18-05	2/82	0.005 - 0.16	0.002	NA	9.4	N	28 250	SSL-MIGR SSL-INH	No	BSL
79-20-9	METHYL ACETATE	0.01		0.49		mg/kg	17-B-14-03	6/75	0.005 - 0.1	0.49	NA	2200	N	7.4 NA	SSL-MIGR SSL-INH	No	BSL
75-09-2	METHYLENE CHLORIDE	0.008	J	0.014	J	mg/kg	17-B-26-03	9/82	0.004 - 0.16	0.014	NA	9.1	C	0.0012 13	SSL-MIGR SSL-INH	Yes	ASL
127-18-4	TETRACHLOROETHENE	0.002	J	0.056	J	mg/kg	17-B-14-03	4/82	0.005 - 0.15	0.056	NA	0.48	C	0.0029 11	SSL-MIGR SSL-INH	Yes	ASL
108-88-3	TOLUENE	0.0007	J	0.003	J	mg/kg	17-B-17-05	2/82	0.005 - 0.16	0.003	NA	520	sat	0.59 650	SSL-MIGR SSL-INH	No	BSL
540-59-0	TOTAL 1,2-DICHLOROETHENE	0.005	J	0.21		mg/kg	17-B-30-02	7/24	0.006 - 0.016	0.21	NA	4.3	N	NA NA	SSL-MIGR SSL-INH	No	BSL
156-60-5	TRANS-1,2-DICHLOROETHENE	0.001	J	0.03		mg/kg	17-B-21-03	5/82	0.005 - 0.16	0.03	NA	6.9	N	0.034 NA	SSL-MIGR SSL-INH	No	BSL

TABLE 6-7

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
79-01-6	TRICHLOROETHENE(7)	0.001	J	910		mg/kg	17-B-17-03	24/82	0.005 - 0.15	910	NA	2.9	C	0.0028 0.071	SSL-MIGR SSL-INH	Yes	ASL
75-69-4	TRICHLOROFLUOROMETHANE	0.003	J	0.046		mg/kg	17-B-27-03	21/82	0.005 - 0.16	0.046	NA	39	N	8 1100	SSL-MIGR SSL-INH	No	BSL
75-01-4	VINYL CHLORIDE	0.005	J	0.005	J	mg/kg	17-B-17-03	1/82	0.005 - 0.28	0.005	NA	0.079	C	0.00067 0.28	SSL-MIGR SSL-INH	Yes	ASL
156-59-2	CIS-1,2-DICHLOROETHENE	0.003	J	1.3		mg/kg	17-B-17-03	15/82	0.005 - 0.16	1.3	NA	4.3	N	0.02 NA	SSL-MIGR SSL-INH	Yes	ASL
Semivolatile Organics (mg/kg)																	
121-14-2	2,4-DINITROTOLUENE	0.51		0.51		mg/kg	17-B-08-01	1/162	0.1 - 21	0.51	NA	12	N	0.000049 NA	SSL-MIGR SSL-INH	Yes	ASL
91-57-6	2-METHYLNAPHTHALENE	0.053	J	0.053	J	mg/kg	17-B-17-05	1/62	0.36 - 21	0.053	NA	5.6	N	NA NA	SSL-MIGR SSL-INH	No	BSL
100-52-7	BENZALDEHYDE	0.47		0.81		mg/kg	17-B-33-03	2/55	0.36 - 21	0.81	NA	610	N	0.86 NA	SSL-MIGR SSL-INH	No	BSL
56-55-3	BENZO(A)ANTHRACENE	0.024	J	0.024	J	mg/kg	17-B-17-03	1/62	0.36 - 21	0.024	0.43	0.62	C	0.16 NA	SSL-MIGR SSL-INH	No	BSL
205-99-2	BENZO(B)FLUORANTHENE	0.029	J	0.029	J	mg/kg	17-B-12-05	1/61	0.36 - 21	0.029	0.6	0.62	C	0.49 NA	SSL-MIGR SSL-INH	No	BSL
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.23	J	5.2		mg/kg	17-B-08-03	6/62	0.36 - 21	5.2	NA	35	C	180 NA	SSL-MIGR SSL-INH	No	BSL
85-68-7	BUTYL BENZYL PHTHALATE	0.024	J	0.033	J	mg/kg	17-B-17-05	2/62	0.36 - 21	0.033	NA	1200	N	840 NA	SSL-MIGR SSL-INH	No	BSL
84-74-2	DI-N-BUTYL PHTHALATE	0.04	J	1		mg/kg	17-B-33-03	4/62	0.36 - 21	1	NA	610	N	250 NA	SSL-MIGR SSL-INH	No	BSL
117-84-0	DI-N-OCTYL PHTHALATE	0.37		0.37		mg/kg	17-B-14-01	1/61	0.36 - 21	0.37	NA	240	N	240000 NA	SSL-MIGR SSL-INH	No	BSL
206-44-0	FLUORANTHENE	0.035	J	0.21	J	mg/kg	17-B-33-03	2/62	0.36 - 21	0.21	1.3	230	N	310 NA	SSL-MIGR SSL-INH	No	BSL
91-20-3	NAPHTHALENE	0.073	J	0.073	J	mg/kg	17-B-17-05	1/62	0.36 - 21	0.073	NA	5.6	N	3.1 170	SSL-MIGR SSL-INH	No	BSL
87-86-5	PENTACHLOROPHENOL	0.38	J	0.38	J	mg/kg	17-B-17-05	1/61	0.91 - 52	0.38	NA	3	C	0.0014 NA	SSL-MIGR SSL-INH	Yes	ASL
85-01-8	PHENANTHRENE	0.025	J	0.16	J	mg/kg	17-B-33-03	2/62	0.36 - 21	0.16	0.75	230	N	NA NA	SSL-MIGR SSL-INH	No	BSL
129-00-0	PYRENE	0.033	J	0.17	J	mg/kg	17-B-33-03	3/62	0.36 - 21	0.17	0.85	230	N	230 NA	SSL-MIGR SSL-INH	No	BSL
Pesticides/PCBs (mg/kg)																	
72-54-8	4,4'-DDD	0.0073		0.0073		mg/kg	17-B-33-03	1/62	0.002 - 0.41	0.0073	0.1	2.4	C	0.71 NA	SSL-MIGR SSL-INH	No	BSL
72-55-9	4,4'-DDE	0.0008	J	0.006		mg/kg	17-B-33-03	2/62	0.002 - 0.41	0.006	0.021	1.7	C	2.2 NA	SSL-MIGR SSL-INH	No	BSL
50-29-3	4,4'-DDT	0.00017	J	0.0039	J	mg/kg	17-B-10-03	8/62	0.002 - 0.41	0.0039	0.0591	1.7	C	1.3 750	SSL-MIGR SSL-INH	No	BSL
309-00-2	ALDRIN	0.00075	J	0.00075	J	mg/kg	17-B-18-01	1/62	0.0018 - 0.21	0.00075	NA	0.029	C	0.025 3.4	SSL-MIGR SSL-INH	No	BSL
11097-69-1	AROCLOR-1254	0.014	J	0.03		mg/kg	17-B-17-05	2/62	0.018 - 0.026	0.03	NA	0.22	C	NA NA	SSL-MIGR SSL-INH	No	BSL
60-57-1	DIELDRIN	0.00014	J	0.00021	J	mg/kg	17-B-11-01	1/62	0.002 - 0.41	0.00021	NA	0.03	C	0.00023 1.1	SSL-MIGR SSL-INH	No	BSL

TABLE 6-7

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
7421-93-4	ENDRIN ALDEHYDE	0.00072	J	0.0013	J	mg/kg	17-B-07-05-D	3/62	0.002 - 0.41	0.0013	NA	1.8	N	NA NA	SSL-MIGR SSL-INH	No	BSL
53494-70-5	ENDRIN KETONE	0.00079	J	0.0012	J	mg/kg	17-B-15-01	2/62	0.002 - 0.41	0.0012	NA	1.8	N	NA NA	SSL-MIGR SSL-INH	No	BSL
5103-74-2	GAMMA-CHLORDANE	0.067	J	0.067	J	mg/kg	17-B-14-03	1/62	0.0018 - 0.2	0.067	0.0145	1.6	C	0.48 72	SSL-MIGR SSL-INH	No	BSL
319-86-8	DELTA-BHC	0.0014	J	0.073	J	mg/kg	17-B-14-03	2/62	0.0018 - 0.2	0.073	NA	0.09	C	NA NA	SSL-MIGR SSL-INH	No	BSL
Explosives (mg/kg)																	
118-96-7	2,4,6-TRINITROTOLUENE	0.35		0.35		mg/kg	17-B-08-01	1/62	0.1 - 0.25	0.35	16900	3.1	N	0.00057 NA	SSL-MIGR SSL-INH	Yes	ASL
Inorganics (mg/kg)																	
7429-90-5	ALUMINUM	6100		52500		mg/kg	17-B-18-05	62/62	---	52500	16900	7600	N	8.3 6860000	SSL-MIGR SSL-INH	Yes	ASL
7440-38-2	ARSENIC	1.8		13.2		mg/kg	17-B-19-03	55/62	0.22 - 2.5	13.2	9.45	0.39	C	0.29 745	SSL-MIGR SSL-INH	Yes	ASL
7440-39-3	BARIUM	8.9		359		mg/kg	17-B-18-05	62/62	---	359	64.5	540	N	82 686000	SSL-MIGR SSL-INH	Yes	ASL
7440-41-7	BERYLLIUM	0.21		1.1		mg/kg	17-B-13-03	31/62	0.22 - 0.53	1.1	0.58	15	N	32 1330	SSL-MIGR SSL-INH	No	BSL
7440-43-9	CADMIUM	0.18		0.56		mg/kg	17-B-33-03	3/62	0.02 - 0.46	0.56	0.12	3.7	N	0.38 1780	SSL-MIGR SSL-INH	Yes	ASL
7440-70-2	CALCIUM	155		3420		mg/kg	17-B-03-01	62/62	---	3420	6120	NA		NA NA	SSL-MIGR SSL-INH	No	NUT, BKG
7440-47-3	CHROMIUM	9.9		62.7		mg/kg	17-B-18-05	62/62	---	62.7	42.9	210	C	2.1 267	SSL-MIGR SSL-INH	Yes	ASL
7440-48-4	COBALT	1.1		5.9		mg/kg	17-B-06-03	62/62	2.6	5.9	2.71	140	C	0.17 1140	SSL-MIGR SSL-INH	Yes	ASL
7440-50-8	COPPER	0.95		39.7		mg/kg	17-B-33-03	37/62	0.5 - 2.1	39.7	3.23	310	N	560 NA	SSL-MIGR SSL-INH	No	BSL
7439-89-6	IRON	4620		66500		mg/kg	17-B-16-03	62/62	---	66500	67900	2300	N	NA NA	SSL-MIGR SSL-INH	No	BKG
7439-92-1	LEAD	4.1		77.1		mg/kg	17-B-33-03	62/62	---	77.1	15.5	400		NA NA	SSL-MIGR SSL-INH	No	BSL
7439-95-4	MAGNESIUM	385		3900		mg/kg	17-B-18-05	62/62	---	3900	746	NA		NA NA	SSL-MIGR SSL-INH	No	NUT
7439-96-5	MANGANESE	12.2		71.5	J	mg/kg	17-B-31-02-D	62/62	---	71.5	25.1	180	N	110 68600	SSL-MIGR SSL-INH	No	BSL
7439-97-6	MERCURY	0.01		0.14		mg/kg	17-B-03-01	11/62	0.01 - 0.05	0.14	0.21	2.3	N	0.1 2.9	SSL-MIGR SSL-INH	No	BKG
7440-02-0	NICKEL	2.4		16		mg/kg	17-B-18-05	62/62	---	16	12.1	160	N	14 NA	SSL-MIGR SSL-INH	Yes	ASL
7440-09-7	POTASSIUM	270		1270		mg/kg	17-B-03-05	62/62	---	1270	225	NA		NA NA	SSL-MIGR SSL-INH	No	NUT
7440-22-4	SILVER	0.2		0.2		mg/kg	17-B-33-03	1/62	0.04 - 0.25	0.2	3.2	39	N	1.6 NA	SSL-MIGR SSL-INH	No	BSL,BKG
7440-23-5	SODIUM	22.6		981		mg/kg	17-B-34-06	21/62	18.5 - 235	981	370	NA		NA NA	SSL-MIGR SSL-INH	No	NUT
7440-28-0	THALLIUM	0.44		1		mg/kg	17-B-11-01-D	3/62	0.32 - 1.7	1	1.63	0.52	N	0.056 NA	SSL-MIGR SSL-INH	No	BKG

TABLE 6-7

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
7440-62-2	VANADIUM	12.7		68.9		mg/kg	17-B-18-05	62/62	---	68.9	66.3	7.8	N	260 NA	SSL-MIGR SSL-INH	Yes	ASL
7440-66-6	ZINC	5.8		1240		mg/kg	17-B-14-03	57/62	12.1 - 30.5	1240	20.5	2300	N	680 NA	SSL-MIGR SSL-INH	Yes	ASL
57-12-5	CYANIDE	0.21	J	5		mg/kg	17-B-17-05	8/62	1.1 - 1.5	5	NA	120	N	2 NA	SSL-MIGR SSL-INH	Yes	ASL

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 If the maximum inorganic concentration is greater than the Charleston NWS background concentration, (Baseline Background Study. Naval Weapons Station, Charleston, SC. TtNUS, March 2002), that inorganic is not selected as a COPC .
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 The "CAL- Modified PRG" is used as the screening value for trichloroethene (USEPA, Region 9, October 2004).

Surrogate Chemicals

Naphthalene is used as a surrogate for 2-methylnaphthalene.
Pyrene is used as a surrogate for benzo(ghi)perylene, and phenanthrene.
Alpha-BHC is used as surrogate for delta-BHC.
Endrin is used as a surrogate for endrin aldehyde and endrin ketone.
Chlordane is used a surrogate for gamma-chlordane.
The PRG for chromium represents a 1:6 ratio of Cr VI:Cr III (USEPA Region 9, October 2004).

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BSL = Below COPC Screening Level/ARAR/TBC
NTX = No Toxicity Information
NUT = Essential Nutrient

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
N = Noncarcinogen
NA = Not Applicable.
SSL-INH = Soil Screening Level for transfers from soil to air (Inhalation) calculated online at http://risk.lsd.ornl.gov/calc_start.shtml by the USEPA's Soil Screenng Guidance (USEPA, July 1996).
SSL-MIGR = Soil Screening Level for transfers from soil to groundwater for a Dilution and Attenuation Factor of 1 calculated online at http://risk.lsd.ornl.gov/calc_start.shtml (USEPA July 1996)

TABLE 6-7

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)

Associated Samples:

17-B-01-01	17-B-06-05	17-B-12-01	17-B-18-01	17-B-25-03
17-B-01-03	17-B-07-01	17-B-12-03	17-B-18-03	17-B-26-01
17-B-01-05	17-B-07-03	17-B-12-05	17-B-18-05	17-B-26-03
17-B-02-01	17-B-07-05	17-B-13-01	17-B-19-01	17-B-26-03-D
17-B-02-03	17-B-07-05-D	17-B-13-03	17-B-19-03	17-B-27-01
17-B-02-05	17-B-08-01	17-B-13-05	17-B-19-05	17-B-27-03
17-B-03-01	17-B-08-03	17-B-14-01	17-B-20-01	17-B-28-01
17-B-03-03	17-B-08-05	17-B-14-03	17-B-20-03	17-B-28-03
17-B-03-05	17-B-09-01	17-B-14-05	17-B-21-01	17-B-29-01
17-B-04-01	17-B-09-03	17-B-15-01	17-B-21-03	17-B-29-03
17-B-04-03	17-B-09-05	17-B-15-03	17-B-22-01	17-B-30-02
17-B-04-05	17-B-10-01	17-B-15-05	17-B-22-01-D	17-B-31-02
17-B-04-05-D	17-B-10-03	17-B-16-01	17-B-22-03	17-B-31-02-D
17-B-05-01	17-B-10-05	17-B-16-03	17-B-23-01	17-B-32-03
17-B-05-03	17-B-11-01	17-B-16-05	17-B-23-03	17-B-33-03
17-B-05-05	17-B-11-01-D	17-B-17-01	17-B-24-01	17-B-34-06
17-B-06-01	17-B-11-03	17-B-17-03	17-B-24-03	
17-B-06-03	17-B-11-05	17-B-17-05	17-B-25-01	

TABLE 6-8

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Volatile Organics (ug/L)																	
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.6	J	140		ug/L	17-Q-13-0403	15/92	5 - 100	140	NA	0.055	C	NA	FED-MCL	Yes	ASL
79-00-5	1,1,2-TRICHLOROETHANE	0.5	J	93		ug/L	17-G-07S-0205	19/92	5 - 100	93	NA	0.2	C	5	FED-MCL	Yes	ASL
76-13-1	1,1,2-TRICHLOROTRIFLUOROETHANE	0.3	J	2500	J	ug/L	17-Q-28-0403	38/84	5 - 50	2500	NA	5900	N	NA	FED-MCL	No	BSL
75-34-3	1,1-DICHLOROETHANE	0.2	J	5	J	ug/L	17-G-07S-0205	12/88	5 - 100	5	NA	81	N	NA	FED-MCL	No	BSL
75-35-4	1,1-DICHLOROETHENE	0.4	J	11	J	ug/L	17-G-07S-0205	27/92	5 - 100	11	NA	34	N	7	FED-MCL	Yes	ASL
107-06-2	1,2-DICHLOROETHANE	0.6	J	14		ug/L	17-Q-56-0105	8/88	5 - 100	14	NA	0.12	C	5	FED-MCL	Yes	ASL
78-87-5	1,2-DICHLOROPROPANE	1	J	2	J	ug/L	17-Q-25D-0403	2/88	5 - 100	2	NA	0.16	C	5	FED-MCL	Yes	ASL
67-64-1	ACETONE	2	J	20	J	ug/L	17-Q-41-0105	6/33	5 - 23	20	NA	550	N	NA	FED-MCL	No	BSL
71-43-2	BENZENE	0.2	J	35		ug/L	17-G-05S-0205-D	24/92	5 - 100	35	NA	0.35	C	5	FED-MCL	Yes	ASL
75-27-4	BROMODICHLOROMETHANE	4	J	4	J	ug/L	17-G-05S-0205	1/88	5 - 100	4	NA	0.18	C	80	FED-MCL	Yes	ASL
75-15-0	CARBON DISULFIDE	0.3	J	0.3	J	ug/L	17-Q-25D-0403	3/88	5 - 100	0.3	NA	100	N	NA	FED-MCL	No	BSL
56-23-5	CARBON TETRACHLORIDE	1	J	68		ug/L	17-Q-56-0105	5/88	5 - 100	68	NA	0.17	C	5	FED-MCL	Yes	ASL
67-66-3	CHLOROFORM	0.4	J	770		ug/L	17-G-07S-0205	28/104	0.5 - 50	770	NA	0.17	C	80	FED-MCL	Yes	ASL
156-59-2	CIS-1,2-DICHLOROETHENE	0.5	J	2500		ug/L	17MW6S	54/104	0.5 - 5	2500	NA	6.1	N	70	FED-MCL	Yes	ASL
75-71-8	DICHLORODIFLUOROMETHANE	2	J	380	J	ug/L	17-Q-19-0403	20/92	5 - 100	380	NA	39	N	NA	FED-MCL	Yes	ASL
74-84-0	ETHANE	0.01		0.2		ug/L	17-PSTW-4	16/16	---	0.2	NA	NA		NA	FED-MCL	No	NTX
74-85-1	ETHENE	0.02		1.77		ug/L	17-PSTW-5	16/16	---	1.77	NA	NA		NA	FED-MCL	No	NTX
100-41-4	ETHYLBENZENE	0.2	J	0.2	J	ug/L	17-Q-19-0403	1/88	5 - 100	0.2	NA	130	N	700	FED-MCL	No	BSL
TTNUS054	M+P-XYLENES	0.2	J	0.4	J	ug/L	17-Q-19-0403	3/73	5 - 200	0.4	NA	21	N	10000	FED-MCL	No	BSL
74-82-8	METHANE	10.2		113.9		ug/L	17-PSTW-9	16/16	---	113.9	NA	NA		NA	FED-MCL	No	NTX
108-87-2	METHYL CYCLOHEXANE	0.8	J	95		ug/L	17-Q-19-0403	2/84	5 - 100	95	NA	520	N	NA	FED-MCL	No	BSL
75-09-2	METHYLENE CHLORIDE	7		19		ug/L	17-Q-19-0403	2/92	1 - 200	19	NA	4.3	C	5	FED-MCL	Yes	ASL
91-20-3	NAPHTHALENE	3	J	3	J	ug/L	17-G-07S-0205	1/46	10 - 50	3	NA	0.62	N	NA	FED-MCL	Yes	ASL
95-47-6	O-XYLENE	0.2	J	0.8	J	ug/L	17-Q-19-0403	5/73	5 - 100	0.8	NA	21	N	10000	FED-MCL	No	BSL
127-18-4	TETRACHLOROETHENE	0.5	J	330		ug/L	17-G-22S-0205	28/92	5 - 100	330	NA	0.1	C	5	FED-MCL	Yes	ASL
108-88-3	TOLUENE	0.2	J	98		ug/L	17-Q-10S-0302	17/92	5 - 100	98	NA	72	N	1000	FED-MCL	Yes	ASL
540-59-0	TOTAL 1,2-DICHLOROETHENE	0.6	J	1000		ug/L	17-G-07S-0205	36/69	5 - 10	1000	NA	6.1	N	NA	FED-MCL	Yes	ASL
1330-20-7	TOTAL XYLENES	0.3	J	1	J	ug/L	17-Q-19-0403	6/92	5 - 300	1	NA	21	N	10000	FED-MCL	No	BSL
156-60-5	TRANS-1,2-DICHLOROETHENE	0.3	J	25		ug/L	17-PSTW-13	21/104	0.5 - 100	25	NA	12	N	100	FED-MCL	Yes	ASL
79-01-6	TRICHLOROETHENE(7)	0.3	J	130000		ug/L	17-G-07S-0205	62/104	5 - 8	130000	NA	1.4	C	5	FED-MCL	Yes	ASL
75-69-4	TRICHLOROFLUOROMETHANE	0.5	J	14		ug/L	17-Q-28-0403	10/88	5 - 100	14	NA	130	N	NA	FED-MCL	No	BSL
75-01-4	VINYL CHLORIDE	0.4	J	21	J	ug/L	17-G-07S-0205	18/92	2 - 100	21	NA	0.02	C	2	FED-MCL	Yes	ASL
Semivolatile Organics (ug/L)																	
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	8	J	54		ug/L	17-G-14S-0305	3/42	10 - 11	54	NA	4.8	C	6	FED-MCL	Yes	ASL
105-60-2	CAPROLACTAM	5	J	5	J	ug/L	17-Q-35-0105	1/38	10 - 11	5	NA	1800	N	NA	FED-MCL	No	BSL
84-74-2	DI-N-BUTYL PHTHALATE	2	J	8	J	ug/L	17-G-12S-0205-D	7/42	10 - 11	8	NA	360	N	NA	FED-MCL	No	BSL
84-66-2	DIETHYL PHTHALATE	2	J	2	J	ug/L	17-G-07S-0205	1/42	10 - 11	2	NA	2900	N	NA	FED-MCL	No	BSL
Explosives (ug/L)																	
121-82-4	RDX	0.92		2.1		ug/L	17-G-05S-0205-D	2/43	0.16 - 2.7	2.1	NA	0.61	C	NA	FED-MCL	Yes	ASL
Inorganics (ug/L)																	
7429-90-5	ALUMINUM	117		39000		ug/L	17-G-16S-0305	18/43	18.2 - 638	39000	1150000	3600	N	50	FED-SMCL	No	BKG
7440-36-0	ANTIMONY	3.9		5.6		ug/L	17-G-18S-0205	2/43	2.34 - 4.3	5.6	ND	1.5	N	6	FED-MCL	Yes	ASL
7440-38-2	ARSENIC	3.8		22.7		ug/L	17-G-12D-0205	11/43	2.8 - 14.2	22.7	4.4	0.045	C	10	FED-MCL	Yes	ASL
7440-39-3	BARIUM	3.4		1920		ug/L	17-G-14S-0305	43/43	---	1920	300	260	N	2000	FED-MCL	Yes	ASL
7440-41-7	BERYLLIUM	0.42		43.6		ug/L	17-G-14S-0305	14/43	0.25 - 1.4	43.6	2.3	7.3	N	4	FED-MCL	Yes	ASL

TABLE 6-8

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
7440-70-2	CALCIUM	663		929000		ug/L	17-G-14D-0305	43/43	---	929000	583000	NA		NA	FED-MCL	No	NUT
7440-47-3	CHROMIUM	10.3		19.7		ug/L	17-Q-42-0105	4/43	0.8 - 7.1	19.7	44.5	11	N	100	FED-MCL	No	BKG
7440-48-4	COBALT	0.78		988		ug/L	17-G-14S-0305	29/43	0.64 - 4.3	988	16	73	N	NA	FED-MCL	Yes	ASL
7440-50-8	COPPER	6.7		24.9		ug/L	17-G-03S-0205-D	7/43	0.86 - 14.6	24.9	7	150	N	1300	FED-AL	No	BSL
7439-89-6	IRON	84		360000		ug/L	17-G-18S-0205	40/43	42.9 - 123	360000	521000	1100	N	300	FED-SMCL	No	BKG
7439-92-1	LEAD	2.3		4.2		ug/L	17-G-16S-0305	6/43	1.7 - 3.6	4.2	15	NA		15	FED-AL	No	BSL,BKG
7439-95-4	MAGNESIUM	825		270000		ug/L	17-G-16S-0305	43/43	---	270000	11700	NA		NA	FED-MCL	No	NUT
7439-96-5	MANGANESE	9.7		4850		ug/L	17-G-17S-0205	43/43	---	4850	2580	88	N	50	FED-SMCL	Yes	ASL
7439-97-6	MERCURY	0.01		0.03		ug/L	17-G-04S-0205	11/43	0.01 - 0.06	0.03	ND	1.1	N	2	FED-MCL	No	BSL
7440-02-0	NICKEL	10.8		508		ug/L	17-G-14S-0305	15/43	2.6 - 57.3	508	24.7	73	N	NA	FED-MCL	Yes	ASL
7440-09-7	POTASSIUM	257		12700		ug/L	17-G-18D-0205	35/43	238 - 6210	12700	5200	NA		NA	FED-MCL	No	NUT
7782-49-2	SELENIUM	3.8		3.8		ug/L	17-Q-42-0105	1/43	3.71 - 4.1	3.8	ND	18	N	50	FED-MCL	No	BSL
7440-23-5	SODIUM	18600		2800000		ug/L	17-G-16S-0305	43/43	---	2800000	208000	NA		NA	FED-MCL	No	NUT
7440-62-2	VANADIUM	1		30		ug/L	17-Q-42-0105	13/43	0.75 - 5.07	30	78.8	3.6	N	NA	FED-MCL	No	BKG
7440-66-6	ZINC	7.9		590		ug/L	17-G-14S-0305	29/43	2.5 - 15.5	590	153	1100	N	5000	FED-SMCL	No	BSL
Miscellaneous Parameters (ug/L)																	
24959-67-9	BROMIDE	500		7900		ug/L	17-PSTW-15	12/12	---	7900	NA	NA		NA	FED-MCL	No	NTX
16887-00-6	CHLORIDE	51000		2800000		ug/L	17-PSTW-15	12/12	---	2800000	NA	NA		250000	FED-SMCL	Yes	ASL
57-12-5	CYANIDE	4.2	J	4.2	J	ug/L	17-G-20S-0205	1/43	10	4.2	NA	73	N	200	FED-MCL	No	BSL
14808-79-8	SULFATE	34000		320000		ug/L	17-PSTW-15	12/12	---	320000	NA	NA		250000	FED-SMCL	Yes	ASL

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 If the maximum inorganic concentration is greater than the Charleston NWS background concentration, (Baseline Background Study. Naval Weapons Station, Charleston, SC. TtNUS, March 2002), that inorganic is not selected as a COPC .
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 The "CAL- Modified PRG" is used as the screening value for trichloroethene (USEPA, Region 9, October 2004).

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BKG = Within background levels
BSL = Below COPC Screening Level/ARAR/TBC
NTX = No Toxicity Information
NUT = Essential Nutrient

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
N = Noncarcinogen
NA = Not Applicable.
FED-MCL = Federal Maximum Contaminant Level (USEPA, Winter 2004)
FED-SMCL = Federal Secondary Maximum Contaminant Level (USEPA, Winter 2004
FED-AL = Federal Action Level (USEPA, Winter 2004)

TABLE 6-8

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)

Associated Samples:

17-G-01S-0205,17MW01,20050224
17-G-02S-0205,17MW02S,20050227
17-G-03S-0205,17MW03S,20050214
17-G-03S-0205-AVG,17MW03S,20050214
17-G-03S-0205-D,17MW03S,20050214
17-G-04S-0205,17MW04S,20050227
17-G-05S-0205,17MW05S,20050225
17-G-05S-0205-AVG,17MW05S,20050225
17-G-05S-0205-D,17MW05S,20050225
17-G-06D-0205,17MW06D,20050224
17-G-07S-0205,17MW07S,20050228
17-G-11S-0205,17MIP03-TW29-MW11S,20050223
17-G-12D-0205,17MW12D,20050228
17-G-12D-0205-AVG,17MW12D,20050228
17-G-12D-0205-D,17MW12D,20050228
17-G-12S-0205,17MIP29-TW38-MW12S,20050225
17-G-12S-0205-AVG,17MIP29-TW38-MW12S,20050225
17-G-12S-0205-D,17MIP29-TW38-MW12S,20050225
17-G-13S-0205,17MW13S,20050227
17-G-14D-0305,17MW14D,20050309
17-G-14S-0305,17MIP38-TW47-MW14S,20050309
17-G-15D-0305,17MW15D,20050309
17-G-15S-0305,17MIP39-TW48-MW15S,20050309
17-G-16D-0305,17MW16D,20050308
17-G-16I-0305,17MIP40-TW49-MW16I,20050308
17-G-16S-0305,17MW16S,20050308
17-G-17D-0305,17MW17D,20050308
17-G-17I-0205,17MIP41-TW50-MW17I,20050226
17-G-17S-0205,17MW17S,20050226
17-G-18D-0205,17MW18D,20050226
17-G-18S-0205,17MIP42-TW51-MW18S,20050226
17-G-19S-0205,17MIP43-TW52-MW19S,20050224
17-G-20S-0205,17MIP48-TW57-MW20S,20050227
17-G-21S-0205,17MW21S,20050215
17-G-22S-0205,17MIP02-TW30-MW22S,20050223
17-G-22S-0205-AVG,17MIP02-TW30-MW22S,20050223
17-G-22S-0205-D,17MIP02-TW30-MW22S,20050223
17-G-23S-0205,17MW23S,20050224
17-PSTW-10,17-PSTW-10,20041110
17-PSTW-11,17-PSTW-11,20041110
17-PSTW-12,17-PSTW-12,20041110
17-PSTW-13,17-PSTW-13,20041110
17-PSTW-14,17-PSTW-14,20041110
17-PSTW-15,17-PSTW-15,20041110
17-PSTW-4,17-PSTW-4,20041109
17-PSTW-5,17-PSTW-5,20041109
17-PSTW-6,17-PSTW-6,20041109
17-PSTW-7,17-PSTW-7,20041110
17-PSTW-8,17-PSTW-8,20041110
17-PSTW-9,17-PSTW-9,20041110
17-Q-01-0302,17TW01S,20020307
17-Q-02-0302,17TW02S,20020307
17-Q-03-0302,17TW03,20020307
17-Q-04-0302,17TW04S,20020307
17-Q-05-0302,17TW05S,20020308
17-Q-06D-0302,17TW06D,20020308
17-Q-06S-0302,17TW06S,20020308
17-Q-07D0302,17TW07D,20020308
17-Q-07S-0302,17TW07S,20020307
17-Q-08D-0302,17TW08D,20020308
17-Q-08S-0302,17TW08S,20020308
17-Q-09D-0302,17TW09D,20020309
17-Q-09S-0302,17TW09S,20020309
17-Q-10D-0302,17TW10D,20020308
17-Q-10S-0302,17TW10S,20020308
17-Q-11-0403,17MIP11-TW11,20030426
17-Q-12-0403,17MIP12-TW12,20030426
17-Q-13-0403,17MIP21-TW13,20030426
17-Q-14-0403,17MIP16-TW14,20030426
17-Q-15-0403,17MIP15-TW15,20030426
17-Q-15-0403-AVG,17MIP15-TW15,20030426
17-Q-15-0403-D,17MIP15-TW15,20030426
17-Q-16-0403,17MIP13-TW16,20030426
17-Q-17-0403,17MIP18-TW17,20030426
17-Q-18-0403,17MIP19-TW18,20030426
17-Q-19-0403,17MIP20-TW19,20030427
17-Q-20-0403,17MIP17-TW20,20030427
17-Q-21-0403,17MIP09-TW21,20030427
17-Q-22-0403,17MIP14-TW22,20030427
17-Q-23-0403,17MIP08-TW23,20030427
17-Q-24-0403,17MIP07-TW24,20030427
17-Q-25D-0403,17MIP10-TW25SD,20030427
17-Q-25S-0403,17MIP10-TW25SD,20030427
17-Q-26-0403,17MIP06-TW26,20030427
17-Q-26-0403-AVG,17MIP06-TW26,20030427
17-Q-26-0403-D,17MIP06-TW26,20030427
17-Q-27-0403,17MIP05-TW27,20030427
17-Q-28-0403,17MIP04-TW28,20030427
17-Q-31-0403,17MIP01-TW31,20030427
17-Q-32-0105,17MIP23-TW32,20050115
17-Q-32-0105-AVG,17MIP23-TW32,20050115
17-Q-32-0105-D,17MIP23-TW32,20050115
17-Q-33-0105,17MIP24-TW33,20050117
17-Q-34-0105,17MIP25-TW34,20050115
17-Q-35-0105,17MIP26-TW35,20050117
17-Q-36-0105,17MIP27-TW36,20050117
17-Q-37-0105,17MIP28-TW37,20050116
17-Q-39-0105,17MIP30-TW39,20050116
17-Q-39-0105-AVG,17MIP30-TW39,20050116
17-Q-39-0105-D,17MIP30-TW39,20050116
17-Q-40-0105,17MIP31-TW40,20050116
17-Q-41-0105,17MIP32-TW41,20050117
17-Q-42-0105,17MIP33-TW42,20050117
17-Q-43-0105,17MIP34-TW43,20050116
17-Q-44-0105,17MIP35-TW44,20050117
17-Q-45-0105,17MIP36-TW45,20050117
17-Q-46-0105,17MIP37-TW46,20050116
17-Q-53-0105,17MIP44-TW53,20050115
17-Q-54-0105,17MIP45-TW54,20050115
17-Q-54-0105-AVG,17MIP45-TW54,20050115
17-Q-54-0105-D,17MIP45-TW54,20050115
17-Q-55-0105,17MIP46-TW55,20050117
17-Q-56-0105,17MIP47-TW56,20050115
17-Q-56-0105-AVG,17MIP47-TW56,20050115
17-Q-56-0105-D,17MIP47-TW56,20050115
17-Q-58-0105,17MIP49-TW58,20050116
17-Q-59-0105,17MIP50-TW59,20050115
17-Q-60-0105,17MIP51-TW60,20050117
17-Q-61-0105,17MIP52-TW61,20050117
17-Q-62-0105,17MIP53-TW62,20050116
17-Q-63-0105,17MIP54-TW63,20050116
17-Q-64-0105,17MIP55-TW64,20050116
17MW6S,17MW06S,20041116
17PS-01,17-PS-1,20040401
17PS-02,17-PS-2,20040401
17PS-03,17-PS-3,20040401

TABLE 6-9

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE WATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Inorganics (ug/L)																	
7429-90-5	ALUMINUM	1400		1400		ug/L	17-W-01-1001	1/1	---	1400	3520	3600	N	NA	FED-AWQC	No	BSL,BKG
7440-36-0	ANTIMONY	5.5		5.5		ug/L	17-W-01-1001	1/1	---	5.5	ND	1.5	N	5.6	FED-AWQC	Yes	ASL
7440-38-2	ARSENIC	4.4		4.4		ug/L	17-W-01-1001	1/1	---	4.4	6.8	0.045	C	0.018	FED-AWQC	No	BKG
7440-39-3	BARIUM	47.3		47.3		ug/L	17-W-01-1001	1/1	---	47.3	46.6	260	N	1000	FED-AWQC	No	BSL
7440-70-2	CALCIUM	167000		167000		ug/L	17-W-01-1001	1/1	---	167000	226000	NA		NA	FED-AWQC	No	N UT
7440-48-4	COBALT	2.9		2.9		ug/L	17-W-01-1001	1/1	---	2.9	NA	73	N	NA	FED-AWQC	No	BSL
7439-89-6	IRON	2740		2740		ug/L	17-W-01-1001	1/1	---	2740	2480	1100	N	300	FED-AWQC	Yes	ASL
7439-95-4	MAGNESIUM	488000		488000		ug/L	17-W-01-1001	1/1	---	488000	610000	NA		NA	FED-AWQC	No	NUT
7439-96-5	MANGANESE	169		169		ug/L	17-W-01-1001	1/1	---	169	106	88	N	50	FED-AWQC	Yes	ASL
7440-09-7	POTASSIUM	143000		143000		ug/L	17-W-01-1001	1/1	---	143000	354000	NA		NA	FED-AWQC	No	NUT
7440-22-4	SILVER	1.3		1.3		ug/L	17-W-01-1001	1/1	---	1.3	ND	18	N	NA	FED-AWQC	No	BSL
7440-23-5	SODIUM	4100000		4100000		ug/L	17-W-01-1001	1/1	---	4100000	4300000	NA		NA	FED-AWQC	No	NUT
7440-62-2	VANADIUM	5.2		5.2		ug/L	17-W-01-1001	1/1	---	5.2	11	3.6	N	NA	FED-AWQC	No	BKG
7440-66-6	ZINC	16.4		16.4		ug/L	17-W-01-1001	1/1	---	16.4	NA	1100	N	7400	FED-AWQC	No	BSL

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 If the maximum inorganic concentration is greater than the concentration at the upgradient location, 23SW/SD08, that inorganic is not selected as a COPC .
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).

Associated Samples:

17-W-01-1001

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BKG = Within background levels
BSL = Below COPC Screening Level/ARAR/TBC
NTX = No Toxicity Information
NUT = Essential Nutrient

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
N = Noncarcinogen
NA = Not Applicable.
FED-AWQC = Nationl Recommended Water Quality Criteria for Priority Toxic Pollutants, Human Health for Consumption of Water and Organisms (USEPA, 2004).

TABLE 6-10

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SEDIMENT
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: *Current/Future*
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Volatile Organics (mg/kg)																	
75-15-0	CARBON DISULFIDE	0.019	J	0.019	J	mg/kg	17-D-01-1001	1/1	---	0.019	NA	36	N	NA	NA	No	BSL
Pesticides/PCBs (mg/kg)																	
72-55-9	4,4'-DDE	0.0036	J	0.0036	J	mg/kg	17-D-01-1001	1/1	---	0.0036	NA	1.7	C	NA	NA	No	BSL
1031-07-8	ENDOSULFAN SULFATE	0.0028	J	0.0028	J	mg/kg	17-D-01-1001	1/1	---	0.0028	NA	37	N	NA	NA	No	BSL
76-44-8	HEPTACHLOR	0.0015	J	0.0015	J	mg/kg	17-D-01-1001	1/1	---	0.0015	NA	0.11	C	NA	NA	No	BSL
Inorganics (mg/kg)																	
7429-90-5	ALUMINUM	20900		20900		mg/kg	17-D-01-1001	1/1	---	20900	52800	7600	N	NA	NA	No	BKG
7440-38-2	ARSENIC	9.4		9.4		mg/kg	17-D-01-1001	1/1	---	9.4	36.6	0.39	C	NA	NA	No	BKG
7440-39-3	BARIUM	27.6		27.6		mg/kg	17-D-01-1001	1/1	---	27.6	72.4	540	N	NA	NA	No	BSL,BKG
7440-41-7	BERYLLIUM	1.3		1.3		mg/kg	17-D-01-1001	1/1	---	1.3	3.2	15	N	NA	NA	No	BSL,BKG
7440-70-2	CALCIUM	2410		2410		mg/kg	17-D-01-1001	1/1	---	2410	14760	---		NA	NA	No	NUT, BKG
7440-47-3	CHROMIUM	40.2		40.2		mg/kg	17-D-01-1001	1/1	---	40.2	113.6	210	N	NA	NA	No	BSL,BKG
7440-48-4	COBALT	10.5		10.5		mg/kg	17-D-01-1001	1/1	---	10.5	22.6	140	N	NA	NA	No	BSL,BKG
7440-50-8	COPPER	18.4		18.4		mg/kg	17-D-01-1001	1/1	---	18.4	57.4	310	N	NA	NA	No	BSL,BKG
7439-89-6	IRON	24500		24500		mg/kg	17-D-01-1001	1/1	---	24500	69200	2300	N	NA	NA	No	BKG
7439-92-1	LEAD	35.2		35.2		mg/kg	17-D-01-1001	1/1	---	35.2	53.6	400	N	NA	NA	No	BSL,BKG
7439-95-4	MAGNESIUM	5070		5070		mg/kg	17-D-01-1001	1/1	---	5070	13100	---		NA	NA	No	NUT, BKG
7439-96-5	MANGANESE	256		256		mg/kg	17-D-01-1001	1/1	---	256	704	180	N	NA	NA	No	BKG
7439-97-6	MERCURY	0.39		0.39		mg/kg	17-D-01-1001	1/1	---	0.39	0.28	2.3	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	2480		2480		mg/kg	17-D-01-1001	1/1	---	2480	6960	---		NA	NA	No	NUT
7440-23-5	SODIUM	11500		11500		mg/kg	17-D-01-1001	1/1	---	11500	15200	---	N	NA	NA	No	NUT
7440-62-2	VANADIUM	60.9		60.9		mg/kg	17-D-01-1001	1/1	---	60.9	127.4	7.8		NA	NA	No	BKG
7440-66-6	ZINC	73.4		73.4		mg/kg	17-D-01-1001	1/1	---	73.4	162.2	2300	N	NA	NA	No	BSL,BKG

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 If the maximum inorganic concentration is greater than the concentration at the upgradient location, 23SW/SD08, that inorganic is not selected as a COPC .
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).

Surrogate Chemicals

Endosulfan is used as a surrogate for endosulfan sulfate.
The PRG for chromium represents a 1:6 ratio of Cr VI:Cr III (USEPA Region 9, October 2004).

Associated Sample:

17-D-01-1001

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BKG = Within background levels
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
N = Noncarcinogen
NA = Not Applicable.

TABLE 6-11

EXPOSURE POINT CONCENTRATIONS FOR COPCs
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Exposure Point Concentration				
	Surface Soil(1) (mg/kg)	Subsurface Soil(2) (mg/kg)	Surface Water(1) (µg/L)	Sediment(1) (mg/kg)	Groundwater(3) (µg/L)
Tetrachloroethene			0.7		
Trichloroethene					32
Vinyl Chloride					
Benzo(a)anthracene		0.4			
Benzo(a)pyrene		0.5		0.16	
Benzo(b)fluoranthene		0.5		1.1	
Carbazole		0.2(1)			
Chrysene		0.5			
Bis(2-ethylhexyl)phthalate	4950				11
2,4-Dinitrotoluene			0.66		
Aroclor-1254	50	1(5)			
Aroclor-1260		0.32(5)			
alpha-BHC		0.0033(4)			
gamma-BHC (Lindane)		0.002(4)			
Aluminum		36400	11000		
Antimony	110	11(5)	11.8		
Arsenic		20.5			
Barium	179	580			
Cadmium	52.4	17.3(5)			
Chromium	573	79.4			
Cobalt		10.2			
Copper		992(4)			
Iron		53300	9980		
Lead	2760(6)		4.4(6)		
Manganese		311	388		
Mercury		0.2			
Nickel		86			
Silver		14.8(5)			
Thallium		1.6			
Vanadium		70	24.2		
Zinc		15600			

BLANK SPACES INDICATE THAT THE CHEMICAL WAS NOT SELECTED AS A COPC FOR THE SPECIFIED MEDIUM.

1 - Dataset consists of less than 10 samples. Therefore, the maximum concentration is used as the EPC.
2 - UCLs calculated according to the USEPA's ProUCL guidance, unless otherwise noted. See RAGS - Part D Table 3s in Appendix F for details concerning the UCLs.
3 - The maximum concentration is used as the EPC for groundwater (See Section 6.2.3).
4 - UCL is greater than the maximum concentration. Therefore, the maximum concentration is used as the EPC.
5 - The maximum concentration is used as the EPC based on low frequency of detection (See Section 6.2.3).
6 - The EPC for lead is the arithmetic average, as recommended by USEPA guidance (USEPA, August 2005).

TABLE 6-12

EXPOSURE POINT CONCENTRATIONS FOR COPCs
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Exposure Point Concentration				
	Surface Soil(1) (mg/kg)	Subsurface Soil(1) (mg/kg)	Surface Water(2) (µg/L)	Sediment(2) (mg/kg)	Groundwater(3) (µg/L)
1,1,2,2-Tetrachloroethane		0.21(4)			140
1,1,2-Trichloroethane		0.27(4)			93
1,1-Dichloroethene					11
1,2-Dichloroethane					14
1,2-Dichloropropane		0.004(4)			2
Acetone		0.9			
Benzene		0.002(4)			35
Bromodichloromethane		0.16(4)			4
Carbon Tetrachloride		5.2(4)			68
Chloroform		9.1(4)			770
cis-1,2-Dichloroethene	0.025(4)	1.3(4)			2500
Chloroemthane		0.088(4)			
Dichlorodifluoromethane					380
Methylene Chloride	0.014(4)	0.014(4)			19
Naphthalene					3
Tetrachloroethene		0.056(4)			330
Toluene					98
Total 1,2-Dichloroethene					1000
trans-1,2-Dichloroethene					25
Trichloroethene	3.2(4)	910(4)			130000
Vinyl Chloride		0.005(4)			21
Benzo(a)anthracene	1(4)				
Benzo(a)pyrene	0.74(4)				
Benzo(b)fluoranthene	1.1(4)				
Carbazole	0.45(4)				
Chrysene	0.91(4)				
Dibenzo(a,h)anthracene	0.13(4)				
Bis(2-ethylhexyl)phthalate					54
2,4-Dinitrotoluene		0.51(4)			
2,4,6-Trinitrotoluene		0.35(4)			
RDX					2.1
Pentachlorophenol		0.38(4)			
Aroclor-1248	0.57(4)				
Aroclor-1254	0.87(4)				
Aroclor-1260	0.35(4)				
alpha-BHC	0.00067(4)				
beta-BHC	0.0009(4)				
gamma-BHC (Lindane)	0.00087(4)				
Aluminum	15300	23600			
Antimony	31.4(4)		5.5		5.6
Arsenic	5.2	5.2			22.7
Barium	59.5	51.1			1920
Beryllium					43.6
Cadmiun	12.5(4)	0.56(4)			
Chromium	50.4	33.6			
Cobalt	4.3	3			988
Copper	557				
Iron			2740		
Lead	94(5)				
Manganese	114		169		4850
Mercury	0.47				
Nickel	63.7	6.8			508
Vanadium		39.4			
Zinc	531	39.6			
Cyanide		5(4)			
Chloride (mg/L)					2800
Sulfate (mg/L)					320

BLANK SPACES INDICATE THAT THE CHEMICAL WAS NOT SELECTED AS A COPC FOR THE SPECIFIED MEDIUM.

1 - UCLs calculated according to the USEPA's ProUCL guidance, unless otherwise noted. See RAGS - Part D Table 3s in Appendix F for details concerning the UCLs.
2 - Dataset consists of less than 10 samples. Therefore, the maximum concentration is used as the EPC.
3 - The maximum concentration is used as the EPC for groundwater (See Section 6.2.3 of text).
4 - The maximum concentration is used as the EPC based on low frequency of detection (See Section 6.2.3).
5 - The EPC for lead is the arithmetic average, as recommended by USEPA guidance (USEPA, August 2005).

TABLE 6-13

RECEPTORS AND EXPOSURE ROUTES FOR QUANTITATIVE EVALUATION
SWMU 16 - OLD SOUTHSIDE LANDFILL
AND
SWMU 17 - OLD SOUTHSIDE MISSILE ANDWASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Receptors	Exposure Routes
Occupational Worker (current/future land use)	• Soil dermal contact (surface soil) • Soil ingestion (surface soil) • Inhalation of air/dust/emissions (surface soil) • Inhalation of volatiles from groundwater by vapor intrusion
Adolescent Trespassers (7 to 16 years) (current/future land use)	• Soil dermal contact (surface soil) • Soil ingestion (surface soil) • Inhalation of air/dust/emissions (surface soil) • Surface water/sediment dermal contact • Surface water/sediment Ingestion
Construction Workers (future land use)	• Soil dermal contact (surface and subsurface soil) • Soil ingestion (surface and subsurface soil) • Inhalation of air/dust/emissions (surface and subsurface soil) • Groundwater dermal contact (during excavation) • Inhalation of volatiles from groundwater in a trench (during excavation)
On-Base Residents (Adult/Children)[1] (future land use)	• Soil dermal contact (surface soil) • Soil ingestion (surface soil) • Inhalation of air/dust/emissions (surface soil) • Direct ingestion of groundwater • Groundwater dermal contact (showering/bathing) • Inhalation of volatiles (showering/bathing) • Inhalation of volatiles from groundwater by vapor intrusion • Surface water/sediment dermal contact • Surface water/sediment ingestion

1 Residential exposure scenario is evaluated for SWMU 17 only.

TABLE 6-14

SUMMARY OF EXPOSURE INPUT PARAMETERS - REASONABLE MAXIMUM EXPOSURE
SWMUs 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

Exposure Input Parameter	Excavation Worker	Occupational Worker	Adult Resident	Child Resident	Adolescent Trespasser
All Exposures					
Exposure Concentration - C_{soil} / C_{sed} (mg/kg) C_{gw} / C_{sw} (mg/L)	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]
Exposure Frequency (EF) (days/year)	30[2]	250[3]	350[3] / 100[4]	350[3] / 100[4]	30[2]
Exposure Duration (ED) (years)	1[2]	25[3]	24[3]	6[3]	10[3]
Body Weight (BW) (kg)	70[3]	70[3]	70[3]	15[3]	45[3]
Noncarcinogenic Averaging Time (AT_n) (days)	365[5]	9,125[5]	8,760[5]	2,190[5]	3,650[5]
Carcinogenic Averaging Time (AT_c) (days)	25,550[5]	25,550[5]	25,550[5]	25,550[5]	25,550[5]
Incidental Ingestion/Dermal Contact with Soil and Sediment					
Ingestion Rate (IR) (mg/day)	330[6]	100[3]	100[3]	200[3]	100[3]
Fraction Ingested from Contaminated Source (Fi) (unitless)	1.0[3]	1.0[3]	1.0[3]	1.0[3]	1.0[3]
Skin Surface Area (SA) (cm^2/day)	3,300[7]	3,300[7]	5,700[7]	2,800[7]	3,280[8]
Soil-to-Skin Adherence Factor (AF) (mg/cm^2)	0.3[7]	0.2[7]	0.07[7]	0.2[7]	0.2[7]
Absorption Factor (ABS) (unitless)	chemical-specific[7]	chemical-specific[7]	chemical-specific[7]	chemical-specific[7]	chemical-specific[7]
Conversion Factor (CF) (kg/mg)	1E-06	1E-06	1E-06	1E-06	1E-06
Ingestion/Dermal Contact with Groundwater			**(SWMU 16/17)**		
Ingestion Rate (IR_{gw})(L/day)	NA[9]	NA	NA/2[3]	NA/1[3]	NA
Exposure Time (ET) (hours/day) and t_{event} (hours/event)	4[10]	NA	NA/0.33[7]	NA/0.33[7]	NA
Skin Surface Area (A) (cm^2/day)	3,300[7]	NA	NA/18,000[7]	NA/6,600[7]	NA
Event Frequency (EV) (events/day)	1[2]	NA	NA/1[2]	NA/1[2]	NA
Permeability Coefficient from Water through Skin (K_p)(cm/hour)	chemical-specific[7]	NA	chemical-specific[7]	chemical-specific[7]	NA
Bunge Dermal Model variables - t* (hour/event), T (hour), and B (unitless)	chemical-specific[7]	NA	chemical-specific[7]	chemical-specific[7]	NA
Conversion Factor (CF) (L/cm^3)	1E-03	NA	1E-03	1E-03	NA

TABLE 6-14

SUMMARY OF EXPOSURE INPUT PARAMETERS - REASONABLE MAXIMUM EXPOSURE
SWMUs 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

Exposure Input Parameter	Excavation Worker	Occupational Worker	Adult Resident	Child Resident	Adolescent Trespasser
Incidental Ingestion/Dermal Contact with Surface Water					
Contact Rate (CR) (L/hour)	NA	NA	0.01[3]	0.05[3]	0.01[3]
Exposure Time (ET) (hours/day) and t_{event} (hours/event)	NA	NA	1.5[8]	1.5[8]	1.5[8]
Skin Surface Area (A) (cm^2/day)	NA	NA	5,700[7]	2,800[7]	3,280[8]
Event Frequency (EV) (events/day)	NA	NA	1[2]	1[2]	1[2]
Permeability Coefficient from Water through Skin (K_p)(cm/hour)	NA	NA	chemical-specific[7]	chemical-specific[7]	chemical-specific[7]
Bunge Dermal Model variables - t* (hour/event), T (hour), and B (unitless)	NA	NA	chemical-specific[7]	chemical-specific[7]	chemical-specific[7]
Conversion Factor (CF) (L/cm^3)	NA	NA	1E-03	1E-03	1E-03
Inhalation of Vapors/Dusts/Particulates					
Inhalation Rate	2.5 m^3/hour[8]	20 m^3/day[3]	20 m^3/day[3]	15 m^3/day[3]	1.9 m^3/hour[8]
Exposure Time (ET) (hours/day)	8[3]	20[3]	20[3]	20[3]	1.5 [8]

$C_{soil/sed/gw/sw}$ Exposure concentration for soil/sediment/groundwater/surface water.
t* Time to reach steady-state conditions.
T Lag time.
B Bunge Model partitioning coefficient.

1 USEPA, December 2002. 95% UCL is used if the dataset is of sufficient size (i.e., 10 samples for more). For smaller datasets (i.e., less than 10 samples), the 95% UCL is not appropriate and the maximum concentration is used.
2 Professional Judgement (ABB-ES, January 1995).
3 USEPA, Region IV, May 2000.
4 A value of 100 days per year is used for exposure to surface water and sediment. Limited exposure to surface water and sediment is anticipated.
5 USEPA, December 1989.
6 USEPA, December 2000.
7 USEPA, July 2004.
8 USEPA, August 1997.
9 Excavation worker is evaluated only for dermal exposure to groundwater. Exposure via ingestion is expected to be relatively insignificant.
10 Assumption: one-half of the workday.

NA Residential exposure to groundwater is not evaluated for SWMU 16 because the site is a swampy area and it is very unlikely that dwellings of any kind could be constructed on the site or that the groundwater could be used as a source of potable water.

TABLE 6-15

SUMMARY OF EXPOSURE INPUT PARAMETERS - CENTRAL TENDENCY EXPOSURE
SWMUs 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

Exposure Input Parameter	Excavation Worker	Occupational Worker	Adult Resident	Child Resident	Adolescent Trespasser
All Exposures					
Exposure Concentration - C_{soil} / C_{sed} (mg/kg) C_{gw} / C_{sw} (mg/L)	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]
Exposure Frequency (EF) (days/year)	30[2]	219[3]	234[3] / 100[4]	234[3] / 100[4]	30[2]
Exposure Duration (ED) (years)	1[2]	9[3]	7[3]	2[3]	5[5]
Body Weight (BW) (kg)	70[3]	70[3]	70[3]	15[3]	45[6]
Noncarcinogenic Averaging Time (AT_n) (days)	365[7]	3,285[7]	2,555[7]	730[7]	1,825[7]
Carcinogenic Averaging Time (AT_c) (days)	25,550[7]	25,550[7]	25,550[7]	25,550[7]	25,550[7]
Incidental Ingestion/Dermal Contact with Soil and Sediment					
Ingestion Rate (IR) (mg/day)	330[8]	50[3]	50[3]	100[3]	50[3]
Fraction Ingested from Contaminated Source (Fi) (unitless)	1.0[6]	1.0[6]	1.0[6]	1.0[6]	1.0[6]
Skin Surface Area (SA) (cm^2/day)	3,300[9]	3,300[9]	5,700[9]	2,800[9]	3,280[10]
Soil-to-Skin Adherence Factor (AF) (mg/cm^2)	0.1[9]	0.02[9]	0.01[9]	0.04[9]	0.04[9]
Absorption Factor (ABS) (unitless)	chemical-specific[9]	chemical-specific[9]	chemical-specific[9]	chemical-specific[9]	chemical-specific[9]
Conversion Factor (CF) (kg/mg)	1E-06	1E-06	1E-06	1E-06	1E-06
Ingestion/Dermal Contact with Groundwater			**(SWMU 16/17)**		
Ingestion Rate (IR_{gw})(L/day)	NA[11]	NA	NA/1.4[3]	NA/0.66[10]	NA
Exposure Time (ET) (hours/day) and t_{event} (hours/event)	2[5]	NA	NA/0.25[9]	NA/0.25[9]	NA
Skin Surface Area (A) (cm^2/day)	3,300[9]	NA	NA/18,000[9]	NA/6,600[9]	NA
Event Frequency (EV) (events/day)	1[2]	NA	NA/1[2]	NA/1[2]	NA
Permeability Coefficient from Water through Skin (K_p)(cm/hour)	chemical-specific[9]	NA	chemical-specific[9]	chemical-specific[9]	NA
Bunge Dermal Model variables - t^* (hour/event), T (hour), and B (unitless)	chemical-specific[9]	NA	chemical-specific[9]	chemical-specific[9]	NA
Conversion Factor (CF) (L/cm^3)	1E-03	NA	1E-03	1E-03	NA

TABLE 6-15

SUMMARY OF EXPOSURE INPUT PARAMETERS - CENTRAL TENDENCY EXPOSURE
SWMUs 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

Exposure Input Parameter	Excavation Worker	Occupational Worker	Adult Resident	Child Resident	Adolescent Trespasser
Incidental Ingestion/Dermal Contact with Surface Water					
Contact Rate (CR) (L/hour)	NA	NA	0.01[6]	0.05[6]	0.01[6]
Exposure Time (ET) (hours/day) and t_{event} (hours/event)	NA	NA	1.0[10]	1.0[10]	1.0[10]
Skin Surface Area (A) (cm^2/day)	NA	NA	5,700[9]	2,800[9]	3,280[10]
Event Frequency (EV) (events/day)	NA	NA	1[2]	1[2]	1[2]
Permeability Coefficient from Water through Skin (K_p)(cm/hour)	NA	NA	chemical-specific[9]	chemical-specific[9]	chemical-specific[9]
Bunge Dermal Model variables - t* (hour/event), T (hour), and B (unitless)	NA	NA	chemical-specific[9]	chemical-specific[9]	chemical-specific[9]
Conversion Factor (CF) (L/cm^3)	NA	NA	1E-03	1E-03	1E-03
Inhalation of Vapors/Dusts/Particulates					
Inhalation Rate	1.5 m^3/hour[6]	20 m^3/day[3]	20 m^3/day[3]	15 m^3/day[3]	1.2 m^3/hour[8]
Exposure Time (ET) (hours/day)	8[3]	20[3]	20[3]	20[3]	1[8]

$C_{soil/sed/gw/sw}$ Exposure concentration for soil/sediment/groundwater/surface water.
t* Time to reach steady-state conditions.
T Lag time.
B Bunge Model partitioning coefficient.

1 USEPA, December 2002. 95% UCL is used if the dataset is of sufficient size (i.e., 10 samples for more). For smaller datasets (i.e., less than 10 samples), the 95% UCL is not appropriate and the maximum concentration is used.
2 Professional Judgement (ABB-ES, January 1995).
3 USEPA, May 1993.
4 A value of 100 days per year is used for exposure to surface water and sediment. Limited exposure to surface water and sediment is anticipated.
5 Assumption: one-half the RME value.
6 USEPA, Region IV, May 2000
7 USEPA, December 1989.
8 USEPA, December 2000.
9 USEPA, July 2004.
10 USEPA, August 1997.
11 Excavation worker is evaluated only for dermal exposure to groundwater. Exposure via ingestion is expected to be relatively insignificant.

NA Residential exposure to groundwater is not evaluated for SWMU 16 because the site is a swampy area and it is very unlikely that dwellings of any kind could be constructed on the site or that the groundwater could be used as a source of potable water.

TABLE 6-16

NON-CANCER TOXICITY DATA – ORAL/DERMAL
SWMUs 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA
PAGE 1 OF 2

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal[1]	Absorbed RfD for Dermal[2]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s)
Volatile Organic Compounds										
1,1,2,2-Tetrachloroethane	Chronic	6.0E-02	mg/kg/day	1	6.0E-02	mg/kg/day	Liver	NA	NCEA	4/2005
1,1,2-Trichloroethane	Chronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Blood	1000/1	IRIS	8/2005
1,1-Dichloroethene	Chronic	5.0E-02	mg/kg/day	1	5.0E-02	mg/kg/day	Liver	100/1	IRIS	8/2005
1,2-Dichloroethane	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	NA	NA	NCEA	4/2005
1,2-Dichloropropane	NA	NA	NA	NA	NA	NA	NA	NA	IRIS	8/2005
Acetone	Chronic	9.0E-01	mg/kg/day	1	9.0E-01	mg/kg/day	Kidney	1000/1	IRIS	8/2005
Benzene	Chronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Blood	300/1	IRIS	8/2005
Bromodichloromethane	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Kidney	1000/1	IRIS	8/2005
Carbon Tetrachloride	Chronic	7.0E-04	mg/kg/day	1	7.0E-04	mg/kg/day	Liver	1000/1	IRIS	8/2005
Chloroform	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Liver	1000/1	IRIS	8/2005
Chloromethane	NA	NA	NA	NA	NA	NA	NA	NA	IRIS	8/2005
cis-1,2-Dichloroethene	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Blood	NA	EPA III	4/2005
Dichlorodifluoromethane	Chronic	2.0E-01	mg/kg/day	1	2.0E-01	mg/kg/day	Body Weight	100/1	IRIS	8/2005
Methylene Chloride	Chronic	6.0E-02	mg/kg/day	1	6.0E-02	mg/kg/day	Liver	100/1	IRIS	8/2005
Tetrachloroethene	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Liver	1000/1	IRIS	8/2005
Toluene	Chronic	2.0E-01	mg/kg/day	1	2.0E-01	mg/kg/day	Kidney, Liver	1000/1	IRIS	8/2005
Total-1,2-Dichloroethene	Chronic	9.0E-03	mg/kg/day	1	9.0E-03	mg/kg/day			HEAST	7/1997
trans-1,2-Dichloroethene	Chronic	2.0E-01	mg/kg/day	1	2.0E-01	mg/kg/day	Blood	1000/1	IRIS	8/2005
Trichloroethene	Chronic	5.0E-01	mg/kg/day	1	5.0E-01	mg/kg/day	CNS	NA	CAL EPA	8/2005
Vinyl Chloride	Chronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Liver	30/1	IRIS	8/2005
Semivolatile Organic Compounds										
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Body Weight	3000/1	IRIS	8/2005
Bis(2-ethylhexyl)phthalate	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Liver	1000/1	IRIS	8/2005
Pesticides/PCBs										
Pentachlorophenol	Chronic	3.0E-02	mg/kg/day	1	3.0E-02	mg/kg/day	Liver, Kidney	100/1	IRIS	8/2005
Aroclor-1248	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	Chronic	2.0E-05	mg/kg/day	1	2.0E-05	mg/kg/day	Immunological	300/1	IRIS	8/2005
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-BHC	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA
beta-BHC	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC (LINDANE)	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Liver, Kidney	1000/1	IRIS	8/2005
Energetics										
2,4,6-Trinitrotoluene	Chronic	5.0E-04	mg/kg/day	1	5.0E-04	mg/kg/day	Liver	1000/1	IRIS	8/2005
2,4-Dinitrotoluene	Chronic	2.0E-03	mg/kg/day	1	2.0E-03	mg/kg/day	CNS, Liver	100/1	HEAST	7/1997
RDX	Chronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Prostate	100/1	IRIS	8/2005
Inorganics										
Aluminum	Chronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	CNS	100	NCEA	4/2005
Antimony	Chronic	4.0E-04	mg/kg/day	0.15	6.0E-05	mg/kg/day	Blood	1000/1	IRIS	8/2005
Arsenic	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Skin, CVS	3/1	IRIS	8/2005
Barium	Chronic	7.0E-02	mg/kg/day	0.07	4.9E-03	mg/kg/day	Kidney	3/1	IRIS	8/2005
Beryllium	Chronic	2.0E-03	mg/kg/day	0.007	1.4E-05	mg/kg/day	GS	300/1	IRIS	8/2005

TABLE 6-16

NON-CANCER TOXICITY DATA – ORAL/DERMAL
SWMUs 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal[1]	Absorbed RfD for Dermal[2]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s)
Cadmium[3]	Chronic	5.0E-04	mg/kg/day	0.05	2.5E-05	mg/kg/day	Kidney	10/1	IRIS	8/2005
Chromium VI	Chronic	3.0E-03	mg/kg/day	0.025	7.5E-05	mg/kg/day	Fetotoxicity/GS/Bone	300/3	IRIS	8/2005
Cobalt	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	NA	NA	EPA 3	4/2005
Copper	Chronic	4.0E-02	mg/kg/day	1	4.0E-02	mg/kg/day	GS	NA	HEAST	7/1997
Iron	Chronic	3.0E-01	mg/kg/day	1	3.0E-01	mg/kg/day	NA	1	NCEA	4/2005
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Soil)	Chronic	7.0E-02	mg/kg/day	0.04	2.8E-03	mg/kg/day	CNS	1/1	IRIS	8/2005
Manganese (Water)	Chronic	2.4E-02	mg/kg/day	0.04	9.6E-04	mg/kg/day	CNS	3/1	IRIS	8/2005
Mercury[4]	Chronic	3.0E-04	mg/kg/day	0.07	2.1E-05	mg/kg/day	CNS	1000/1	IRIS	8/2005
Nickel	Chronic	2.0E-02	mg/kg/day	0.04	8.0E-04	mg/kg/day	Body Weight	300/1	IRIS	8/2005
Silver	Chronic	5.0E-03	mg/kg/day	1	5.0E-03	mg/kg/day	Skin	3/1	IRIS	8/2005
Vanadium	Chronic	1.0E-03	mg/kg/day	0.026	2.6E-05	mg/kg/day	Kidney	300	NCEA	4/2005
Zinc	Chronic	3.0E-01	mg/kg/day	1	3.0E-01	mg/kg/day	Blood	3/1	IRIS	8/2005
Cyanide	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Weight Loss, Thyroid	100/5	IRIS	8/2005

Notes:
1 - USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
2 - Adjusted dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.
3 - Water value for cadmium is listed.
4 - Values are for mercuric chloride.

Definitions:
CNS = Central Nervous System
CVS = Cardiovascular system
GS = Gastrointestinal System
EPA 3 = USEPA Region 3 RBC Table, April, 2005.
EPA 9 = USEPA Region 9 PRG Table, October 19, 2004.
HEAST= Health Effects Assessment Summary Tables
IRIS = Integrated Risk Information System
NA = Not Applicable
NCEA = USEPA National Center for Environmental Assessment
NOEL = No Observed Effect Level

TABLE 6-17

NON-CANCER TOXICITY DATA – INHALATION
SWMUs 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD[1]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s)
Volatile Organic Compounds									
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	Chronic	2.0E-01	mg/m^3	5.7E-02	(mg/kg/day)	Liver	30/1	IRIS	8/2005
1,2-Dichloroethane	Chronic	2.5E+00	mg/m^3	7.0E-01	(mg/kg/day)		NA	NCEA	10/19/2004
1,2-Dichloropropane	Chronic	4.0E-03	mg/m^3	1.1E-03	(mg/kg/day)	Nasal	300/1	IRIS	8/2005
Acetone	Chronic	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	Chronic	3.0E-02	mg/m^3	8.6E-03	(mg/kg/day)	Blood	300/1	IRIS	8/2005
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	Chronic	1.8E-01	mg/m^3	5.0E-02	(mg/kg/day)	Liver	NA	NCEA	10/19/2004
Chloroform	Chronic	4.9E-02	mg/m^3	1.4E-02	(mg/kg/day)	Liver	NA	NCEA	10/19/2004
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	Chronic	9.0E-02	mg/m^3	2.6E-02	(mg/kg/day)	Neurological	1000/1	IRIS	8/2005
Dichlorodifluoromethane	Chronic	2.0E-01	mg/m^3	5.7E-02	(mg/kg/day)	Liver	10000	HEAST	8/2005
Methylene Chloride	Chronic	1.1E+00	mg/m^3	3.0E-01	(mg/kg/day)	Liver	NA	EPA 3	4/2005
Tetrachloroethene	Chronic	4.9E-01	mg/m^3	1.4E-01	(mg/kg/day)	Liver	NA	NCEA	10/19/2004
Toluene	Chronic	4.0E-01	mg/m^3	1.1E-01	(mg/kg/day)	CNS	300/1	IRIS	8/2005
Total-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trans-1,2-Dichloroethene	NA	7.0E-02	mg/m^3	2.0E-02	(mg/kg/day)	Blood, Liver	NA	NA	NA
Trichloroethene	Chronic	6.0E-01	mg/m^3	1.7E-01	(mg/kg/day)	CNS	NA	EPA 9	10/2004
Vinyl Chloride	Chronic	1.0E-01	mg/m^3	2.9E-02	(mg/kg/day)	Liver	30/1	IRIS	8/2005
Semivolatile Organic Compounds									
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	Chronic	0.003	mg/m^3	8.6E-04	(mg/kg/day)	Nasal	3000/1	IRIS	8/2005
Pesticides/PCBs									
PCBs	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA
beta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC (LINDANE)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Energetics									
2,4,6-Trinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA
RDX	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 6-17

NON-CANCER TOXICITY DATA – INHALATION
SWMUs 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD[1]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s)
Metals									
Aluminum	Chronic	3.5E-03	mg/m^3	1.0E-03	(mg/kg/day)	CNS	300	NCEA	10/19/2004
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	Chronic	5.0E-04	mg/m^3	1.4E-04	(mg/kg/day)	Fetus	1000/1	HEAST	7/1997
Beryllium	Chronic	2.0E-05	mg/m^3	5.7E-06	(mg/kg/day)	Lungs	10/1	IRIS	8/2005
Cadmium	Chronic	2.0E-04	mg/m^3	5.7E-05	(mg/kg/day)	Kidney	NA	EPA 3	10/19/2004
Chromium III	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium VI	Chronic	1.0E-04	mg/m^3	2.9E-05	(mg/kg/day)	Lungs	300/1	IRIS	8/2005
Cobalt	Chronic	2.0E-05	mg/m^3	5.7E-06	(mg/kg/day)	NA	NA	EPA 3	10/19/2004
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lithium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	Chronic	5.0E-05	mg/m^3	1.4E-05	(mg/kg/day)	CNS	1000/1	IRIS	8/2005
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
1 - Extrapolated RfD = RfC *$20m^3$/day / 70 kg

Definitions:
NA = Not Applicable
CNS = Central Nervous System
EPA 3 = USEPA Region 3 RBC Table, April, 2005.
EPA 9 = USEPA Region 9 PRG Table, October 19, 2004.
HEAST= Health Effects Assessment Summary Tables
IRIS = Integrated Risk Information System
NCEA = USEPA National Center for Environmental Assessment

TABLE 6-18

CANCER TOXICITY DATA – ORAL/DERMAL
SWMUs 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA
PAGE 1 OF 2

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal[1]	Absorbed Cancer Slope Factor for Dermal[2]		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds								
1,1,2,2-Tetrachloroethane	2.0E-01	$(mg/kg/day)^{-1}$	1	2.0E-01	$(mg/kg/day)^{-1}$	C	IRIS	8//2005
1,1,2-Trichloroethane	5.7E-02	$(mg/kg/day)^{-1}$	1	5.7E-02	$(mg/kg/day)^{-1}$	C	IRIS	8//2005
1,1-Dichloroethene	NA	NA	NA	NA	NA	C	IRIS	8//2005
1,2-Dichloroethane	9.1E-02	$(mg/kg/day)^{-1}$	1	9.1E-02	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
1,2-Dichloropropane	6.8E-02	$(mg/kg/day)^{-1}$	1	6.8E-02	$(mg/kg/day)^{-1}$	NA	HEAST	7/1997
Acetone	NA	NA	NA	NA	NA	D	IRIS	8//2005
Benzene	5.5E-02	$(mg/kg/day)^{-1}$	1	5.5E-02	$(mg/kg/day)^{-1}$	A	IRIS	8//2005
Bromodichloromethane	6.2E-02	$(mg/kg/day)^{-1}$	1	6.2E-02	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
Carbon Tetrachloride	1.3E-01	$(mg/kg/day)^{-1}$	1	1.3E-01	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
Chloroform	NA	NA	NA	NA	NA	B2	IRIS	8//2005
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	D	IRIS	8//2005
Chloromethane	NA	NA	NA	NA	NA	NA	IRIS	8//2005
Dichlorodifluoromethane	NA	NA	NA	NA	NA	D	IRIS	8//2005
Methylene Chloride	7.5E-03	$(mg/kg/day)^{-1}$	1	7.5E-03	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
Tetrachloroethene	5.4E-01	$(mg/kg/day)^{-1}$	1	5.4E-01	$(mg/kg/day)^{-1}$	NA	EPA 3	10/19/2004
Toluene	NA	NA	NA	NA	NA	D	IRIS	8//2005
Total-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA
Trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	1.3E-02	$(mg/kg/day)^{-1}$	1	1.3E-02	$(mg/kg/day)^{-1}$	C	EPA 9	10/2004
Vinyl Chloride (child)	1.5E+00	$(mg/kg/day)^{-1}$	1	1.5E+00	$(mg/kg/day)^{-1}$	A	IRIS	8//2005
Vinyl Chloride (adult)	7.2E-01	$(mg/kg/day)^{-1}$	1	7.2E-01	$(mg/kg/day)^{-1}$	A	IRIS	8//2005
Semivolatile Organic Compounds								
Benzo(a)anthracene	7.3E-01	$(mg/kg/day)^{-1}$	1	7.3E-01	$(mg/kg/day)^{-1}$	B2	EPA(1)	7/1993
Benzo(a)pyrene	7.3E+00	$(mg/kg/day)^{-1}$	1	7.3E+00	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
Benzo(b)fluoranthene	7.3E-01	$(mg/kg/day)^{-1}$	1	7.3E-01	$(mg/kg/day)^{-1}$	B2	EPA(1)	7/1993
Carbazole	2.0E-02	$(mg/kg/day)^{-1}$	1	2.0E-02	$(mg/kg/day)^{-1}$	NA	HEAST	7/1997
Chrysene	7.3E-03	$(mg/kg/day)^{-1}$	1	7.3E-03	$(mg/kg/day)^{-1}$	B2	EPA(1)	7/1993
Dibenzo(a,h)anthracene	7.3E+00	$(mg/kg/day)^{-1}$	1	7.3E+00	$(mg/kg/day)^{-1}$	B2	EPA(1)	7/1993
Naphthalene	NA	NA	NA	NA	NA	C	IRIS	8//2005
Bis(2-ethylhexyl)phthalate	1.4E-02	$(mg/kg/day)^{-1}$	1	1.4E-02	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
Pesticides/PCBs								
PCBs	2.0E+00	$(mg/kg/day)^{-1}$	1	2.0E+00	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
Pentachlorophenol	1.2E-01	$(mg/kg/day)^{-1}$	1	1.2E-01	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
alpha-BHC	6.3E+00	$(mg/kg/day)^{-1}$	1	6.3E+00	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
beta-BHC	1.8E+00	$(mg/kg/day)^{-1}$	1	1.8E+00	$(mg/kg/day)^{-1}$	C	IRIS	8//2005
gamma-BHC (LINDANE)	1.3E+00	$(mg/kg/day)^{-1}$	1	1.3E+00	$(mg/kg/day)^{-1}$	NA	HEAST	7/1997

TABLE 6-18

CANCER TOXICITY DATA -- ORAL/DERMAL
SWMUs 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal[1]	Absorbed Cancer Slope Factor for Dermal[2]		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Energetics								
2,4,6-Trinitrotoluene	3.0E-02	$(mg/kg/day)^{-1}$	1	3.0E-02	$(mg/kg/day)^{-1}$	C	IRIS	8//2005
2,4-Drinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA
RDX	1.1E-01	$(mg/kg/day)^{-1}$	1	1.1E-01	$(mg/kg/day)^{-1}$	C	IRIS	8//2005
Metals								
Arsenic	1.5E+00	$(mg/kg/day)^{-1}$	1	1.5E+00	$(mg/kg/day)^{-1}$	A	IRIS	8//2005

Notes:

1 - USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

2 - Adjusted cancer slope factor for dermal = Oral cancer slope factor x Oral Absorption Efficiency for Dermal.

Definitions:

IRIS = Integrated Risk Information System.

HEAST= Health Effects Assessment Summary Tables.

EPA 3 = USEPA Region 3 RBC Table, April, 2005.

EPA 9 = USEPA Region 9 PRG Table, October 19, 2004.

EPA(1) = USEPA, PCBs: Cancer Dose-Response Assessment and Applications to Environmental Mixtures, September 1996, EPA/600/P-96/001F.

NA = Not Available.

EPA Group:

A - Human carcinogen.

B1 - Probable human carcinogen - indicates that limited human data are available.

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans .

C - Possible human carcinogen.

D - Not classifiable as a human carcinogen.

E - Evidence of noncarcinogenicity.

TABLE 6-19

CANCER TOXICITY DATA – INHALATION
SWMUs 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA
PAGE 1 OF 2

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor[1]		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds							
1,1,2,2-Tetrachloroethane	5.8E-02	$(mg/m^3)^{-1}$	2.0E-01	$(mg/kg/day)^{-1}$	C	IRIS	8//2005
1,1,2-Trichloroethane	1.6E-02	$(mg/m^3)^{-1}$	5.6E-02	$(mg/kg/day)^{-1}$	C	IRIS	8//2005
1,1-Dichloroethene	NA	NA	NA	NA	C	IRIS	8//2005
1,2-Dichloroethane	2.6E-02	$(mg/m^3)^{-1}$	9.1E-02	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
1,2-Dichloropropane	1.9E-05	$(mg/m^3)^{-1}$	6.8E-02	$(mg/kg/day)^{-1}$	NA	HEAST, EPA 9	10/2004
Acetone	NA	NA	NA	NA	NA	NA	NA
Benzene	7.8E-03	$(mg/m^3)^{-1}$	2.7E-02	$(mg/kg/day)^{-1}$	A	IRIS	8//2005
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	1.5E-02	$(mg/m^3)^{-1}$	5.3E-02	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
Chloroform	2.3E-02	$(mg/m^3)^{-1}$	8.1E-02	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
cis-1,2-Dichloroethene	NA	NA	NA	NA	D	IRIS	8//2005
Chloromethane	NA	NA	NA	NA	NA	IRIS	8//2005
Dichlorodifluoromethane	NA	NA	NA	NA	NA	IRIS	8//2005
Methylene Chloride	4.7E-04	$(mg/m^3)^{-1}$	1.6E-03	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
Tetrachloroethene	5.7E-03	$(mg/m^3)^{-1}$	2.0E-02	$(mg/kg/day)^{-1}$	NA	EPA 3	10/19/2004
Toluene	NA	NA	NA	NA	D	IRIS	8//2005
Total-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA
Trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	2.0E-03	$(mg/m^3)^{-1}$	7.0E-03	$(mg/kg/day)^{-1}$	C	EPA 9	10/2004
Vinyl Chloride (child)	8.8E-03	$(mg/m^3)^{-1}$	3.0E-02	$(mg/kg/day)^{-1}$	A	IRIS	8//2005
Vinyl Chloride (adult)	4.4E-03	$(mg/m^3)^{-1}$	1.5E-02	$(mg/kg/day)^{-1}$	A	IRIS	8//2005
Semivolatile Organic Compounds							
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	8.9E-01	$(mg/m^3)^{-1}$	3.1E+00	$(mg/kg/day)^{-1}$	B2	NCEA	10/19/2004
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	4.0E-03	$(mg/m^3)^{-1}$	1.4E-02	$(mg/kg/day)^{-1}$	B2	NCEA	10/19/2004
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	C	IRIS	8//2005
Pesticides/PCBs							
PCBs	5.7E-01	$(mg/m^3)^{-1}$	2.0E+00	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA
alpha-BHC	1.8E+00	$(mg/m^3)^{-1}$	6.3E+00	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005

TABLE 6-19

CANCER TOXICITY DATA – INHALATION
SWMUs 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA
PAGE 2 OF 2

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor[1]		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
beta-BHC	5.1E-01	$(mg/m^3)^{-1}$	1.8E+00	$(mg/kg/day)^{-1}$	C	IRIS	8//2005
gamma-BHC (LINDANE)	NA	NA	NA	NA	NA	NA	NA
Energetics							
2,4,6-Trinitrotoluene	NA	NA	NA	NA	NA	NA	NA
2,4-Drinitrotoluene	NA	NA	NA	NA	NA	NA	NA
RDX	NA	NA	NA	NA	NA	NA	NA
Metals							
Arsenic	4.3E+00	$(mg/m^3)^{-1}$	1.5E+01	$(mg/kg/day)^{-1}$	A	IRIS	8//2005
Beryllium	2.4E+00	$(mg/m^3)^{-1}$	8.4E+00	$(mg/kg/day)^{-1}$	B1	IRIS	8//2005
Cadmium	1.8E+00	$(mg/m^3)^{-1}$	6.3E+00	$(mg/kg/day)^{-1}$	B1	IRIS	8//2005
Chromium VI	1.2E+01	$(mg/m^3)^{-1}$	4.2E+01	$(mg/kg/day)^{-1}$	A	IRIS	8//2005
Cobalt	2.8E+00	$(mg/m^3)^{-1}$	9.8E+00	$(mg/kg/day)^{-1}$	NA	EPA 3	10/19/2004

Notes:

1 - Inhalation CSF = Unit Risk * 70 kg / $20m^3$/day.

Definitions:

IRIS = Integrated Risk Information System.

HEAST= Health Effects Assessment Summary Tables.

EPA 3 = USEPA Region 3 RBC Table, April, 2005.

EPA 9 = USEPA Region 9 PRG Table, October 19, 2004.

NCEA = USEPA National Center for Environmental Assessment

EPA Group:

A - Human carcinogen.

B1 - Probable human carcinogen - indicates that limited human data are available.

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans .

C - Possible human carcinogen.

D - Not classifiable as a human carcinogen.

E - Evidence of noncarcinogenicity.

TABLE 6-20

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Receptor	Medium	Exposure Route	Cancer Risk (ILCR)	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Construction Worker	Surface Soil	Ingestion	9.E-07	--	--	--	1	--
		Dermal Contact	3.E-07	--	--	--	0.4	--
		Inhalation	6.E-06	--	--	Chromium	0.35	--
		Total	8.E-06	--	--	Chromium	2	--
	Subsurface Soil	Ingestion	2.E-07	--	--	--	0.23	--
		Dermal Contact	3.E-08	--	--	--	0.01	--
		Inhalation	NA	--	--	--	NA	--
		Total	2.E-07	--	--	--	0.25	--
	Sediment	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
	Surface Water	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
	Groundwater	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	5.E-09	--	--	--	0.001	--
		Inhalation	2.E-09	--	--	--	0.0001	--
		Total	8.E-09	--	--	--	0.001	--
		Total Surface Soil	8.E-06	--	--	--	2	--
		Total Subsurface Soil	2.E-07	--	--	--	0.25	--
		Total Sediment	NA	--	--	--	NA	--
		Total Surface Water	NA	--	--	--	NA	--
		Total Groundwater	8.E-09	--	--	--	0.001	--
		Total Across the Entire Site	**8.E-06**	--	--	--	**2**	--
Occupational Worker	Surface Soil	Ingestion	6.E-05	--	Aroclor-1254, BEHP	--	3	Aroclor-1254
		Dermal Contact	5.E-05	--	Aroclor-1254, BEHP	--	2	Aroclor-1254
		Inhalation	1.E-06	--	--	--	0.003	--
		Total	1.E-04	--	Aroclor-1254, BEHP	--	6	Aroclor-1254
	Sediment	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
	Surface Water	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
	Groundwater	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
		Total Surface Soil	1.E-04	--	--	--	6	--
		Total Sediment	NA	--	--	--	NA	--
		Total Surface Water	NA	--	--	--	NA	--
		Total Groundwater	NA	--	--	--	NA	--
		Total Across the Entire Site	**1.E-04**	--	--	--	**6**	--

TABLE 6-20

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Receptor	Medium	Exposure Route	Cancer Risk (ILCR)	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Trespasser	Surface Soil	Ingestion	4.E-06	--	--	BEHP, Aroclor-1254	0.6	--
		Dermal Contact	4.E-06	--	--	BEHP, Aroclor-1254	0.5	--
		Inhalation	1.E-08	--	--	--	0.0001	--
		Total	8.E-06	--	--	BEHP, Aroclor-1254	1	--
	Sediment	Ingestion	9.E-07	--	--	--	0.07	--
		Dermal Contact	2.E-07	--	--	--	0.002	--
		Total	1.E-06	--	--	--	0.07	--
	Surface Water	Ingestion	1.E-09	--	--	--	0.003	--
		Dermal Contact	3.E-08	--	--	--	0.01	--
		Total	4.E-08	--	--	--	0.02	--
	Groundwater	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
		Total Surface Soil	8.E-06	--	--	--	1	--
		Total Sediment	1.E-06	--	--	--	0.07	--
		Total Surface Water	4.E-08	--	--	--	0.02	--
		Total Groundwater	NA	--	--	--	NA	--
		Total Across the Entire Site	9.E-06	--	--	--	1	--

NA Exposure pathway not applicable to this receptor.

TABLE 6-21

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Receptor	Media	Exposure Route	Cancer Risk (ILCR)	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Construction/Excavation Worker	Surface Soil	Ingestion	1.E-07	--	--	--	0.09	--
		Dermal Contact	3.E-08	--	--	--	0.008	--
		Inhalation	6.E-07	--	--	--	0.03	--
		Total	7.E-07	--	--	--	0.1	--
	Subsurface Soil	Ingestion	1.E-07	--	--	--	0.04	--
		Dermal Contact	4.E-09	--	--	--	0.001	--
		Inhalation	7.E-07	--	--	--	0.04	--
		Total	8.E-07	--	--	--	0.1	--
	Sediment	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
	Surface Water	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
	Groundwater	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	7.E-06	--	--	PCE, TCE	0.3	--
		Inhalation (in a trench)	1.E-05	--	--	TCE	0.9	--
		Total	2.E-05	--	TCE	PCE	1	--
		Total Surface Soil	7.E-07	--	--	--	0.1	--
		Total Subsurface Soil	8.E-07	--	--	--	0.1	--
		Total Sediment	NA	--	--	--	NA	--
		Total Surface Water	NA	--	--	--	NA	--
		Total Groundwater	2.E-05	--	--	--	1	--
		Total Across the Entire Site	2.E-05	--	--	--	1	--

TABLE 6-21

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Receptor	Media	Exposure Route	Cancer Risk (ILCR)	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Occupational Worker	Surface Soil	Ingestion	7.E-06	--	--	PAHs, Arsenic	0.2	--
		Dermal Contact	4.E-06	--	--	PAHs	0.05	--
		Inhalation	6.E-07	--	--	--	0.0002	--
		Total	1.E-05	--	--	PAHs, Aroclor-1254, Arsenic	0.3	--
	Sediment	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
	Surface Water	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
	Groundwater	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Inhalation (showering)	NA	--	--	--	NA	--
		Inhalation (indoor air)	1.E-05	--	--	TCE	0.04	--
		Total	1.E-05	--	--	TCE	0.04	--
		Total Surface Soil	1.E-05	--	--	--	0.3	--
		Total Sediment	NA	--	--	--	NA	--
		Total Surface Water	NA	--	--	--	NA	--
		Total Groundwater	1.E-05	--	--	--	0.04	--
		Total Across the Entire Site	2.E-05	--	--	--	0.3	--

TABLE 6-21

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Receptor	Media	Exposure Route	Cancer Risk (ILCR)	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Trespasser	Surface Soil	Ingestion	5.E-07	--	--	--	0.04	--
		Dermal Contact	3.E-07	--	--	--	0.009	--
		Inhalation	6.E-09	--	--	--	0.00001	--
		Total	8.E-07	--	--	--	0.05	--
	Sediment	Ingestion	--	--	--	--	--	--
		Dermal Contact	--	--	--	--	--	--
		Total	--	--	--	--	--	--
	Surface Water	Ingestion	--	--	--	--	0.001	--
		Dermal Contact	--	--	--	--	0.002	--
		Total	--	--	--	--	0.003	--
	Groundwater	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Inhalation (showering)	NA	--	--	--	NA	--
		Inhalation (indoor air)	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
		Total Surface Soil	8.E-07	--	--	--	0.05	--
		Total Sediment	--	--	--	--	--	--
		Total Surface Water	--	--	--	--	0.003	--
		Total Groundwater	NA	--	--	--	NA	--
		Total Across the Entire Site	**8.E-07**	--	--	--	**0.05**	--

TABLE 6-21

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Receptor	Media	Exposure Route	Cancer Risk (ILCR)	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Future Child Resident	Surface Soil	Ingestion	2.E-05	--	--	PAHs, Aroclor-1248, Aroclor-1254, Arsenic	3	--
		Dermal Contact	5.E-06	--	--	PAHs	0.3	--
		Inhalation	7.E-07	--	--	--	0.001	--
		Total	3.E-05	--	--	PAHs, Aroclor-1248, Aroclor-1254, Arsenic	3	--
	Sediment	Ingestion	--	--	--	--	--	--
		Dermal Contact	--	--	--	--	--	--
		Total	--	--	--	--	--	--
	Surface Water	Ingestion	--	--	--	--	0.04	--
		Dermal Contact	--	--	--	--	0.02	--
		Total	--	--	--	--	0.06	--
	Groundwater	Ingestion	1.E-02	1,1,2,2-TCA, PCE, TCE, Vinyl Chloride, Arsenic	1,1,2-TCA, Benzene, Carbon Tetrachloride	1,2-DCA, Bromodichloromethane, BEHP, RDX	82	1,1,2-TCA, Carbon Tetrachloride, Chloroform, 1,2-DCE, PCE, TCE, Arsenic, Beryllium, Cobalt, Manganese
		Dermal Contact	1.E-03	PCE, TCE	1,1,2,2-TCA	1,1,2-TCA, Carbon Tetrachloride, Vinyl Chloride, BEHP	6	TCE
		Inhalation (showering)	1.E-02	1,1,2,2-TCA, PCE, TCE, Vinyl Chloride	1,1,2-TCA, Benzene, Carbon Tetrachloride	1,2-DCA, Bromodichloromethane	56	1,1,2-TCA, Carbon Tetrachloride, Chloroform, 1,2-DCE, PCE, TCE
		Inhalation (indoor air)	5.E-04	TCE	Chloroform	1,1,2,2-TCA, 1,1,2-TCA, Carbon Tetrachloride, PCE	7	TCE
		Total	2.E-02	1,1,2,2-TCA, Carbon Tetrachloride, PCE, TCE, Vinyl Chloride, Arsenic	1,1,2-TCA 1,2-DCA, Benzene, Chloroform	1,2-Dichloropropane, Bromodichloromethane, Methylene Chloride, BEHP, RDX	151	1,1,2-TCA, Carbon Tetrachloride, Chloroform, 1,2-DCE, PCE, TCE, Arsenic, Beryllium, Cobalt, Manganese
		Total Surface Soil	3.E-05	--	--	--	3	--
		Total Sediment	--	--	--	--	--	--
		Total Surface Water	--	--	--	--	0.06	--
		Total Groundwater	2.E-02	--	--	--	151	--
		Total Across the Entire Site	2.E-02	--	--	--	154	--

TABLE 6-21

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Receptor	Media	Exposure Route	Cancer Risk (ILCR)	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Future Adult Resident	Surface Soil	Ingestion	9.E-06	--	--	PAHs, Arsenic	0.3	--
		Dermal Contact	3.E-06	--	--	PAHs	0.04	--
		Inhalation	7.E-07	--	--	--	0.0003	--
		Total	1.E-05	--	--	PAHs, Arsenic	0.3	--
	Sediment	Ingestion	--	--	--	--	--	--
		Dermal Contact	--	--	--	--	--	--
		Total	--	--	--	--	--	--
	Surface Water	Ingestion	--	--	--	--	0.002	--
		Dermal Contact	--	--	--	--	0.01	--
		Total	--	--	--	--	0.01	--
	Groundwater	Ingestion	2.E-02	1,1,2,2-TCA, PCE, TCE, Vinyl Chloride, Arsenic	1,1,2-TCA, 1,2-DCA, Benzene, Carbon Tetrachloride	1,2-Dichloropropane, Bromodichloromethane, Methylene Chloride, BEHP, RDX	35	Carbon Tetrachloride, Chloroform, 1,2-DCE, TCE, Arsenic, Cobalt, Manganese
		Dermal Contact	3.E-03	PCE, TCE	1,1,2,2-TCA, Carbon Tetrachloride	1,1,2-TCA, Benzene, Vinyl Chloride, BEHP	4	TCE
		Inhalation (showering)	2.E-02	1,1,2,2-TCA, PCE, TCE, Vinyl Chloride	1,1,2-TCA, 1,2-DCA, Benzene, Carbon Tetrachloride	1,2-Dichloropropane, Bromodichloromethane, Methylene Chloride	24	Carbon Tetrachloride, Chloroform, 1,2-DCE, TCE
		Inhalation (indoor air)	6.E-04	TCE	Chloroform	1,1,2,2-TCA, 1,1,2-TCA, Carbon Tetrachloride, PCE	2	TCE
		Total	4.E-02	1,1,2,2-TCA, 1,1,2-TCA, Carbon Tetrachloride, PCE, TCE, Vinyl Chloride, Arsenic	1,2-DCA, Carbon Tetrachloride, Benzene, Chloroform, BEHP	1,2-Dichloropropane, Bromodichloromethane, Methylene Chloride, RDX	65	Carbon Tetrachloride, Chloroform, 1,2-DCE, PCE, TCE, Arsenic, Cobalt, Manganese
		Total Surface Soil	1.E-05	--	--	--	0.3	--
		Total Sediment	--	--	--	--	--	--
		Total Surface Water	--	--	--	--	0.01	--
		Total Groundwater	4.E-02	--	--	--	65	--
		Total Across the Entire Site	**4.E-02**	--	--	--	**65**	--

TABLE 6-21

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Receptor	Media	Exposure Route	Cancer Risk (ILCR)	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Total Residential Risks	Surface Soil	Ingestion	3.E-05	--	--	PAHs, PCBs, Arsenic	NA	--
		Dermal Contact	9.E-06	--	--	PAHs, PCBs	NA	--
		Inhalation	1.E-06	--	--	--	NA	--
		Total	4.E-05	--	PAHs	PCBs, Arsenic	NA	--
	Sediment	Ingestion	--	--	--	--	NA	--
		Dermal Contact	--	--	--	--	NA	--
		Total	--	--	--	--	NA	--
	Surface Water	Ingestion	--	--	--	--	NA	--
		Dermal Contact	--	--	--	--	NA	--
		Total	--	--	--	--	NA	--
	Groundwater	Ingestion	3.E-02	1,1,2,2-TCA, Carbon Tetrachloride, PCE, TCE, Vinyl Chloride, Arsenic	1,1,2-TCA, 1,2-DCA, Benzene, BEHP	1,2-Dichloropropane, Bromodichloromethane, Methylene Chloride, RDX	NA	--
		Dermal Contact	4.E-03	PCE, TCE	1,1,2,2-TCA, Carbon Tetrachloride, Vinyl Chloride, BEHP	1,1,2-TCA, Benzene, Arsenic	NA	--
		Inhalation (showering)	3.E-02	1,1,2,2-TCA, Carbon Tetrachloride, PCE, TCE, Vinyl Chloride	1,1,2-TCA, 1,2-DCA, Benzene, Carbon Tetrachloride	1,2-Dichloropropane, Bromodichloromethane, Methylene Chloride,	NA	--
		Inhalation (indoor air)	1.E-03	TCE	Chloroform	1,1,2,2-TCA, 1,1,2-TCA, Carbon Tetrachloride, PCE	NA	--
		Total	6.E-02	1,1,2,2-TCA, 1,1,2-TCA, Carbon Tetrachloride, PCE, TCE, Vinyl Chloride, Arsenic	1,2-DCA, Benzene, Chloroform, BEHP	1,2-Dichloropropane, Bromodichloromethane, Methylene Chloride, RDX	NA	--
		Total Surface Soil	4.E-05	--	--	--	NA	--
		Total Sediment	--	--	--	--	NA	--
		Total Surface Water	--	--	--	--	NA	--
		Total Groundwater	6.E-02	--	--	--	NA	--
		Total Across the Entire Site	**6.E-02**	--	--	--	NA	--

NA Exposure pathway not applicable to this receptor.

TABLE 6-22

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Receptor	Medium	Exposure Route	Cancer Risk (ILCR)	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Construction Worker	Surface Soil	Ingestion	9.E-07	--	--	--	1	--
		Dermal Contact	1.E-07	--	--	--	0.1	--
		Inhalation	4.E-06	--	--	Chromium	0.2	--
		Total	5.E-06	--	--	Chromium	2	--
	Subsurface Soil	Ingestion	2.E-07	--	--	--	0.2	--
		Dermal Contact	1.E-08	--	--	--	0.00	--
		Inhalation	NA	--	--	--	NA	--
		Total	2.E-07	--	--	--	0.2	--
	Sediment	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
	Surface Water	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
	Groundwater	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	4.E-09	--	--	--	0.001	--
		Inhalation	1.E-09	--	--	--	0.0001	--
		Total	5.E-09	--	--	--	0.001	--
		Total Surface Soil	5.E-06	--	--	--	2	--
		Total Subsurface Soil	2.E-07	--	--	--	0.2	--
		Total Sediment	NA	--	--	--	NA	--
		Total Surface Water	NA	--	--	--	NA	--
		Total Groundwater	5.E-09	--	--	--	0.0	--
		Total Across the Entire Site	**5.E-06**	--	--	--	**2**	--
Occupational Worker	Surface Soil	Ingestion	9.E-06	--	--	Aroclor-1254, BEHP	1	--
		Dermal Contact	2.E-06	--	--	Aroclor-1254	0.2	--
		Inhalation	2.E-07	--	--	--	0.001	--
		Total	1.E-05	--	--	Aroclor-1254, BEHP	2	--
	Sediment	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
	Surface Water	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
	Groundwater	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
		Total Surface Soil	1.E-05	--	--	--	2	--
		Total Sediment	NA	--	--	--	NA	--
		Total Surface Water	NA	--	--	--	NA	--
		Total Groundwater	NA	--	--	--	NA	--
		Total Across the Entire Site	**1.E-05**	--	--	--	**2**	--

TABLE 6-22

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Receptor	Medium	Exposure Route	Cancer Risk (ILCR)	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Trespasser	Surface Soil	Ingestion	1.E-06	--	--	--	0.3	--
		Dermal Contact	4.E-07	--	--	--	0.1	--
		Inhalation	6.E-09	--	--	--	0.00003	--
		Total	1.E-06	--	--	--	0.4	--
	Sediment	Ingestion	2.E-07	--	--	--	0.03	--
		Dermal Contact	2.E-08	--	--	--	0.000	--
		Total	2.E-07	--	--	--	0.03	--
	Surface Water	Ingestion	5.E-10	--	--	--	0.002	--
		Dermal Contact	1.E-08	--	--	--	0.01	--
		Total	1.E-08	--	--	--	0.01	--
	Groundwater	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
		Total Surface Soil	1.E-06	--	--	--	0.4	--
		Total Sediment	2.E-07	--	--	--	0.03	--
		Total Surface Water	1.E-08	--	--	--	0.01	--
		Total Groundwater	NA	--	--	--	NA	--
		Total Across the Entire Site	**2.E-06**	--	--	--	**0.4**	--

NA Exposure pathway not applicable to this receptor.

TABLE 6-23

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SWUM 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Receptor	Medium	Exposure Route	Cancer Risk (ILCR)	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Construction/Excavation Worker	Surface Soil	Ingestion	1.1E-07	--	--	--	0.09	--
		Dermal Contact	9.8E-09	--	--	--	0.003	--
		Inhalation	3.4E-07	--	--	--	0.02	--
		Total	4.5E-07	--	--	--	0.11	--
	Subsurface Soil	Ingestion	1.1E-07	--	--	--	0.04	--
		Dermal Contact	1.4E-09	--	--	--	0.0002	--
		Inhalation	3.9E-07	--	TCE	--	0.0	--
		Total	5.1E-07	--	TCE	--	0.1	--
	Sediment	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
	Surface Water	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
	Groundwater	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	4.7E-06	--	--	PCE, TCE	0.18	--
		Inhalation (in a trench)	6.6E-06	--	--	TCE	0.53	--
		Total	1.1E-05	--	--	PCE, TCE	0.71	--
		Total Surface Soil	4.5E-07	--	--	--	0.1	--
		Total Subsurface Soil	5.1E-07	--	--	--	0.1	--
		Total Sediment	NA	--	--	--	NA	--
		Total Surface Water	NA	--	--	--	NA	--
		Total Groundwater	1.1E-05	--	--	--	0.71	--
		Total Across the Entire Site	**1.2E-05**	--	--	--	**1**	--

TABLE 6-23

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SWUM 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Receptor	Medium	Exposure Route	Cancer Risk (ILCR)	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Occupational Worker	Surface Soil	Ingestion	1.1E-06	--	--	PAHs, Arsenic	0.1	--
		Dermal Contact	1.3E-07	--	--	PAHs	0.004	--
		Inhalation	1.1E-07	--	--	--	0.0001	--
		Total	1.3E-06	--	--	PAHs, Aroclor-1254, Arsenic	0.1	--
	Sediment	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
	Surface Water	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
	Groundwater	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Inhalation (showering)	NA	--	--	--	NA	--
		Inhalation (indoor air)	2.8E-06	--	--	TCE	0.02	--
		Total	2.8E-06	--	--	TCE	0.02	--
		Total Surface Soil	1.3E-06	--	--	--	0.1	--
		Total Sediment	NA	--	--	--	NA	--
		Total Surface Water	NA	--	--	--	NA	--
		Total Groundwater	2.8E-06	--	--	--	0	--
		Total Across the Entire Site	**4.1E-06**	--	--	--	**0.1**	--

TABLE 6-23

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SWUM 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Receptor	Medium	Exposure Route	Cancer Risk (ILCR)	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Trespasser	Surface Soil	Ingestion	1.3E-07	--	--	--	0.02	--
		Dermal Contact	3.0E-08	--	--	--	0.002	--
		Inhalation	2.5E-09	--	--	--	0.000003	--
		Total	1.6E-07	--	--	--	0.02	--
	Sediment	Ingestion	--	--	--	--	--	--
		Dermal Contact	--	--	--	--	--	--
		Total	--	--	--	--	--	--
	Surface Water	Ingestion	--	--	--	--	0.001	--
		Dermal Contact	--	--	--	--	0.002	--
		Total	--	--	--	--	0.002	--
	Groundwater	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Inhalation (showering)	NA	--	--	--	NA	--
		Inhalation (indoor air)	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--
		Total Surface Soil	1.6E-07	--	--	--	0.0	--
		Total Sediment	--	--	--	--	--	--
		Total Surface Water	--	--	--	--	0.00	--
		Total Groundwater	NA	--	--	--	NA	--
		Total Across the Entire Site	**1.6E-07**	--	--	--	**0.02**	--

TABLE 6-23

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SWUM 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Receptor	Medium	Exposure Route	Cancer Risk (ILCR)	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Future Child Resident	Surface Soil	Ingestion	2.4E-06	--	--	--	1	--
		Dermal Contact	2.4E-07	--	--	--	0.03	--
		Inhalation	1.5E-07	--	--	--	0.001	--
		Total	2.7E-06	--	--	PAHs	0.98	--
	Sediment	Ingestion	--	--	--	--	--	--
		Dermal Contact	--	--	--	--	--	--
		Total	--	--	--	--	--	--
	Surface Water	Ingestion	--	--	--	--	0.027	--
		Dermal Contact	--	--	--	--	0.01	--
		Total	--	--	--	--	0.04	--
	Groundwater	Ingestion	1.6E-03	PCE, TCE,	1,1,2,2-TCA, Vinyl Chloride, Arsenic	1,1,2-TCA, Benzene, Carbon Tetrachloride	36	Carbon Tetrachloride, Chloroform, 1,2-DCE, TCE, Arsenic, Cobalt, Manganese
		Dermal Contact	2.4E-04	TCE	PCE	1,1,2,2-TCA, Carbon Tetrachloride	3.4	--
		Inhalation (showering)	1.6E-03	PCE, TCE,	1,1,2,2-TCA, Vinyl Chloride	1,1,2-TCA, Benzene, Carbon Tetrachloride	25	Carbon Tetrachloride, Chloroform, 1,2-DCE, TCE
		Inhalation (indoor air)	1.2E-04	TCE	--	Chloroform	4.7	TCE
		Total	3.5E-03	PCE, TCE,	1,1,2,2-TCA, Carbon Tetrachloride, Vinyl Chloride, Arsenic	1,1,2-TCA, 1,2-DCA, Benzene, Chloroform, BEHP	69	1,1,2-TCA, Carbon Tetrachloride, Chloroform, 1,2-DCE, PCE, TCE, Arsenic, Cobalt, Manganese
		Total Surface Soil	2.7E-06	--	--	--	1	--
		Total Sediment	--	--	--	--	--	--
		Total Surface Water	--	--	--	--	0.04	--
		Total Groundwater	3.5E-03	--	--	--	69	--
		Total Across the Entire Site	**3.5E-03**	--	--	--	**70**	--

TABLE 6-23

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SWUM 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Receptor	Medium	Exposure Route	Cancer Risk (ILCR)	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Future Adult Resident	Surface Soil	Ingestion	8.9E-07	--	--	--	0.10	--
		Dermal Contact	9.2E-08	--	--	--	0.004	--
		Inhalation	1.5E-07	--	--	--	0.0002	--
		Total	1.1E-06	--	--	--	0.1	--
	Sediment	Ingestion	--	--	--	--	--	--
		Dermal Contact	--	--	--	--	--	--
		Total	--	--	--	--	--	--
	Surface Water	Ingestion	--	--	--	--	0.001	--
		Dermal Contact	--	--	--	--	0.01	--
		Total	--	--	--	--	0.01	
	Groundwater	Ingestion	2.5E-03	PCE, TCE	1,1,2.2-TCA, Carbon Tetrachloride, Viny;Chloirde, Arsenic	1,1,2-TCA, 1,2-DCA, Benzene	16	Carbon Tetrachloride, 1,2-DCE, TCE, Manganese
		Dermal Contact	4.8E-04	PCE, TCE	--	1,1,2,2-TCA, Carbon Tetrachloride, BEHP	2	TCE
		Inhalation (showering)	2.5E-03	PCE, TCE	1,1,2.2-TCA, Carbon Tetrachloride, Viny;Chloirde	1,1,2-TCA, 1,2-DCA, Benzene	11	Carbon Tetrachloride, 1,2-DCE, TCE
		Inhalation (indoor air)	1.2E-04	TCE	--	Chloroform	1.4	--
		Total	5.6E-03	PCE, TCE	1,1,2,2-TCA, 1,1,2-TCA, Carbon Tetrachloride, Vinyl Chloride, Arsenic	1,2-DCA, Benzene, BEHP	31	Carbon Tetrachloride, Chloroform, 1,2-DCE, PCE, TCE, Manganese
		Total Surface Soil	1.1E-06	--	--	--	0.1	--
		Total Sediment	--	--	--	--	--	--
		Total Surface Water	--	--	--	--	0.01	--
		Total Groundwater	5.6E-03	--	--	--	31	--
		Total Across the Entire Site	**5.6E-03**	--	--	--	**31**	--

TABLE 6-23

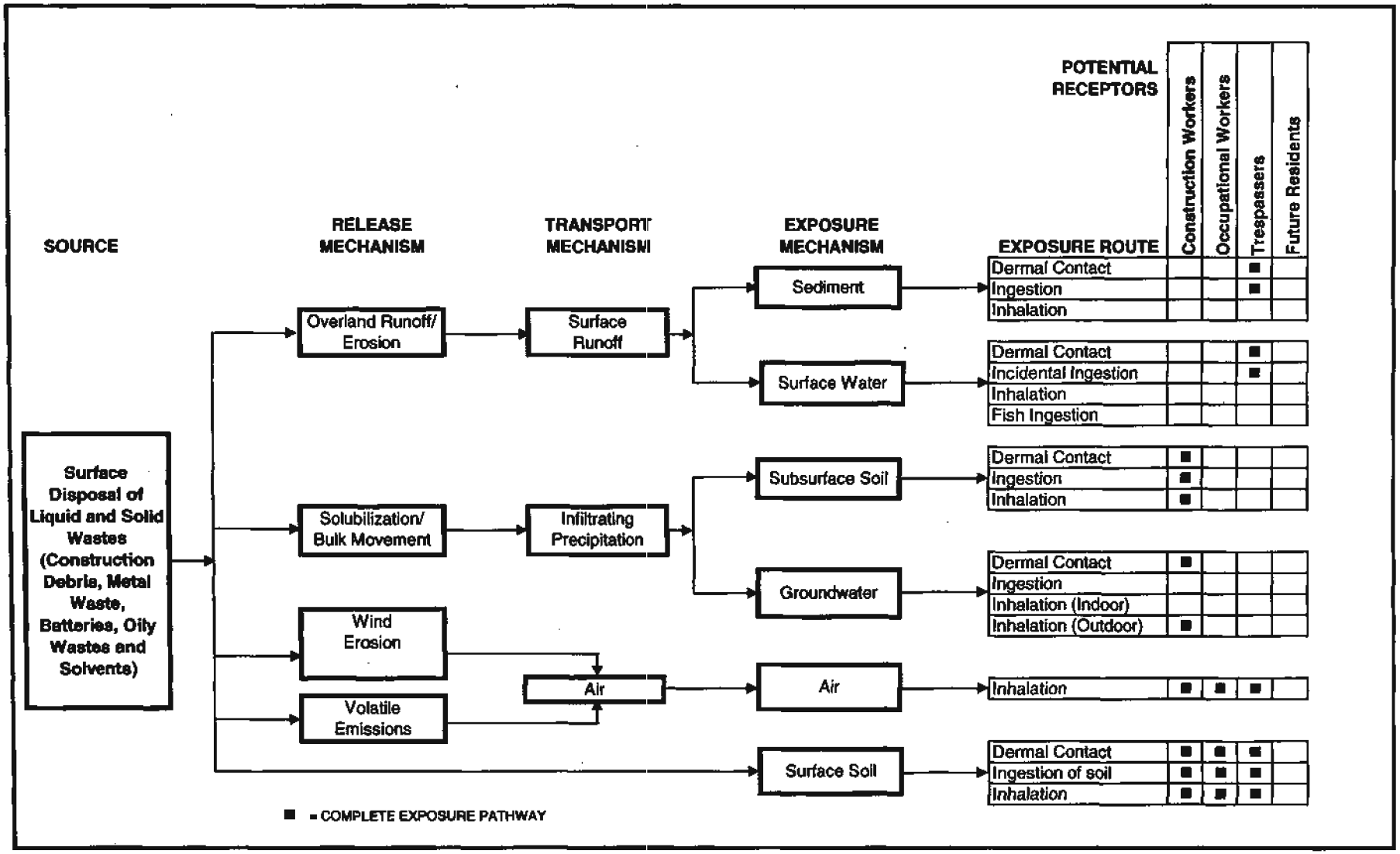
SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SWUM 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Receptor	Medium	Exposure Route	Cancer Risk (ILCR)	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Total Residential Risks	Surface Soil	Ingestion	3.2E-06	--	--	Arsenic	NA	--
		Dermal Contact	3.3E-07	--	--	--	NA	--
		Inhalation	2.9E-07	--	--	--	NA	--
		Total	3.9E-06	--	--	Arsenic	NA	--
	Sediment	Ingestion	--	--	--	--	NA	--
		Dermal Contact	--	--	--	--	NA	--
		Total	--	--	--	--	NA	--
	Surface Water	Ingestion	--	--	--	--	NA	--
		Dermal Contact	--	--	--	--	NA	--
		Total	--	--	--	--	NA	--
	Groundwater	Ingestion	4.1E-03	PCE, TCE	1,1,2,2-TCA, 1,1,2-TCA, Carbon Tetrachloride, Vinyl Chloride, Arsenic	1,2-DCA, Benzene, BEHP	NA	--
		Dermal Contact	7.2E-04	PCE, TCE	--	1,1,2,2-TCA, Carbon Tetrachloride, Vinyl Chloride, BEHP	NA	--
		Inhalation (showering)	4.0E-03	PCE, TCE	1,1,2,2-TCA, 1,1,2-TCA, Carbon Tetrachloride, Vinyl Chloride	1,2-DCA, Benzene	NA	--
		Inhalation (indoor air)	2.4E-04	TCE	Chloroform	1,1,2,2-TCA, Carbon Tetrachloride, PCE	NA	--
		Total	9.1E-03	1,1,2,2-TCA, PCE, TCE	1,1,2-TCA, Carbon Tetrachloride, Vinyl Chloride, Arsenic	1,2-DCA, Benzene, Bromodichloromethane, BEHP	NA	--
		Total Surface Soil	3.9E-06	--	--	--	NA	--
		Total Sediment	--	--	--	--	NA	--
		Total Surface Water	--	--	--	--	NA	--
		Total Groundwater	9.1E-03	--	--	--	NA	--
		Total Across the Entire Site	9.1E-03	--	--	--	NA	--

NA Exposure pathway not applicable to this receptor.

FIGURE 6-1

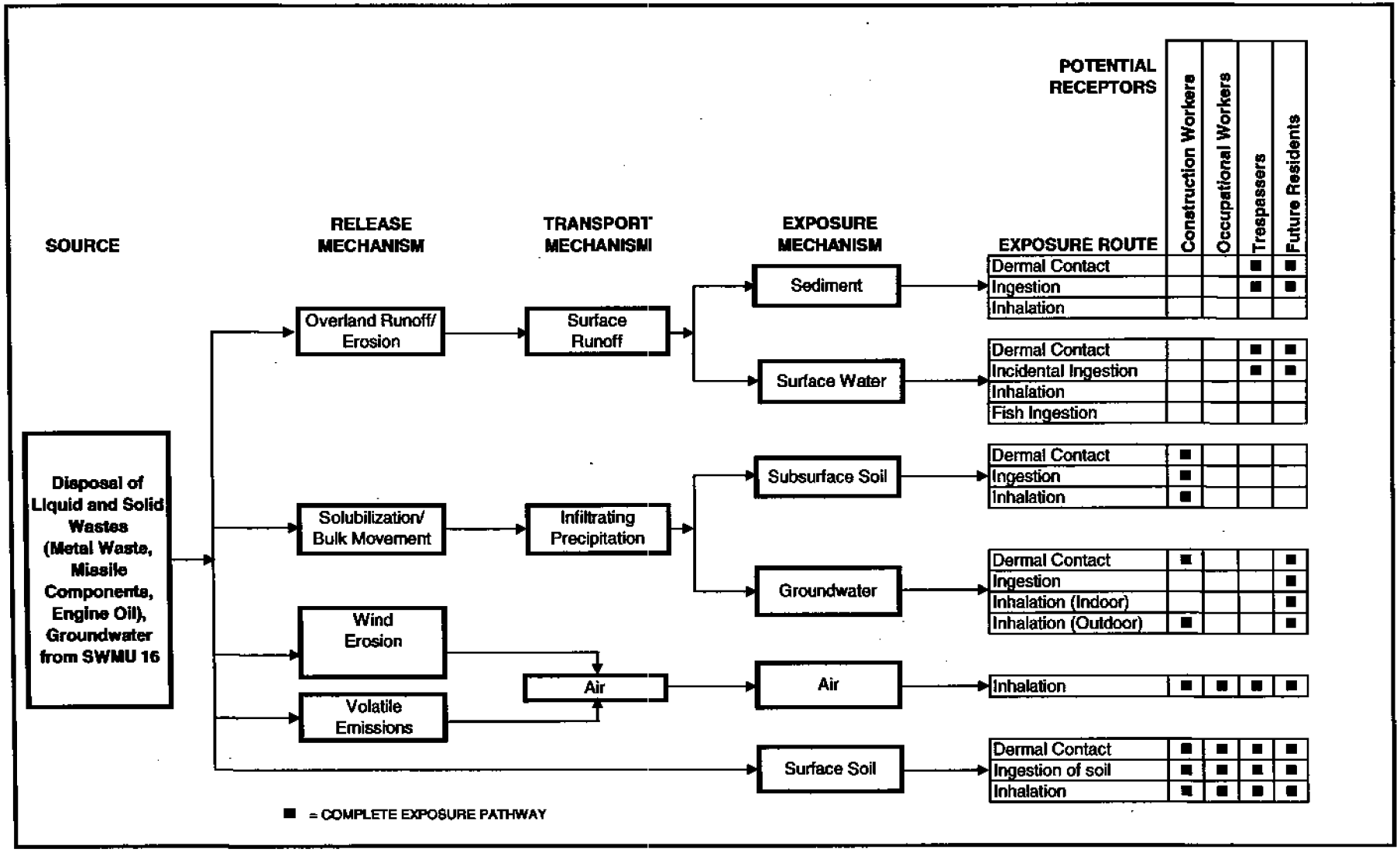
HUMAN HEALTH CONCEPTUAL SITE MODEL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA



Blank space indicates incomplete exposure pathway or relatively insignificant, or not applicable potential exposure.

FIGURE 6-2

HUMAN HEALTH CONCEPTUAL SITE MODEL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA



Blank space indicates incomplete exposure pathway or relatively insignificant, or not applicable potential exposure.

7.0 ECOLOGICAL RISK ASSESSMENT

In addition to characterizing the nature and extent of site contamination and assessing potential risks to human health, the RFI process requires an assessment of the potential adverse effects of site contamination on the environment. Specifically, ecological receptors that inhabit SWMU 16 and SWMU 17 and nearby areas may be at risk from environmental contamination associated with these SWMUs. Accordingly, a screening-level ecological risk assessment (SERA) was performed to characterize the potential risks from SWMU 16- and SWMU 17-related contaminants to ecological receptors.

This SERA was conducted in accordance with USEPA Ecological Risk Assessment Guidance for Superfund (USEPA, June 1997), USEPA Amended Guidance on Ecological Risk Assessment at Military Bases (USEPA, June 2000), and the Navy Policy for Conducting Ecological Risk Assessments (Navy, 1999). The risk assessments for SWMUs 16 and 17 consist of Steps 1 through 3a of USEPA's eight-step ecological risk assessment process. Steps 1 through 3a consist of the following:

Step 1	Screening-Level Problem Formulation and Ecological Effects Evaluation
Step 2	Screening-Level Exposure Estimate and Risk Calculation
Step 3a	Refinement of Preliminary Chemicals of Potential Concern

Steps 1, 2, and 3a are the first three steps of the eight ecological risk evaluation steps required by USEPA guidance and the Navy Policy for Conducting Ecological Risk Assessments. Steps 1 and 2 constitute a SERA, and Steps 3 through 7 constitute a Baseline ERA (BERA), which concludes with Step 8, a risk management evaluation. Step 3a is technically the first step of the BERA and it consists of a refinement of the conservative exposure assumptions. USEPA Region 4 recognizes that most ecological risk assessments will proceed to Step 3, and facilities are encouraged to submit the results of Steps 1 through 3 as a single deliverable document (USEPA, June 2000). With this in mind, the risk assessment process for SWMUs 16 and 17 includes Step 3a. Steps 3b through 7 are conducted if additional evaluations or investigations are necessary. Aspects of Step 8, risk management, are addressed throughout the ERA process, in cooperation with the Region 4 regulators.

7.1 SCREENING-LEVEL PROBLEM FORMULATION

The screening-level problem formulation is the first step of the SERA and includes identification of potential receptor groups, potential contaminants, and the mechanisms for contaminant fate, transport, and toxicity. Determination of the complete exposure pathways that exist at a site is accomplished at this point to facilitate receptor selection. Site habitats, exposure pathways, and potential ecological receptors are identified as part of the receptor selection. The problem formulation process enables the risk

assessor to identify the ecological resources to be protected (known as assessment endpoints); the measurements that will be used to evaluate risks to those resources (known as measures of effects); and the chemicals, geographic areas, and environmental media relevant to the risk assessment.

7.1.1 Environmental Setting

The basewide environmental setting at NWS Charleston and site-specific environmental settings for SWMU 16 and SWMU 17 are discussed below.

Basewide Environmental Setting

The Integrated Natural Resources Management Plan (INRMP) for Naval Weapons Station Charleston, South Carolina was developed by the Navy (Southern Division) to provide "for integrated land management, fish and wildlife management and outdoor recreation management by implementing an ecosystem approach to natural resources" (Navy, 2003). As described in the INRMP, NWS Charleston consists of 16,307 acres, of which 9,100 acres are managed commercial forest and 12,000 acres are managed fish and wildlife areas.

NWS Charleston is located approximately 16 river miles from the Atlantic Ocean. NWS Charleston lies in the Cooper River watershed and is bisected by two major water systems: Foster Creek in the northern portion of the facility and Goose Creek in the southern portion of the facility. Foster Creek empties into Back River, which eventually drains into Cooper River with Goose Creek (Navy, 2003). Due to its coastal location, much of NWS Charleston consists of salt, brackish, and freshwater marshes and wetlands. There are 17 freshwater ponds on the facility, which comprise approximately 226 acres. Due to its close proximity to the Atlantic Ocean, low-lying areas and wetlands (such as the vicinity of SWMU 16 and 17) are daily influenced by tidal fluctuations; these areas provide habitats for a variety of game and non-game species. Game species include deer, rabbit, and waterfowl. Non-game species include various birds, amphibians, and reptiles.

The NWS Charleston landscape was radically altered in 1989 by Hurricane Hugo. The hurricane caused significant habitat destruction and alteration. Many of the indigenous species at the facility were forced from their habitats or otherwise destroyed. In particular, the federally endangered red-cockaded woodpecker, which requires old growth open pine forests for habitat, has experienced a decline in population because the forest type needed for its survival was destroyed by the hurricane (Navy, 2003). NWS Charleston actively manages 2,500 acres for the red-cockaded woodpecker.

The predominant forest types at NWS Charleston are loblolly pine, loblolly pine/hardwood, and longleaf pine. Other forest types, though less prominent at the facility, include bottomland hardwoods, live oak hammocks, and bald cypress/gum ponds (Navy, 2003).

Site-Specific Environmental Setting

SWMU 16 is located in the southern part of NWS Charleston (Figures 1-1 and 1-2). It encompasses an area of approximately 10 acres. Various debris, predominantly construction rubble, lies on the surface. The site was the primary landfill used for disposal of solid and liquid waste generated at NWS Charleston between 1941 and 1978. In addition, approximately 500 mercury batteries were disposed of at random locations in the landfill, and 90 mm shells were discarded at the site, of which approximately 40 were removed in 1980. SWMU 16 was closed in 1980 and covered with approximately 2 feet of local fill soil. There is no reason to suspect the fill soil to be hazardous because it was from an undisturbed, non-industrial area of the base. Rubbish of mainly wood, concrete, metal, and plastic was removed from along the marsh edge, and riprap was installed along the edge of the marsh. Additionally, approximately 0.3 acre in the southeastern portion of SWMU 16 is the site of a debris pile; according to the Base point of contact, the debris pile originated after soil cover placement in 1980. Surface waste was historically disposed in this debris area.

SWMU 16 habitats consist of a forested area along the edge of an extensive marsh. The forest can be classified as loblolly pine/hardwood. Primary tree species consist of loblolly pine (*Pinus taeda*), sweetgum (*Liquidambar styraciflua*), oaks (*Quercus spp.*), cabbage palm (*Sabal palmetto*), and the invasive exotic Chinese tallowtree (*Sapium sebiferum*). Common shrubs and vines include muscadine grape (*Vitis rotundifolia*), saltbush (*Baccharis halimifolia*), wax myrtle (*Myrica cerifera*), and the invasive exotic privet (*Ligustrum spp*). Thick stands of common reed (*Phragmites australis*) are found in some areas along the forest edge. The western edge of the site is part of an extensive tidal marsh along Goose Creek; the marsh is dominated by smooth cordgrass (*Spartina alterniflora*). Individuals in the marsh interior are stunted while those along the edges are taller and darker. The difference in appearance among the *Spartina alterniflora* is "high" versus "low" marsh plants, that is, there is considerable variation in *Spartina* based on their location within the marsh. Interestingly, *Spartina alterniflora* is deciduous and stems die back at the end of each growing season, which may explain nearly bare mud at some locations on some occasions. Numerous wildlife species undoubtedly use the forested portion of the site. The marsh provides habitat for numerous semi-aquatic species such as the raccoon, mink, and various birds. Numerous fiddler crabs are typically seen along the edge of the marsh.

SWMU 17 is located in the southern part of NWS Charleston, immediately east of SWMU 16 (Figures 1-1 and 1-2). The site is rectangular in shape and measured 180 feet long and 90 feet wide. However, the actual size was suspected to be larger and based on the geophysical survey conducted in 2000 and

based on historical aerials showing disturbed areas. Therefore, the site boundary was conservatively expanded to 500 feet long by 200 feet wide. The site was used primarily for surface disposal of solid waste between 1950 and 1978, but oils and missile components were also disposed at the site.

SWMU 17 is entirely forested, and consists of the same species as at nearby SWMU 16. These include loblolly pine, sweetgum, oaks, cabbage palm, Chinese tallowtree, muscadine grape, saltbush, wax myrtle, and privet (*Ligustrum spp*).

Threatened and Endangered Species

The INRMP lists federal and State threatened and endangered species that potentially occur at NWS Charleston. Three reptiles/amphibians, seven birds, two mammals, one fish, and three plants are listed (Navy, 2003). An internet search was conducted to verify that the species listed in the INRMP did not experience a change in status. The South Carolina Department of Natural Resources (SCDNR) website (www.dnr.state.sc.us/pls/heritage/county_species.list?pcounty= charleston) and the United States Fish and Wildlife Service (USFWS) website (www.fws.gov/endangered/wildlife.html) were reviewed. Only one species experienced a change in status. The Southeastern myotis (*Myotis austroriparius*) was downgraded from a State threatened species to a State species of concern.

Rare, threatened, and endangered plant surveys were conducted at NWS Charleston in 1987 and 1993 by a local botanist. No threatened or endangered plant species were found (Navy, 2003).

A rare, threatened, and endangered amphibians and reptiles survey was conducted at NWS Charleston in 1994 by SCDNR. No State or federal threatened or endangered species were found (Navy, 2003).

A threatened and endangered mammal survey was conducted at NWS Charleston in 2001 by SCDNR. One bat species, the Southeastern myotis (*Myotis austroriparius*), currently State listed as a species of concern, was captured. The presence of the Eastern woodrat (*Neotoma floridana*) and the fox squirrel (*Sciurus niger*), both State-listed as species of concern, was confirmed (Navy, 2003).

In 2000, a red-cockaded woodpecker (*Picoides borealis*) survey was conducted to survey, monitor, and manage historical woodpecker stands. One male woodpecker was found and banded (for future surveying), but no mating or nesting activities were observed (Navy, 2003). NWS Charleston currently conducts surveys every 5 years to monitor the presence of red-cockaded woodpeckers and their habitat. The last survey was completed in 2000. Annual monitoring activities for this State and federally endangered bird are conducted to track the number of adults and fledglings at each identified site and to determine the sex of birds, number of breeding groups, and number of nests (Navy, 2003).

NWS Charleston actively manages the facility for the red-cockaded woodpecker, bald eagle (*Haliaeetus leucocephalus*), American alligator (*Alligator mississippiensis*), West Indian manatee (*Trichechus manatus*), wood stork (*Mycteria americana*), shortnose sturgeon (*Acipenser brevirostrum*), least tern (*Sterna antillarum*), swallow-tailed kite (*Elanoides forficatus*), flatwoods salamander (*Ambystoma cingulatum*), Canby's dropwort (*Oxypolis canbyi*), pondberry (*Lindera melissifolia*), chaff-seed (*Schwalbea americana*), Rafinesque's big-eared bat (*Corynorhinus rafinesquii*), and Southeastern myotis (Navy, 2003). Other species may be added to this list as they become State or federally listed as threatened or endangered. Species surveys are conducted to identify newly listed species at the facility and monitor changes in the above-listed populations and habitats. This information is used in management practices and may result in the modification of certain practices, as necessary.

No threatened or endangered species have been recorded at SWMU 16 or SWMU 17. Some of these species, however, might occasionally forage in the marsh at SWMU 16, especially in the deeper channels associated with Goose Creek slightly beyond the western boundary of SWMU 16. In particular, wood storks might occasionally forage in shallow water in the marsh, bald eagles might forage in the creek channels, and alligators might also be found in the channels, although alligators are principally inhabitants of freshwater swamps and marshes. The two listed bat species might forage over the site, but would probably not roost there, due to the lack of large hollow trees. None of the threatened and endangered species in the previous paragraph would be expected to occur at SWMU 17, but the two listed bat species might forage over the site.

7.1.2 Contaminants, Ecotoxicity, and Fate and Transport

As discussed in Section 4.0, SWMU 16 was the primary landfill used for disposal of solid and liquid waste generated at NWS Charleston between 1941 and 1978. Solid wastes consisted of household waste, construction and demolition materials, empty containers from shop areas, and metal waste. Additionally, approximately 500 mercury batteries were disposed at random locations in the landfill and 90 mm shells were discarded at the site. Liquid wastes included oily wastes and solvents generated by NWS, POMFLANT, and ships. An estimated 5,000 to 15,000 gallons of waste oil and solvents (i.e. toluene, MEK, xylenes, and acetone) were disposed of at the site annually (Harmon Engineering and Testing, 1984).

SWMU 17 was used primarily for surface disposal of solid waste between 1950 and 1978, but oils and missile components were also disposed at the site. Solid waste observed included rubble, paint cans and buckets, and missile components. An estimated 3,000 to 4,000 gallons of engine oil were disposed of at the site between 1965 and 1966 (Harmon Engineering and Testing, 1984). Empty drums and other debris are still present at SWMU 17.

A detailed discussion of contaminant fate and transport was presented in Section 5.0. Based on the historical activities and sampling, the following classes of site-related chemical contaminants are known to be present or potentially present in environmental media in SWMUs 16 and 17:

- VOCs (e.g., TCE and breakdown products)
- SVOCs (e.g., benzo(a)pyrene)
- Explosives (e.g., 2,4,6-TNT)
- Pesticides (e.g., 4,4'-DDT)
- PCBs (e.g., Aroclor-1254)
- Metals (e.g., lead)

The primary contaminant migration pathways applicable at these SWMUs are erosion and infiltration. Since most of SWMU 16 and SWMU 17 are covered with vegetation and a thick detritus layer, wind and soil erosion are not likely significant migration pathways. However, if surface soil is disturbed through activities such as excavation, soils could serve as a source for airborne transport of contaminants, and soil contaminants could then be transported to downwind locations. Soil erosion along the marsh edge at SWMU 16 would be possible during high tides and severe storms, but such erosion was not apparent during site visits..

Infiltrating precipitation has resulted in the contamination of subsurface soil and groundwater at SWMUs 16 and 17; however, surface water samples were collected from both SWMUs for evaluation. Therefore, it is not necessary to evaluate groundwater contaminant concentrations for the pathway of groundwater seeping into surface water, and this is not discussed further in this section.

Emission and volatilization of VOCs is also a potential migration pathway at the SWMUs; however, the inhalation pathway is not considered to be of significant concern. Although inhalation of particulates by mammals and birds may be a complete pathway, it is expected to be insignificant compared to other pathways such as ingestion of food items that have bioaccumulated contaminants from soil. Additionally, at SWMU 16, solvents have not been disposed since 1978 when dumping ceased. Moreover, both SWMUs are wetlands and so airborne migration of particulates is expected to be nominal. Also, inhalation pathways are not typically evaluated in SERAs because of the uncertainty inherent in estimating exposure levels and toxicological effects. Therefore, the air inhalation pathway is not evaluated in this SERA.

Physical and chemical characteristics of contaminants may affect their mobility, transport, and bioavailability in the environment. These characteristics include bioaccumulation factors (BAFs), organic carbon partition coefficients, and octanol-water partition coefficients. The physical and chemical

characteristics and ecotoxicity of the different chemical classes present in SWMUs 16 and 17 media are presented in Appendix G.1.

7.1.3 Complete Exposure Pathways

Soil invertebrates are exposed to soil contaminants at SWMUs 16 and 17 through ingestion and dermal contact. Higher trophic-level animals such as birds and small mammals will be exposed to site-related contamination through ingestion of contaminated food items. These animals can also incidentally ingest contaminants in soil while grooming fur, preening feathers, digging, grazing close to the soil, or feeding on items to which soil has adhered. Absorption of contaminants from the gastrointestinal tract is the primary pathway of intake for terrestrial receptors. Exposure to contaminants in soil through dermal contact could occur but is unlikely to represent a major exposure pathway because fur, feathers, and chitinous exoskeletons minimize transfer of contaminants across dermal tissue.

The airborne transport of dust is a negligible pathway for terrestrial animals because the SWMUs are covered by grass, mature trees, and shrubs. Similarly, the inhalation pathway is not significant (see Section 7.1.2).

Terrestrial vegetation could be exposed to contaminants via contact with soil and subsequent root translocation. Aerial deposition is a negligible pathway for plants and animals at SWMUs 16 and 17 because, as previously mentioned, the SWMUs are largely covered by vegetation and detritus, reducing the amount of bare soil and fugitive dust.

Small finger-like tributaries drain SWMU 16 in the direction of Goose Creek. Seven surface water/sediment samples were collected in these small tributaries to evaluate whether SWMU 16 contaminants were migrating and potentially impacting aquatic organisms. There are no surface water bodies at SWMU 17, but a tidal marsh is located approximately 300 feet east of the site. Ecological receptors are not directly exposed to contaminants in groundwater, but they are indirectly exposed to groundwater discharging into surface water. For this reason, one surface water/sediment sample (17SW/SD01) was collected approximately 400 feet east of the site in the marsh, to evaluate whether contaminants in SWMU 17 groundwater are discharging to surface water.

Figures 7-1 and 7-2 are the CSMs for SWMU 16 and 17, respectively. A complete exposure pathway has three components: a source of contaminants that can be released to the environment; a route of contaminant transport through an environmental medium; and an exposure or contact point for an ecological receptor. As explained in Step 1 of USEPA's ecological risk assessment guidance (USEPA, 1997a), if an exposure pathway is not complete, that exposure pathway does not need to be evaluated.

This is the case for groundwater at SWMUs 16 and 17. Because surface water samples were collected at both SWMUs, groundwater contaminants will be evaluated through surface water samples in this ERA.

In summary, complete exposure pathways and routes of entry into biota at SWMU 16 and SWMU 17 that will be evaluated as part of this SERA consist of the following:

- Direct contact with soil, sediment, and/or surface water
- Incidental ingestion of soil, sediment, and/or surface water
- Ingestion of contaminated food items

7.1.4 Preliminary Assessment and Measurement Endpoints

USEPA Region 4 has specified that assessment endpoints for the screening-level assessment should be broad and generic. For the screening-level assessment, the preliminary assessment endpoint is the protection of the following ecological receptors from adverse effects of chemicals on their growth, survival, and reproduction:

- Soil invertebrates
- Terrestrial vegetation/plants
- Herbivorous birds and mammals
- Insectivorous birds and mammals
- Benthic macroinvertebrates (and other aquatic organisms)
- Fish
- Amphibians and reptiles
- Piscivorous birds and mammals (SWMU 16 only)

The following paragraphs discuss the reasons that the above assessment endpoints were selected for evaluation in the SERA.

Soil Invertebrates: Soil invertebrates are expected to be present in soil at SWMUs 16 and 17. They aid in the formation of soil and the redistribution and decomposition of organic matter in soil, and they serve as a food source for higher trophic-level organisms. They also can accumulate bioaccumulative contaminants that can then be transferred to higher trophic-level organisms that consume soil invertebrates.

Terrestrial Vegetation: Terrestrial vegetation at SWMUs 16 and 17 consists of grasses, shrubs, and trees. Terrestrial vegetation serves as a food source and provides shade and cover for many organisms and

helps to prevent soil erosion, among other important functions. Terrestrial vegetation can accumulate some contaminants that can then be transferred to higher trophic-level organisms that consume plants.

Herbivorous Birds and Mammals: Herbivorous birds and mammals (i.e., animals that consume only plant tissue) may be present in vegetative habitats at SWMUs 16 and 17. Their role in the community is essential because, without them, higher trophic levels could not exist (Smith, 1966). They may be exposed to and accumulate contaminants present in terrestrial vegetation and plants they consume.

Insectivorous Birds and Mammals: The term "insectivorous" refers to insect-eating organisms, and "vermivorous" refers to worm-eating organisms. However, most animals that consume worms also consume adult and larval insects and other arthropods, and no animals at SMWUs 16 and 17 are strictly insectivorous or strictly vermivorous. Henceforth, in this ERA, the term insectivorous is used in a broad sense to describe birds and mammals whose primary prey is a combination of worms, adult and larval insects, and other arthropods.

Insectivorous birds and mammals are present throughout NWS Charleston in different terrestrial habitats (i.e., forested, open field) and are likely present at SWMUs 16 and 17. These are considered first-level carnivores, and they serve as a food source for higher trophic-level carnivores. They may be exposed to and accumulate contaminants present in soil invertebrates they consume.

Benthic Macroinvertebrates (and other aquatic organisms): Benthic macroinvertebrates (and other aquatic organisms) are similar to soil invertebrates in that they serve as a food source for higher trophic-level organisms (i.e., fish, amphibians, birds, and mammals). All aquatic organisms can accumulate contaminants that can then be transferred to higher trophic-level organisms such as fish in Goose Creek or its tributaries that consume them.

Fish: Fish may be exposed to and can accumulate contaminants from the food items they consume or from the surface water in which they live. Additionally, fish can accumulate contaminants that can then be transferred to higher trophic-level organisms that consume them.

Amphibians and Reptiles: Amphibians are expected to inhabit water bodies and the surrounding areas, and reptiles can inhabit both aquatic environments and terrestrial habitats. Amphibians and reptiles feed primarily on invertebrates, plants, fish, and/or small mammals. They are exposed to and can accumulate contaminants from the food items they consume or from the surface water, sediment, or surface soil in which they live.

Piscivorous birds and mammals: Piscivorous birds and mammals consist of birds and mammals that eat fish. These are considered first-level carnivores, and they serve as a food source for higher trophic-level carnivores. They may be exposed to and accumulate contaminants present in the food items they consume. Piscivorous birds and mammals are evaluated at SWMU 16 because they are potentially exposed to contaminants that have migrated from SWMU 16 to Goose Creek and its tributaries and accumulated in fish they consume.

Not all of the potential assessment endpoints listed above will be evaluated in the SERA. As indicated in USEPA guidance (USEPA, June 1997), "it is not practical or possible to directly evaluate risks to all of the individual components of the ecosystem at a site. Instead, assessment endpoints focus the risk assessment on particular components of the ecosystem that could be adversely affected by contaminants from the site." Therefore, the SERA will focus on the endpoints that will tend to yield the highest risks, which should then account for endpoints that will have lower risks. For example, omnivores were not selected as assessment endpoints because exposure to contaminants in plants is greatest for herbivores, and exposure to contaminants in invertebrates is greatest for insectivorous birds and mammals. Therefore, omnivores will be protected by protecting herbivores and insectivorous birds and mammals. Additionally, large carnivorous mammals and birds (e.g., red fox, red-tailed hawk) were not selected as assessment endpoints because the greatest exposure to site contaminants is expected to occur for small mammals and birds that ingest soil invertebrates, fish, or plants. Additionally, the contaminated area at SWMUs 16 and 17 represent only a small percentage of these large carnivores' home ranges. Conservative data indicate a home range size of 150 hectares (ha) (370 acres, southern Michigan fields and wood lots) for the red-tailed hawk and 78 ha (193 acres, Wisconsin marsh, forests, and prairies) for the red fox (USEPA, December 1993). The potentially contaminated surface area at SWMU 16 (represented by the debris area where surface soil samples were collected) is approximately 0.3 acre, and SWMU 17 is approximately 2 acres. These small areas represent only a fraction of where these large carnivores potentially hunt and feed, less than 1 percent for the hawk and fox. Therefore, by protecting the small mammals and birds, large carnivorous mammals and birds will also be protected.

Measurement endpoints represent the assessment endpoints chosen for a site and are measures of biological effects (USEPA, June 1997). The preliminary measurement endpoints were chemical concentrations in surface soil, sediment, and surface water that are associated with no adverse effects on growth, survival, and reproduction of terrestrial organisms. The measurement endpoints are represented by USEPA Region 4 ecological screening values (ESVs). USEPA Ecological Soil Screening Levels (Eco-SSLs) were used in place of the EPA Region 4 ESVs for surface soil contaminants as the measurement endpoints for chemicals when Eco-SSLs were available.

Measurement endpoints are estimates of measurable biological impacts (e.g., mortality, growth, and reproduction) that are used to evaluate the assessment endpoints. The following measures of effects are used to evaluate the assessment endpoints in the SERA:

- Surface soil, sediment, and surface water screening values - Mortality, growth, and reproduction of plants and soil invertebrates is evaluated by comparing the measured concentrations of chemicals in surface soil, sediment, and surface water to screening values designed to be protective of ecological receptors.

  The USEPA Region 4 ESVs for surface soil are based on conservative endpoints and sensitive ecological effects data and thus the screening values represent chemical concentrations associated with a low probability of unacceptable risks to ecological receptors. For this reason, USEPA Region 4 considers the soil ESVs to be protective of terrestrial invertebrates and plants as well as upper-level receptors such as birds and mammals. Additionally, the lesser of the plant, invertebrate, mammalian, and avian USEPA (2005) Eco-SSLs was used (in place of the ESVs) for chemicals when Eco-SSLs were available. In the initial screening therefore, a distinction is not made between measurement endpoints associated with direct toxicity to invertebrates and plants and measurement endpoints associated with food-chain effects. Distinctions between the assessment endpoints are not made until the Step 3a refinement of COPCs.

  Mortality and other adverse effects (e.g., growth, feeding rates, and behavioral changes) of benthic macroinvertebrates and other aquatic organisms will be evaluated by comparing the measured concentrations of chemicals in sediment and surface water to screening values designed to be protective of ecological receptors.

7.2 SCREENING-LEVEL ECOLOGICAL EFFECTS EVALUATION

For the SERA, maximum concentrations of chemicals were compared to USEPA Region 4 ESVs (USEPA, November 2001). For surface soil, the USEPA Eco-SSLs were used in place of the Region 4 ESVs for chemicals in which Eco-SSLs are available. If the maximum concentration was less than the ESV (or the Eco-SSL), the chemical was eliminated from further consideration. If the maximum concentration equaled or exceeded the screening level, or if a screening level was not available, the chemical was considered to be an ecological COPC and was retained for further study in the ERA.

7.3 SCREENING-LEVEL EXPOSURE ESTIMATE AND RISK CALCULATION

The complete surface soil, sediment, and surface water datasets are presented in Appendix E.

The term "surface soil" is used in this risk assessment to refer to soil collected from no deeper than the 0- to 1-foot depth interval because USEPA Region 4 considers this depth to be representative of surface soil.

The following are the rules used in the selection of ecological COPCs:

- A contaminant was retained as a COPC if the maximum detected concentration exceeded the associated ESV (or substituted screening level) in surface soil, surface water, or sediment. Contaminants retained as COPCs are further evaluated as part of Step 3a of the eight-step ERA process.

- Calcium, magnesium, potassium, and sodium were not retained as COPCs in any medium because of their relatively low toxicity to ecological receptors and their high natural variability in concentrations. These metals are considered essential nutrients.

- Contaminants without ESVs (or substituted screening levels, as appropriate) were retained as COPCs for further evaluation as part of Step 3a of the eight-step ERA process.

An HQ approach was used to characterize the risk to ecological receptors. This approach characterizes the potential effects by comparing exposure concentrations with effects data. The HQs for terrestrial receptors were calculated as follows:

$$HQ = \frac{C_{ss}}{SSSL}$$

where:

C_{ss} = contaminant concentration in surface soil (µg/kg or mg/kg)

SSSL = surface soil screening level (µg/kg or mg/kg), as described above

The HQs for the aquatic receptors were calculated as follows:

$$HQ = \frac{C_{sw}}{SWSL} \text{ or } \frac{C_{sd}}{SDSL}$$

where:

C_{sw} = contaminant concentration in surface water (µg/L)

C_{sd} = contaminant concentration in sediment (µg/kg or mg/kg)

SWSL = surface water screening level (µg/L)

SDSL = sediment screening level (µg/kg or mg/kg)

An HQ greater than 1.0 was considered to indicate potential risk. Such values do not necessarily indicate that an effect will occur but only that a low (i.e., conservative) threshold has been exceeded.

7.3.1 SWMU 16 COPCs

Table 7-1 is the conservative COPC screening for chemicals detected in surface soil at SWMU 16. In surface soil, one VOC, four SVOCs, two pesticides, one PCB, and 10 metals were selected as COPCs. Of these the one VOC, all four SVOCs, and two metals were selected as COPCs because USEPA Eco-SSLs and Region 4 ESVs are not available.

Table 7-2 is the conservative COPC screening for chemicals detected in sediment at SWMU 16. In sediment, one VOC, six SVOCs, seven pesticides, one PCB, and 15 metals were selected as COPCs. Of these, the one VOC, three SVOCs, and eight metals were selected as COPCs because Region 4 ESVs are not available.

Table 7-3 is the conservative COPC screening for chemicals detected in surface water at SWMU 16. In surface water, one VOC, two explosives, and nine metals were selected as COPCs. Of these, the one VOC, both explosives, and four metals were selected as COPCs because Region 4 ESVs are not available.

7.3.2 SWMU 17 COPCs

Table 7-4 is the conservative COPC screening for chemicals detected in surface soil at SWMU 17. In surface soil, nine VOCs, 17 SVOCs, nine pesticides, three PCBs, and 12 metals were selected as COPCs. Of these, seven VOCs, five SVOCs, three pesticides, and one metal were selected as COPCs because USEPA Eco-SSLs and Region 4 ESVs are not available.

Table 7-5 is the conservative COPC screening for chemicals detected in sediment at SWMU 17. In sediment, one VOC, three pesticides, and 10 metals were selected as COPCs. Of these, the one VOC, two SVOCs, and seven metals were selected as COPCs because Region 4 ESVs are not available.

Table 7-6 is the conservative COPC screening for chemicals detected in surface water at SWMU 17. In surface water, seven metals were selected as COPCs. Five of these metals were selected as COPCs because Region 4 ESVs are not available.

7.4 STEP 3A - REFINEMENT OF COPCS

At this point, the first two steps of the ERA have been completed. The ERA process includes a series of scientific/management decision points (SMDPs) (USEPA, June 1997). The first SMDP occurs at the end of Step 2 and requires the risk managers to evaluate and approve or redirect the work up to that point and determine whether the risk assessment will continue into Step 3. However, USEPA Region 4 recognizes that most ERAs will proceed into Step 3, and facilities are encouraged to submit the results of Steps 1 through 3 as a single deliverable document (USEPA, June 2000). With this in mind, and because the SERA indicates a potential for adverse effects, a more thorough assessment is warranted. Therefore, the risk assessment process for SWMUs 16 and 17 will proceed into Step 3 (Baseline Risk Assessment Problem Formulation), specifically Step 3a, refinement of the COPCs.

7.4.1 General Approach

The BERA begins with a more balanced evaluation of the conservativeness inherent in the first two steps of the risk assessment process (USEPA, June 1997; Navy, 1999). The initial phase of Step 3 is typically known as Step 3a and consists of a refinement of the conservative exposure assumptions to more realistically estimate potential risks to ecological receptors (i.e., plants, invertebrates, and wildlife receptors). Examples of factors considered during Step 3a include toxicological evaluation of COPCs (including the use of surrogate chemicals), spatial distribution of contaminants, food-chain modeling, and habitat quality (USEPA, June 1997; Navy, 1999).

Additionally, site concentrations were compared to available background data to evaluate the levels of contaminants related to SWMU activities and levels representative of background conditions. This comparison is made because toxicity values used in the screening are typically conservative. Therefore, although concentrations of chemicals detected in surface soil, sediment, and/or surface water may exceed a conservative toxicity value, risks to ecological receptors may not necessarily be related to SWMU activities and are better characterized as those that would be expected from background conditions. Surface soil concentrations were compared to background hydric soil concentrations collected as a part of the Baseline Background Study report (TtNUS, 2002), where applicable. Sediment and surface water concentrations were compared to two times chemical concentrations detected at location 23SW/SD08. Samples were collected from this location as part of the supplementary field investigation RFI for SWMU 23 – Old South Annex Sanitary Landfill (TtNUS, 2000). This location was selected for the SWMU 16 and 17 background comparison because it is located upgradient of SWMUs 16 and 17 in Goose Creek in an area not expected to be impacted by any other SWMUs at NWS Charleston.

7.4.2 Risks to Terrestrial Wildlife

Food-chain modeling is conducted to investigate potential risks to representative receptors from COPCs that are known to bioaccumulate or biomagnify (USEPA, February 2000) because most benchmark values are not designed to evaluate risks to terrestrial wildlife via the ingestion of soil, sediment, surface water, and food items. Therefore, a terrestrial intake model was used to estimate exposure of terrestrial receptors to COPCs. Food-chain modeling was conducted only on COPCs that are considered to be bioaccumulative [i.e., included in the list of important bioaccumulative chemicals in USEPA (February 2000)], excluding PAHs. USEPA Region 4 considers the potential toxicity of PAHs via the terrestrial food web to be generally negligible unless PAHs are present at extremely high concentrations (i.e., percent levels, 10,000 mg/kg) in soil. If the maximum chemical concentration was less than the Region 4 ESV (or USEPA Eco-SSL for surface soil) or if the chemical is not bioaccumulative, it was not carried through the food-chain model; such chemicals are not causing an unacceptable risk to wildlife at SWMUs 16 and 17. Additionally, although terrestrial wildlife can be exposed to contaminants in surface water through ingestion, this pathway was not included in the terrestrial food-chain models at SWMUs 16 and 17 because the only surface water at the sites is saltwater.

Ingestion is the primary route of exposure for most mammals and birds. The selection of species used to represent the receptor groups identified in Section 7.1.4 was based on considerations of their preferred habitat, body size, sensitivity to contaminants, home range, abundance, commercial or sport utilization, legal status, and functional role (e.g., predators). The availability of exposure parameters such as body mass, feeding rate, and drinking rate was also a factor in selecting the representative species. Receptor profiles for each of the following chosen representative species are presented in Appendix G.2:

- Herbivorous mammal – cotton mouse
- Herbivorous bird – mourning dove
- Insectivorous mammal – short-tailed shrew
- Insectivorous bird – American woodcock
- Piscivorous bird – marsh wren (see following paragraph)
- Piscivorous mammal – raccoon

The marsh wren is not typically selected to represent piscivorous (fish-eating) birds in ERAs and is not actually piscivorous. The extensive vegetation cover of the marsh at SWMU 16 however, largely precludes foraging by piscivorous wading birds (e.g., herons or egrets), by piscivorous accipiters (e.g., osprey, bald eagle), or by piscivorous diving birds such as kingfishers, in most of the marsh. Marsh wrens, conversely, are common bird inhabitants of freshwater and estuarine marshes. Marsh wrens consume aquatic insects and invertebrates by gleaning from the water surface, on stems and leaves of

aquatic plants, and the marsh bottom. This species would be present at SWMU 16 and potentially exposed to contaminated food items in sediment and surface water, thus it is an appropriate representative receptor through which sediment and surface water contamination via the food chain can be evaluated. With this in mind, the term "piscivorous bird," is used in this report in a very broad sense to describe birds that prey on a variety of aquatic and sediment organisms. Similarly, raccoons are opportunistic feeders that consume a wide variety of terrestrial and aquatic plants and animals, particularly frogs, crayfish, crustaceans, insects, fleshy fruits, nuts, acorns, and grains. Despite the fact that the raccoon is omnivorous rather than strictly piscivorous, it can nevertheless be used as a piscivorous receptor in food-chain modeling. The marsh wren and raccoon have been used as representative receptors in previous ERAs at NWS Charleston.

The methods used to model the doses that representative receptors could receive as well as the selection of toxicity reference values (TRVs) are presented below. Risks to terrestrial receptors as a result of exposure to COPCs in the soil and sediment were determined by estimating the chronic daily intake (CDI) and comparing the CDI to TRVs representing acceptable daily doses in mg per kg-day. The TRVs were developed from no-observed-adverse-effect-levels (NOAELs) and lowest-observed-adverse-effect-levels (LOAELs) obtained from wildlife studies. The majority of the TRVs came from the Oak Ridge National Laboratory (ORNL) Toxicological Benchmarks for Wildlife: 1996 Revision (Sample et al., 1996).

Appendix G.3 presents the derivation of the TRVs. Table G.3-1 in Appendix G.3 presents the TRVs that were used in the food-chain modeling. If a LOAEL study was used to develop the NOAEL TRV, the LOAEL was multiplied by a factor of 0.1 to obtain the NOAEL.

COPC intake for wildlife exposed to bioaccumulative COPCs in surface soil was estimated as daily dose (mg per kg-day) using exposure equations. The contaminant concentrations in surface soil and sediment were used to calculate CDI doses. The following equations presents the CDI equations used in calculating a total daily dose for the representative species selected for modeling:

$$\text{Dose, surface soil or sediment (mg/kg - day)} = \frac{(SC * SI)}{BW}$$

$$\text{Dose, food (mg/kg - day)} = \frac{(FC * FI)}{BW}$$

$$\text{Total CDI (mg/kg - day)} = [\text{Dose (surface soil or sediment)} + \text{Dose (food)}] * H$$

Where:
- FI = food ingestion rate (kg/day)
- FC = food concentration (mg/kg)
- BW = body weight (kg)
- SI = incidental soil or sediment ingestion rate (kg/day)
- SC = surface soil or sediment concentration (mg/kg)
- H = home range/contaminated area (assumed = 1 for maximum exposure)

The "H" term in the above equation is defined as the home range divided by the contaminated area and is assumed equal to 1.0 in the maximum exposure scenario. For some species however, home range data are not available. For example, the Exposure Factors Handbook (USEPA, December 1993) provides only territory data (as opposed to home range data) for some species, in particular birds. A distinction between the terms "territory" and "home range" is important in the Step 3a evaluation of risks to terrestrial wildlife. The term "territory" refers to the area occupied by an animal or group of animals that is forcibly defended against by intruders of the samples species. The home range is the area within which an animal normally spends all, or most, of its time in the course of a season (Dasmann, 1981), and home ranges of birds are usually larger than their territories.

For pesticides, PCBs, and metals in surface soil at SWMUs 16 and 17 and metals in sediment at SWMU 16, the contaminant concentration of prey items (e.g., earthworms, vegetation, benthic invertebrates, and fish) for the insectivorous, herbivorous, and piscivorous species is calculated using the following equation:

$$FC = SC * BAF$$

Where:
- FC = contaminant concentration in food (e.g., earthworms, vegetation, benthic invertebrates, and fish, kg/day)
- SC = contaminant concentration in surface soil or sediment (mg/kg)
- BAF = soil to plant, soil to invertebrate, sediment to benthic invertebrate, or sediment to fish bioaccumulation factor (unitless)

For pesticides and PCBs in sediment at SWMU 16, the contaminant concentration of prey items (e.g., benthic invertebrates and fish) is calculated using the following equation:

$$FC = \frac{SC * \%L * BSAF}{\%TOC}$$

Where:
- FC = Contaminant concentration in food (mg/kg)
- SC = Contaminant concentration in sediment (mg/kg)

%L = Percentage of lipids in fish [14.4 = the average of various species of sunfish. Appendix G.4 presents the calculation used to derive this value (USEPA, September 1997)]

BSAF = Biota-Sediment Accumulation Factor (chemical-specific)

%TOC = Percentage of total organic carbon (TOC) in sediment (assumed 1 because site-specific sediment TOC data are not available; note using 1 percent is possible underestimating TOC since SWMU 16 surface soil TOC samples are approximately 1.5 to 2.5 percent)

The following sources of BAFs and BSAFs were used in the SERA:

- Plant BAFs (Organics): Toxicity and Chemical-Specific Factors Database (ORNL, 2005).
- Plant BAFs (Inorganics): Empirical Model for the Uptake of Inorganic Chemicals from Soil by Plants (ORNL, 1998a).
- Soil Invertebrate BAFs: Development and Validation of Bioaccumulation Models for Earthworms (Sample et al., 1998a).
- BSAFs (Inorganics): Biota Sediment Accumulation Factors for Invertebrates: Review and Recommendations for the Oak Ridge Reservation (ORNL, 1998b).
- BSAFs (Organics) The Incidence and Severity of Sediment Contamination in Surface Waters of the United States, Volume 1: National Sediment Quality Survey (USEPA, September 1997).

Table G.1-1 in Appendix G.1 presents chemical-specific BAFs and other BAF data.

The exposure assumptions (e.g., ingestion rates and body weight) were obtained from the Wildlife Exposure Factors Handbook (USEPA, December 1993) or other literature sources. The exposure parameters from USEPA (1993) are wet weight values; however, the BAFs presented in the above sources estimate the tissue concentrations in dry weight. Therefore, the exposure parameters from USEPA (1993) were converted to dry weight values for the food-chain model calculations. Table 7-7 presents the exposure parameters that were used in the SERA, and Appendix G.2 presents the values that were used to calculate the exposure parameters and a discussion of how they were calculated.

An HQ approach was used to characterize the risk to terrestrial receptors. This approach characterizes the potential effects by comparing exposure concentration with effects data. Similar to the initial

conservative screening conducted in Section 7.3, an HQ of greater than 1.0 is considered indicative of a potential risk. The HQ is not an expression of probability, and the meaning of values greater than 1.0 must be interpreted in light of attendant uncertainties in risk management.

The HQ for the terrestrial wildlife model was calculated as follows:

$$HQ = \frac{\text{Total CDI}}{\text{TRV}}$$

Where: HQ = hazard quotient (unitless)
Total CDI = total daily intake dose (mg/kg-day)
TRV = toxicity reference value (NOAEL or LOAEL) (mg/kg-day)

7.4.3 Step 3a Discussion - SWMU 16

The Step 3a discussion for SWMU 16 includes evaluations of COPCs in surface soil (plants and terrestrial invertebrates), COPCs in sediment and surface water (benthic and aquatic invertebrates and other aquatic organisms), and food-chain modeling (terrestrial wildlife). This was done because although a chemical may pose potential risks to one receptor group, it might not pose potential risks to another receptor group.

7.4.3.1 Surface Soil COPCs

The following is a refinement summary of the Step 3a evaluation for terrestrial invertebrates and plants exposed to surface soil COPCs.

Acetone

Acetone was the only VOC selected as a COPC. Acetone was the only VOC detected in surface soils at SWMU 16, and it was a COPC in surface soil because a screening level is not available. No alternate benchmarks for acetone are available, and due to its volatility, acetone is rarely present in environmental samples. Acetone is a common laboratory contaminant. Although the lack of toxicity information for acetone precludes a thorough risk evaluation, acetone probably does not pose significant risk to terrestrial invertebrates and plants at SWMU 16. The uncertainties involved in not having toxicity data available are discussed in Section 7.5.2.

Benzaldehyde

Benzaldehyde was initially selected as a COPC because a screening level is not available. No alternate benchmarks for benzaldehyde are available. Because only four surface soil samples were collected for evaluation, other Step 3a factors such as frequency of detection and spatial distribution cannot adequately evaluate risks to plants and soil invertebrates from this COPC. Therefore, further evaluations of benzaldehyde are not possible. The uncertainties involved in not having toxicity data available are discussed in Section 7.5.2.

bis(2-Ethylhexyl) phthalate, butyl benzyl phthalate, and di-n-octyl phthalate

These phthalates were initially selected as COPCs because screening levels are not available. The toxicity of phthalates is anticipated to be generally similar in magnitude; therefore, phthalate concentrations were compared to the following benchmarks for plants and soil invertebrates:

- ORNL plant value (di-n-butyl phthalate) – 200 mg/kg
- ORNL plant value (diethyl phthalate) – 100 mg/kg
- ORNL earthworm value (dimethyl phthalate) – 200 mg/kg

The di-n-butyl phthalate ORNL plant value is based on growth effects of corn at an exposure concentration of 200 mg/kg. The diethyl phthalate ORNL benchmark for plants is based on an effects concentration 50 percent (EC_{50}) value of 134 mg/kg based on effects on the growth of lettuce from seedling to 14 days in loam soils. The ORNL earthworm benchmark for dimethyl phthalate was developed based on survival of adults of four earthworm species; the 14-day lethal concentration 50 percent (LC_{50}) was 1,064 mg/kg. The ORNL earthworm value of 200 mg/kg for dimethylphthalate was obtained by dividing the LC_{50} value (1,064 mg/kg) by a safety factor of five (Efroymson et al., 1997b).

The maximum concentration of bis(2-ethylhexyl) phthalate (6,100 mg/kg) in sample 16-S-02-00-D exceeds the alternate phthalate benchmarks for plants and soil invertebrates above. The concentration in the original sample at this location (16SS02) was 3,800 mg/kg and also exceeds the alternate benchmarks for phthalates. Concentrations at other locations were 0.25 mg/kg and less. Therefore, it appears that risks to plants and soil invertebrates are likely in the vicinity of the maximum concentration (location 16SS02), but risks to plants and terrestrial invertebrates at the other locations are negligible.

The maximum concentrations of butyl benzyl phthalate (16 mg/kg) and di-n-octyl phthalate (70 mg/kg) were less than the alternate benchmarks for phthalates. Therefore, risks to plants and terrestrial invertebrates from these phthalates at SWMU 16 are probably negligible.

4,4'-DDE and 4,4'-DDT

These pesticides were initially selected as COPCs because maximum concentrations were greater than ESVs. The Region 4 ESVs for 4,4'-DDE and 4,4'-DDT are from the Dutch Ministry of Housing, Spatial Planning, and Environment (MHSPE) (1994) target values. The source of the 1994 Dutch target values is unclear; however, these Dutch values were updated in 2000 (MHSPE, 2000). The most recent Dutch target value for total DDD/DDE/DDT is 10 µg/kg, but this target value is based on one acute toxicity study for a field cricket (*Gryllus pennsylvanicus*). For the reasons discussed below, risks to terrestrial invertebrates and plants from these pesticides were evaluated using the Canadian SQG of 12 mg/kg (EC, 1999a). The SQG for DDT is the 25th percentile of effects and no-effects data distribution of a total of 40 data points from plant and invertebrate studies. The 12 mg/kg value is reported as the 4,4'-DDT concentration that reduced Stringless Black Valentine bean root weight by 26 percent after 17 days. Effects concentrations for earthworms were generally higher than 12 mg/kg. Because the SQG is based on more toxicological studies than the Dutch target value, it is a better value for comparison. In fact, the one study on which the Dutch target value is based was included in the 40 data studies used in the derivation of the Canadian SQG.

The maximum 4,4'-DDE and 4,4'-DDT concentrations (4.6 µg/kg and 4.8 µg/kg, respectively) are less than the Canadian SQG; therefore, risks to terrestrial invertebrates and plants are not expected.

Aroclor-1254

Aroclor-1254 was the only PCB detected in surface soils at SWMU 16. It was retained as a COPC because the single detected concentration at location 16SS02 exceeded the ESV. The concentration in the duplicate sample from this location (40,000 µg/kg) also exceeded the screening level by three orders of magnitude. The Region 4 ESV is based on the Dutch MHSPE (1994) target value. The MHSPE (1994) target value was retained for the 2000 revision of the Dutch target values. The 20 µg/kg target value is based on aquatic toxicity data and not soil data for risks to terrestrial invertebrates and plants; therefore, Aroclor-1254 concentrations were compared to the Canadian SQG of 33 mg/kg (EC, 2001) to evaluate risks to these receptors.

The Canadian SQG for PCBs is based on a 30-percent reduction in corn growth observed within the first 5 days after seedling emergence at a soil concentration of 100 mg/kg (EC, 2001). An uncertainty factor of three was applied to the 100 mg/kg concentration to account for a lack of acceptable invertebrate toxicity data.

The Aroclor-1254 concentrations (59,000 µg/kg and 40,000 µg/kg) detected in the original and duplicate samples, respectively, at location 16SS02 exceed the Canadian SQG. Aroclor-1254 was not detected at

other locations; therefore, risks to plants and soil invertebrates at location 16SS02 are possible, but risks to these receptors at other locations are negligible.

Aluminum

The Eco-SSL guidance states that aluminum is considered a COPC in soil only when the soil pH is less than 5.5. Aluminum is the most commonly occurring metallic element in the earth's crust, and concentrations typically range from 10,000 to 30,000 mg/kg in soil (USEPA, February 2005). Soil pH data are not available for SWMU 16 or other sites in the vicinity, so there is uncertainty regarding whether aluminum poses potential risk to plants and soil invertebrates at SWMU 16. However, concentrations are less than the typical range of values, and there is no reason to believe that waste material at SWMU 16 would contain especially high concentrations of aluminum.

Antimony

Antimony was initially selected as a COPC because the maximum concentration in sample 16-S-02-00-D of 122 mg/kg exceeded the Eco-SSL of 0.27 mg/kg. However, the Eco-SSL is based on risks to mammals and not risks to plants and soil invertebrates. The Eco-SSL for soil invertebrates is 78 mg/kg. An Eco-SSL for plants is not available; however, an ORNL plant value of 5 mg/kg is listed in Efroymson et al. (1997a). The maximum concentration in the duplicate sample and the concentration of antimony in the original sample (98.3 mg/kg) at location 16SS02 exceeded the alternate benchmarks for plants and soil invertebrates. Antimony was not detected at any of the other sample locations. Therefore, it appears that risks in the vicinity of the location 16SS02 are possible, but risks at other locations are negligible.

Cadmium

Cadmium was initially selected as a COPC because the maximum concentration of 60.7 mg/kg in sample 16-S-02-00 exceeded the Eco-SSL of 0.36 mg/kg. However, the Eco-SSL is based on risks to mammals and not risks to plants and soil invertebrates. The Eco-SSLs for plants and soil invertebrates are 32 and 140 mg/kg, respectively. The duplicate sample concentration (in sample 16-S-02-00-D) at the location of the maximum concentration was 44 mg/kg. Although the concentrations detected in the original and duplicate samples at location 16SS02 are less than the Eco-SSL for soil invertebrates, the cadmium concentrations are greater than Eco-SSL for plants. Cadmium concentrations at other locations are 0.26 mg/kg and less. Therefore, potential risks to plants exist in the vicinity of location 16SS02, but risks to plants at other locations and risks to soil invertebrates at all locations are negligible.

Chromium

Chromium was initially selected as a COPC because the maximum concentration of 667 mg/kg in the duplicate sample from location 16SS02 exceeded the Eco-SSL of 26 mg/kg. However, the Eco-SSL is based on risks to birds and not risks to plants and soil invertebrates. There is no chromium Eco-SSL for plants or soil invertebrates. Therefore, chromium concentrations were compared to the Canadian SQG to evaluate risks to plants and soil invertebrates.

The Canadian SQG for total chromium is 64 mg/kg and is the geometric mean of the threshold effects concentration (TEC) of 78 mg/kg for risks to plants and invertebrates and the nutrient and energy cycling check (NECC) value of 52 mg/kg (EC, 1999b). The TEC is the sixth of 22 data points associated with the no-observable-effects and observable-effects data for plants and invertebrates and corresponds to the average radish germination effects concentration 25 percent (EC_{25}). As detailed in the supporting document for the SQG, no-effects concentrations for earthworms (235 to 900 mg/kg) were greater than the no-effects concentrations for plants (10 to 230 mg/kg), indicating that invertebrates are less sensitive to total chromium than plants.

The maximum chromium concentration and the original sample concentration (16-S-02-00) of 478 mg/kg exceeded the Canadian SQG; chromium concentrations at other locations were 18.3 mg/kg and less. Therefore, it appears that potential risks to plants and soil invertebrates exist in the vicinity of location 16SS02, but risks at other locations are negligible.

Copper

Copper was initially selected as a COPC because the maximum concentration of 58.1 mg/kg in the duplicate sample at location 16SS02 exceeded the ESV of 40 mg/kg. The Region 4 ESV is a Dutch MHSPE (1994) target value, and as previously mentioned, the source of the 1994 Dutch target values is unclear. The most recent Dutch target value for copper is 36 mg/kg, but this target value is for sediment and is derived by equilibrium partitioning. Copper concentrations were compared to the following other toxicity guidelines to further evaluate risks to plants and soil invertebrates:

- Canadian SQG - 63 mg/kg (CCME, 1997)
- ORNL plant value - 100 mg/kg (Efroymson et al., 1997a)
- ORNL earthworm value - 60 mg/kg (Efroymson et al., 1997b)

The Canadian SQG of 63 mg/kg for copper is the 25th percentile of effects- and no-effects data distribution for plants and invertebrates, which is the seventeenth of 69 data points and corresponds to an effect on radish seedling emergence (CCME, 1997). The copper ORNL benchmark for plants

(100 mg/kg) was based on toxicity data from three studies. Two of the studies demonstrated reductions in root and shoot weights of little bluestem grown in sandy soil to which 100 mg/kg copper (as copper sulfate) was added (Miles and Parker, 1979). The third study showed no effect on leaf and stem weights of bush beans grown in soil to which 100 ppm copper (as copper sulfate) was added, but leaf weight was reduced 26 percent when 200 ppm copper was added (Wallace and Romney, 1977). The copper ORNL benchmark for invertebrates (60 mg/kg) was based on toxicity data from 15 studies. The endpoints for most of the studies cited in Efroymson et al., (1997b) are survival or impacts on reproduction (i.e., cocoon production, hatchling success). Because there were more than 10 studies, the benchmark was based on a 10th percentile LOEC value. However, a review of the data in Appendix A.1 of Efroymson et al., (1997b) shows that most of the studies cited in that document have NOECs that are greater than 60 mg/kg.

The maximum concentration (58.1 mg/kg) in the duplicate sample at location 16SS02 was less than the alternate benchmarks for plants and soil invertebrates. Additionally, the original sample concentration of 38.7 mg/kg was less than the Region 4 ESV. Concentrations at the other locations were 6.6 mg/kg and less. Therefore, risks to plants and soil invertebrates are probably negligible.

Iron

Iron was initially selected as a COPC because a screening level for evaluating risks to soil invertebrates is not available. No toxicity data were located to evaluate risks to soil invertebrates from iron; however, because iron is generally considered a non-toxic metal, it is highly unlikely that soil invertebrates are being impacted by iron at the SWMU. Because only four surface soil samples were collected for evaluation, other Step 3a factors such as frequency of detection and spatial distribution cannot adequately evaluate risks to plants and soil invertebrates from this COPC. Therefore, further evaluations of risks to plants and soil invertebrates from iron are not possible. The uncertainties involved in not having toxicity data are discussed in Section 7.5.2.

Lead

Lead was initially selected as a COPC because the maximum concentration of 12,400 mg/kg in the duplicate sample at location 16SS02 exceeded the Eco-SSL of 11 mg/kg. However, the Eco-SSL is based on risks to birds and not plants and soil invertebrates. The Eco-SSLs for plants and soil invertebrates are 120 and 1,700 mg/kg, respectively. The Eco-SSL for plants is the geometric mean of the maximum acceptable toxicant concentration (MATC) values for four test species under three different test conditions (pH of 4.0 to 6.3). The ecological endpoint for the derivation of the Eco-SSL for plants was growth. The Eco-SSL for soil invertebrates is the geometric mean of the MATC values for one test species (*Folsomia candida*) under three different test conditions (pH of 4.5 to 6.0) and is based on a reproductive endpoint.

The maximum lead concentration and the original sample concentration of 9,610 mg/kg exceeded the Eco-SSLs for both plants and soil invertebrates; lead concentrations at other locations were 11.8 mg/kg and less. Therefore, it appears that potential risks to plants and soil invertebrates exist in the vicinity of location 16SS02, but risks at other locations are negligible.

Mercury

Mercury was initially selected as a COPC because the maximum concentration of 0.11 mg/kg in the duplicate sample at location 16SS02 slightly exceeded the ESV of 0.1 mg/kg. The Region 4 ESV is based on the ORNL earthworm benchmark. The ORNL plant benchmark is 0.3 mg/kg.

The concentration of mercury in the original sample at 16SS02 was 0.09 mg/kg and is less than the ESV. The average mercury concentration of this sample and its duplicate is 0.1 mg/kg, which equals but does not exceed the ESV. Therefore, mercury concentrations at the location of the maximum concentration do not appear to be great enough to cause adverse risks to plants and soil invertebrates.

Vanadium

Vanadium was initially selected as a COPC because the maximum concentration of 34.1 mg/kg in sample 16-S-01-00 exceeded the Eco-SSL of 7.8 mg/kg. However, the Eco-SSL is based on risks to birds and not risks to plants and soil invertebrates. Eco-SSLs for plants and soil invertebrates are not available; therefore, vanadium concentrations were compared to the Canadian SQG of 130 mg/kg (EC, 1999c) to evaluate risks to these receptors.

The Canadian SQG of 130 mg/kg corresponds to the third of 10 data points, which is the 25th percentile based on lettuce seedling emergence. The maximum vanadium concentration is less than the Canadian SQG, which is based on risks to plants and soil invertebrates. Therefore, risks to plants and soil invertebrates from vanadium are probably negligible.

Zinc

Zinc was initially selected as a COPC because the maximum concentration of 157 mg/kg in sample 16-S-02-00 exceeded the ESV of 50 mg/kg. The Region 4 ESV is based on the ORNL plant benchmark. The zinc concentration in the duplicate sample was 125 mg/kg and also exceeded the ORNL plant benchmark.

The ORNL benchmark for earthworms is 100 mg/kg. Both the maximum concentration and the duplicate sample concentration exceeded the ORNL benchmark for earthworms. Concentrations at other locations were 10.3 mg/kg and less. Therefore, potential risks to plants and soil invertebrates exist in the vicinity of location 16SS02, but risks at other locations are negligible.

7.4.3.2 Sediment COPCs

The following is a summary of the Step 3a evaluation for sediment invertebrates exposed to sediment COPCs. As discussed in Section 4.0, site-specific upgradient data were not collected for sediment at SWMU 16 because the origin of the small tributaries lies within SWMU 16. Additionally, SWMU 18 is located north of SWMU 16 and could possibly be contributing contaminants to Goose Creek via the small tributaries at SWMU 16. Six sediment samples (16-D-02-1001 through 16-D-07-1001 corresponding to locations 16SW/SD02 through 16SW/SD07) were collected from tributaries leading to Goose Creek. Sediment sample 16-D-01-1001 is the upgradient sample collected from a culvert north of SWMU 16 and is considered representative of contaminant conditions entering SWMU 16 (because it is downstream from SWMU 18). Therefore, although contamination at this location is possible, it is not necessarily related to SWMU 16, although it is included in the SWMU 16 sediment dataset (Table 7-2).

Carbon disulfide

Carbon disulfide was initially selected as a COPC in sediment because a screening value is not available. The only available alternate benchmark for carbon disulfide is the secondary chronic value (SCV) of 0.85 µg/kg (Jones et al., 1997). The SCV was calculated by equilibrium partitioning assuming 1 percent organic carbon (Jones et al., 1997). Carbon disulfide was detected in five of the seven sediment samples collected and exceeded the SCV in all five. Concentrations in the detected samples were similar and ranged from 2 to 17 µg/kg.

Although detected in 4 of 11 subsurface soil samples (at concentrations ranging from 1 to 50 µg/kg), carbon disulfide was not detected in groundwater or surface soil. Carbon disulfide does not bind tightly to soils and is very mobile in soils, often reaching groundwater before being broken down (ATSDR, 1996). Once dissolved in water, carbon disulfide is stable and not easily degraded. Therefore, its presence in subsurface soils is somewhat perplexing, except when considering that carbon disulfide can be produced by soil microorganisms (ATSDR, 1996). In addition, although other VOCs were detected in subsurface soil and groundwater samples, no other VOCs were detected in sediment samples at SWMU 16. Therefore, it does not appear that carbon disulfide in sediment has migrated from subsurface soil via groundwater. Perhaps most importantly, carbon disulfide is found naturally in coastal and ocean water and sediment (ATSDR, 1996), which may explain its presence in SWMU 16 sediments.

Although risks to sediment invertebrates cannot be positively ruled out because detected concentrations exceeded the conservative SCV, carbon disulfide in sediments at SMWU 16 is probably not related to the SWMU.

PAHs

Benzo(b)fluoranthene, benzo(g,h,i)perylene, and indeno(1,2,3-cd)pyrene were initially selected as COPCs because ESVs are not available. Chrysene, fluoranthene, and pyrene were initially selected as COPCs because the maximum concentrations exceeded ESVs. However, the ESVs are based on the Contract Laboratory Program (CLP) Practical Quantitation Limits (PQLs) and not on effects to sediment invertebrates. Additionally, because effects of PAHs are considered cumulative, the Region 4 ESV for total PAHs is a better measure of PAH toxicity in sediment at SWMU 16.

The Region 4 ESV for total PAHs is 1,684 µg/kg and is from MacDonald (1994). The maximum total PAH concentration of 2,750 µg/kg was detected at location 16SD02. The second greatest total PAH concentration was 1,698 µg/kg at location 16SD03 and only slightly exceeded the conservative ESV. The total PAHs concentration at the next downgradient sample location (16SD04) was much lower at 240 µg/kg; therefore, it does not appear that PAHs are migrating significantly.

The Region 4 ESV for total PAHs is based on the threshold effect level (TEL) from MacDonald, 1994. The TEL represents the "minimal effects range" and is defined as the upper limit of the range of sediment concentrations dominated by no-effects data. Concentrations less than the TEL are considered to not represent significant hazards to aquatic organisms. Whereas the TEL represents the lower limit of effects, the probable effects level (PEL) is the upper limit. The PEL is the lower limit of the range of sediment concentrations that are usually or always associated with adverse biological effects. Sites where contaminant concentrations are greater than the TEL but less than the PEL represent a range where adverse biological effects are possible but not necessarily probable. MacDonald (1994) suggests that site-specific conditions will likely control whether or not toxicity to sediment-dwelling organisms occurs. The PEL from MacDonald (1994) for total PAHs is 16,770 µg/kg. Although the maximum total PAH concentration is greater than the TEL (HQ = 1.6), it is much less than the PEL. Therefore, although risks are possible at location 16SD02, these risks are expected to be minor at worst. Risks to sediment invertebrates at all other locations are likely negligible.

4,4'-DDD, 4,4'-DDE, and 4,4'-DDT

These organochlorine pesticides are no longer used but are known to be extremely persistent in environmental media. They were initially selected as COPCs because the maximum concentrations were greater than the ESVs. However, the Region 4 ESVs for these pesticides are based on laboratory PQLs

not on effects to sediment invertebrates. An effects value of 1.58 µg/kg for total DDT is listed by USEPA Region 4. The effects value is the Effects Range-Low (ER-L) from Long et al. (1995) and is based on marine and estuarine sediments. The maximum total DDT concentration of 13.2 µg/kg exceeded the effects value (ER-L) of 1.58 µg/kg but is significantly less than the Effects Range-Median (ER-M) value of 46.1 µg/kg.

The 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT concentrations were further compared to the consensus-based Threshold Effect Concentration (TEC) for total DDTs of 5.28 µg/kg. The TEC is the geometric mean of the threshold effect level (TEL) (Smith et al., 1996), ER-L (Long and Morgan, 1991), lowest effect level (LEL) (Persaud et al., 1993), minimal effect threshold (MET) (EC and MENVIQ, 1992), and sediment quality advisory levels (SQALs) (USEPA, September 1997). These individual effect levels for each of the studies cited above were calculated using slightly different methods, but they all represent concentrations below which impacts to sediment invertebrates are either unlikely or not expected. For that reason, the TEC is intended to identify contaminant concentrations below which harmful effects on sediment-dwelling organisms are not expected.

The maximum total DDT concentration of 13.2 µg/kg at location 16SD06 was greater than the TEC; therefore, total DDT concentrations were compared to the PEC to further evaluate the risk range. The PEC was derived similarly to the TEC but is the geometric mean of the probable effect level (PEL) (Smith et al., 1996), ER-M (Long and Morgan, 1991), severe effect level (SEL) (Persaud et al., 1993) and Toxic Effect Threshold (TET) (EC and MENVIQ, 1992). The PEC is the level above which harmful effects on sediment-dwelling organisms are expected to frequently occur (MacDonald, et al., 2000). The consensus-based PEC for total DDTs is 572 µg/kg.

Although the maximum total DDT concentration exceeds the conservative ER-L and TEC, it is much less than the ER-M and the PEC. Additionally, concentrations of these individual pesticides were similar overall ranging from 1 to 5.3 µg/kg and showed no clear pattern of contamination. Therefore, it does not appear that detections of these pesticides are related to SWMU releases, but rather their presence in sediment samples is more likely a result of maintenance practices at the facility. Additionally, maximum concentrations only slightly exceeded the conservative effects values; therefore, it appears that risks to sediment invertebrates are possible but probably not significant.

<u>alpha-Chlordane and gamma-chlordane</u>

Similar to DDD/DDE/DDT, chlordanes are no longer used but are extremely persistent in environmental media. alpha-Chlordane and gamma-chlordane were selected as COPCs because detected concentrations exceeded the ESV for chlordane. However, the Region 4 ESV is the laboratory PQL rather than a sediment effects value. An effects value of 0.5 µg/kg from Long and Morgan (1991) is listed

by USEPA Region 4. Because the ER-L from Long and Morgan (1991) was included in the calculation of the consensus-based TEC and the TEC includes effects values from a number of other studies (as described above), the TEC is a more appropriate value for evaluating risks to sediment invertebrtates.

The consensus-based TEC for chlordanes is 3.24 µg/kg. Detected concentrations of alpha-chlordane (3.7 µg/kg) and gamma-chlordane (3.3 µg/kg) only slightly exceeded the TEC and were significantly less than the consensus-based PEC of 17.6 µg/kg. Additionally, these chlordanes were each detected in only one (16-D-02-1001) out of seven samples at concentrations only slightly greater than the screening value; therefore, it appears that risks to sediment invertebrates are slight at worst, but most likely negligible in sediment samples.

alpha-BHC and gamma-BHC

These pesticides were initially selected as COPCs because the maximum concentrations exceeded the ESVs. As with the other pesticides, the ESVs are the laboratory PQLs and are not based on effects to sediment invertebrates. An effects value of 0.32 µg/kg is listed by USEPA Region 4. This effects value is the TEL from MacDonald (1994) for marine and estuarine sediments. All detected concentrations of alpha- and gamma-BHC exceeded the conservative TEL. The PEL for gamma-BHC is 0.99 µg/kg (MacDonald, 1994). The consensus-based TEC for gamma-BHC is 2.37 µg/kg, and the consensus-based PEC for gamma-BHC is 4.99 µg/kg. alpha-BHC and gamma-BHC were each detected at three sediment locations: 16SD03, 16SD04, and 16SD05. All detected concentrations of both alpha- and gamma-BHC exceeded the PEL and the consensus-based PEC. Therefore, it appears that potential risks to sediment invertebrates are possible at locations 16SD03, 16SD04, and 16SD05. There is uncertainty, however, whether these pesticides are site-related because the area is mosquito infested and spraying of insecticides by the base is common.

Aroclor-1242

Aroclor-1242 was initially selected as a COPC because the detected concentration of 160 µg/kg exceeded the screening value for total PCBs. Similar to the pesticides, the ESV is the laboratory PQL and is not based on effects to sediment invertebrates. An effects value of 21.6 µg/kg is listed by USEPA Region 4 for total PCBs and is the TEL from MacDonald (1994) for marine and estuarine sediments. The single detected Aroclor-1242 concentration at location 16SD02 exceeds the TEL.

The PEL for total PCBs is 189 µg/kg (MacDonald, 1994). The detected concentration of Aroclor-1242 is greater than the TEL but less than the PEL. As discussed in MacDonald (1994), concentrations greater than the TEL but less than the PEL represent a range where adverse biological effects are possible but occurrence, nature, and severity of effects are difficult to determine. The consensus-based TEC for total

PCBs is 59.8 µg/kg, and the consensus-based PEC is 676 µg/kg. Aroclor-1242 was detected only once in SWMU 16 sediments, at location 16SD02. The single detected value of Aroclor-1242 is greater than the TEL and consensus-based TEC, but less than the PEL and PEC. Therefore, potential risk to sediment invertebrates posed by Aroclor-1242 at location 16SD02 is uncertain but cannot be ruled out. Potential risks to sediment invertebrates from PCBs are negligible at all other locations.

Aluminum, barium, beryllium, cobalt, iron, manganese, selenium, and vanadium

These metals were selected as COPC because screening levels are not available for comparison. Therefore, concentrations were compared to alternate benchmarks for risks to sediment invertebrates.

The alternate benchmark selected for aluminum is a TEL of 25,500 mg/kg (Buchman, 1999). The TEL represents the concentration below which adverse effects on survival or growth of the amphipod *Hyalella azteca* are expected to occur only rarely in 28-day tests (MacDonald et al., 2000). A PEL is not available. The maximum concentration of aluminum of 45,100 mg/kg was detected in sample 16-D-05-1001 and exceeded the TEL. The concentration of aluminum at the upgradient location 23SD08 is 26,400 mg/kg. Aluminum concentrations exceeded the TEL and upgradient concentration in all sediment samples except 16-D-01-1001. However, the maximum concentration compared to the TEL from Buchman (1999) would result in a relatively low HQ of 1.8. The paucity of sediment toxicity data precludes a thorough assessment of the potential risk posed by aluminum in sediment, but because aluminum was not a soil COPC and because the sediment concentrations are not especially elevated, potential risks posed by aluminum do not seem to be significant, although they cannot be ruled out.

The only available alternate benchmark for barium is the Apparent Effects Threshold (AET) of 48 mg/kg (Buchman, 1999). The maximum barium concentration of 49.6 mg/kg in sample 16-D-05-1001 only slightly exceeded the AET. Concentrations at other locations were less than the AET and were similar to the upgradient location 23SD08 (36.2 mg/kg), ranging from 30.8 to 49.6 mg/kg. Although the lack of lower effects data precludes a thorough evaluation for barium, risks to sediment invertebrates are unlikely.

No alternate benchmarks are available for beryllium. Concentrations were similar in all seven samples, ranging from 0.12 to 1.8 mg/kg, and indicated no clear pattern of contamination. Additionally, the beryllium concentration at upgradient location 23SD08 of 1.6 mg/kg was the second greatest detected concentration. Beryllium was not detected in surface water or surface soil samples. For this reason, detections of beryllium are likely naturally occurring. Therefore, although risks to benthic invertebrates cannot be ruled out because of the lack of toxicity data, any potential risks from beryllium would be similar to background-related risks.

No alternate benchmarks are available for cobalt. Cobalt concentrations ranged from 0.69 to 14.1 mg/kg (16-D-06-1001) and indicated no clear pattern of contamination. Additionally, concentrations were similar to the upgradient cobalt concentration at location 23SD08 of 11.3 mg/kg. Cobalt was not detected in surface water samples and was detected at only low concentrations in surface soil (i.e., less than the ESV). For this reason, detections of cobalt are likely naturally occurring. Therefore, although risks to benthic invertebrates cannot be ruled out because of the lack of toxicity data, any potential risks from cobalt would be similar to background-related risks.

The alternate benchmark selected for iron is the LEL of 20,000 mg/kg [Ontario Ministry of Environment and Energy (OMOE), 1993]. The LEL indicates the level of sediment contamination that has no effect on and can be tolerated by the majority of sediment-dwelling organisms. The Canadian sediment guidelines were developed by first calculating the 90th-percentile of the concentrations where a species was present and then plotting the 90th percentile concentrations for all of the species that were used to develop the guideline. The 5th percentile of the plot was selected as the LEL and the 95th percentile from the plot was selected as the SEL for metals. The SEL for iron is 40,000 mg/kg. Iron concentrations exceeded the TEL in all sediment samples except 16-D-01-1001. The upgradient iron concentration at location 23SD08 was 34,600 mg/kg. Although iron concentrations at some locations exceeded the upgradient location concentration, concentrations were similar to the upgradient concentration ranging from 26,400 to 51,400 mg/kg (excluding location 16SD01). Therefore, although risks to sediment invertebrates are possible at some locations because concentrations exceeded the alternate benchmarks, potential risks appear minor at worst.

The alternate benchmark selected for manganese is the Canadian Sediment Guidelines LEL of 460 mg/kg (OMOE, 1993). The manganese concentration at the upgradient location 23SD08 was 352 mg/kg. The maximum concentration of 234 mg/kg was less than the LEL and the upgradient concentration; therefore, risks to sediment invertebrates are expected to be negligible.

No alternate benchmarks are available for selenium. However, selenium was detected in four of seven samples at similar concentrations (1 to 2.6 mg/kg) and indicated no clear pattern of contamination. Additionally selenium was detected at the upgradient location 23SD08 at a concentration of 4.6 mg/kg. The maximum selenium concentration is less than the upgradient concentration. Selenium was not detected in surface water samples and was detected at only low concentrations in surface soil (i.e., less than the ESV). For this reason, detections of selenium are likely naturally occurring. Therefore, although risks to benthic invertebrates cannot be ruled out because of the lack of toxicity data, any potential risks from selenium would be similar to background-related risks.

The only available alternate benchmark for vanadium is the AET of 57 mg/kg (Buchman, 1999). Vanadium concentrations exceeded the AET in all samples except 16-D-01-1001. However, the vanadium concentration at the upgradient location was 63.7 mg/kg. Although vanadium concentrations at some locations exceeded the upgradient location concentration, concentrations were similar to the upgradient concentration, ranging from 64 to 79.4 mg/kg (excluding location 16SD01). Therefore, although risks to sediment invertebrates are possible at some locations because concentrations exceeded the alternate benchmark, potential risks appear minor at worst.

Arsenic

Arsenic was initially selected as a COPC because the maximum concentration of 20.6 mg/kg exceeded the screening value. However, the upgradient arsenic concentration at location 23SD08 was 18.3 mg/kg. The maximum arsenic concentration is only slightly greater than the upgradient concentration; therefore, arsenic concentrations are similar to background conditions, and site-related risks to sediment invertebrates are not expected.

Chromium

Chromium was initially selected as a COPC because the maximum concentration of 71.6 mg/kg exceeded the screening value of 52.3 mg/kg. The chromium concentration at the upgradient location 23SD08 was 56.8 mg/kg. Although concentrations at some locations were greater than the upgradient concentration, concentrations were generally similar ranging from 54.2 to 71.6 mg/kg (excluding location 16SD01 where the average of the original and duplicate chromium concentration was 4.85 mg/kg). Therefore, although risks to sediment invertebrates are possible because concentrations exceeded the alternate benchmark, potential risks appear minor at worst.

Copper

Copper was initially selected as a COPC because the maximum concentration of 100 mg/kg exceeded the screening level of 18.7 mg/kg. The copper concentration at the upgradient location 23SD08 was 28.7 mg/kg. Only the maximum concentration at location 16SD02 appears unrelated to background conditions because concentrations at all other locations (excluding 16SD01 where the average of the original and duplicate copper concentration was 1.25 mg/kg) were 17.3 to 50 mg/kg and similar to the upgradient concentration. Therefore, risks to sediment invertebrates appear possible at location 16SD02 but any potential risks at other locations are similar to background conditions.

Lead

Lead was initially selected as a COPC because the maximum concentration of 46.5 mg/kg exceeded the screening level of 30.2 mg/kg. The lead concentration at the upgradient location 23SD08 was 26.8 mg/kg. Although concentrations at some locations were greater than the upgradient concentrations, concentrations were generally similar ranging from 21 to 46.5 mg/kg (excluding location 16SD01 where the average of the original and duplicate lead concentration was 5.75 mg/kg). Therefore, although risks to sediment invertebrates are possible because concentrations exceeded the alternate benchmark, potential risks are similar to background conditions.

Mercury

Mercury was initially selected as a COPC because the maximum concentration of 0.29 mg/kg exceeded the screening level of 0.13 mg/kg. The mercury concentration at the upgradient location 23SD08 was 0.14 mg/kg.

The maximum mercury concentration in surface soils was 0.11 mg/kg at location 16SS02. Mercury was detected in only one of seven sediment samples. Sediment location 16SD05 is located south of the debris area at SWMU 16, and it is possible that mercury from contaminated surface soils is migrating to the small tributary where 16-D-05-1001 was collected. However, because mercury was not detected at other locations, potential risks at all other locations are negligible.

Nickel

Nickel was initially selected as a COPC because the maximum concentration of 29.1 mg/kg exceeded the screening level of 15.9 mg/kg. The nickel concentration at the upgradient location 23SD08 was 16 mg/kg.

Nickel was detected in four of seven samples and at similar concentrations (19.2 to 29.1 mg/kg). Concentrations exceeded the screening level and upgradient concentration in all four detected samples. The 15.9 mg/kg ESV is from MacDonald, 1994 and is based on marine and estuarine sediments. The maximum concentration of nickel is less than the PEL of 42.8 mg/kg (MacDonald, 1994). As mentioned previously, concentrations greater than the TEL but less than the PEL represent a range where adverse biological effects are possible but occurrence, nature, and severity of effects are difficult to predict.

Nickel was detected at four locations in SWMU 16 sediments. Although concentrations at these locations exceeded the conservative TEL, concentrations were not significantly greater than the 16 mg/kg

upgradient concentration. There is uncertainty regarding the probability of potential site-related risk from nickel, but potential risks do not appear to be significant.

Zinc

Zinc was initially selected as a COPC because the maximum concentration of 158 mg/kg exceeded the screening level of 124 mg/kg. The zinc upgradient concentration at location 23SD08 was 81.1 mg/kg.

Zinc was detected in all seven sediment samples collected at SWMU 16 and exceeded the ESV at three locations including 16SD02 (158 mg/kg), 16SD03 (128 mg/kg), and 16SD05 (135 mg/kg). Concentrations at these locations only slightly exceeded the screening level; therefore, although potential risks to sediment invertebrates are possible at these locations, risks are expected to be minor.

7.4.3.3 Surface Water COPCs

The following is a summary of the Step 3a evaluation for aquatic organisms exposed to surface water COPCs. Seven surface water samples were collected at SWMU 16 co-located with sediment samples. As previously mentioned, the sample from location 16SW-01 was collected to evaluate contaminant concentrations present at SWMU 16 but not necessarily related to SWMU 16 activities.

Isobutanol

Isobutanol was initially selected as a COPC because a screening level is not available. An Ambient Water Quality Criteria (AWQC) for isobutanol is not available. Additionally, chronic toxicity values for aquatic organisms could not be located; however, the International Programme on Chemical Safety (IPCS) reports acute toxicity levels for aquatic organisms. Concentrations ranged from 290 mg/L for an 8-day NOAEL for blue-green algae to 4,000 mg/L, which is noted as the threshold for tadpole narcosis. Although there is some uncertainty in comparing the single detected isobutanol concentration to these acute, higher effects levels, the single concentration of 6 µg/L is orders of magnitude less than these numbers and therefore risks to aquatic organisms are not likely.

2,6-DNT and 2,4,6-TNT

These two explosives were retained as COPCs because screening levels are not available. An alternate benchmark for 2,6-DNT was not located; however, a chronic water quality criterion of 90 µg/L was developed for TNT by Talmage et al. (1999). The maximum concentration of 0.21 µg/L of TNT is less than the chronic water quality criterion. Although a screening level for 2,6-DNT is not available, the maximum concentration of 0.41 µg/L is less than the chronic water quality criterion for TNT, and risks to

aquatic organisms are not expected. The uncertainties involved in not having toxicity data available are discussed in Section 7.5.2.

Aluminum, copper, lead, mercury, and silver

These inorganics were selected as COPCs because their maximum concentrations were greater than screening levels.

Aluminum was selected as a COPC because the maximum concentration of 11,000 µg/L. exceeded the Region 4 freshwater screening value. A Region 4 screening value for saltwater is not available. Two times the upgradient concentration at location 23SW08 is 3,520 µg/L. Aluminum concentrations exceeded two times the upgradient concentration at locations 16SW05 (11,000 µg/L) and 16SW07 (5,540 µg/L). These two concentrations are located south of the debris area at SWMU 16, and it is possible that aluminum from contaminated surface soils is migrating to the small tributary where 16-W-05-1001 and 16-W-07-1001 were collected. However, because aluminum was not detected at concentrations exceeding the upgradient concentration at other locations, potential risks at all other locations are expected to be similar to background conditions.

Copper was initially selected as a COPC because the maximum concentration exceeded the Region 4 saltwater screening value; the maximum concentration was less than the Region 4 freshwater screening value. Copper was not detected in the upgradient sample. Toxicity test values were reported in the USEPA 1986 (May) Quality Criteria for Water (the Gold Book). The lowest saltwater chronic value was reported for the bay scallop (mortality) and saltwater algal species was 5 µg/L. It was reported however that additional testing with several (freshwater) species indicates that copper toxicity decreases with increases in alkalinity and TOC. Alkalinity and TOC data are not available for SWMU 16 surface water samples. Therefore, potential risk to aquatic organisms is possible, although probably minor. In addition, copper was detected in only two samples.

Lead was selected as a COPC because the maximum concentration exceeded the Region 4 saltwater screening value; the maximum concentration was less than the Region 4 freshwater screening value. Lead was not detected in the upgradient sample. Toxicity test values were reported in the USEPA Gold Book. A chronic value of 17 µg/L was reported for a mysid in which unacceptable effects did not occur, and a species of macroalgae was affected at 20 µg/L (USEPA, May 1986). The maximum lead concentration of 15.5 µg/L is less than saltwater toxic levels. It does not appear that risks to aquatic organisms are likely at concentrations detected in surface water samples.

Mercury was initially selected as a COPC because the maximum concentration exceeded the Region 4 saltwater and freshwater screening values. Mercury were not detected in the upgradient sample.

Toxicity test values were reported in the USEPA Gold Book. Data was reported for both freshwater and saltwater values. A chronic value of 1.1 µg/L for *Daphnia magna* was reported. It is reported in the Gold Book that even the most sensitive plant species tested are less sensitive than the most sensitive animal species. As indicated in the Gold Book, organomercury compounds (and in particular methylmercury) are 4 to 31 times more toxic than inorganic mercury. For example, a chronic toxicity value of less than 0.07 µg/L was reported for *Daphnia magna* and brook trout. Toxicity test values for saltwater species were higher than those reported for the freshwater species discussed above. Mercury was detected in two samples 16-W-05-1001 at 0.09 µg/L and 16-W-07-1001 at 0.05 µg/L of seven samples at SWMU 16. These concentrations are less than the toxicity values reported for inorganic mercury and are similar to those reported for methylmercury. Therefore, although mercury detections exceeded the ESV, risks to aquatic organisms appear negligible considering alternate toxicity data.

Silver was initially selected as a COPC because the maximum concentration of 1.2 µg/L exceeded the Region 4 saltwater and freshwater screening values. Silver was not detected in the upgradient sample. Silver was detected in only one (16-W-01-1001) of seven samples. As mentioned previously, location 16SW01 is upgradient of SWMU 16 and does not likely represent sediment concentrations attributable to SWMU activities. Silver was not detected in surface soil or sediment samples at SWMU 16 and so its presence in one surface water sample is unlikely related to SWMU 16. Nevertheless, risks are possible at this location from silver because the concentration exceeds the ESV. However, the chronic ESV is based on data available for only one species and may not be truly representative of toxicity at this location.

Barium, iron, manganese, and vanadium

These inorganics were initially selected as COPCs because screening levels were not available for comparison. The alternate benchmarks selected for comparison are the Tier II values (i.e., ORNL aquatic SCVs) for barium, manganese, and vanadium (Suter and Tsao, 1996) and the USEPA AWQC for iron.

The SCV for barium is 4.0 µg/L and two times the upgradient concentration is 46.6 µg/L. Although the maximum concentration of barium (63.4 µg/L) exceeded the conservative SCV and two times the upgradient concentration, the USEPA 1986 Quality Criteria for Water (the Gold Book) states that the soluble barium concentration would have to exceed 50 mg/L (50,000 µg/L) in fresh and marine waters before toxicity to aquatic life is expected. The Gold Book indicates that in most natural waters, a sufficient amount of sulfate or carbonate exists to precipitate barium as an insoluble, non-toxic compound. Therefore, adverse risks to aquatic organisms from barium in surface water are not expected.

The chronic AWQC for iron is 1,000 µg/L and two times the upgradient concentration is 2,480 µg/L. Iron concentrations exceeded the AWQC and two times the upgradient concentration in two of the seven samples collected. Concentrations at locations 16SW05 and 16SW07 were 9,980 and 4,880 µg/L,

respectively. These two locations are located south of the debris area, and it is possible that iron from contaminated surface soils is migrating to the small tributary where samples 16-W-05-1001 and 16-W-07-1001 were collected. However, because iron was not detected at other locations, potential risks at all other locations are negligible.

The SCV for manganese is 120 µg/L and two times the upgradient concentration is 106 µg/L. Although the maximum concentration of manganese (388 µg/L) is greater than the SCV and two times the upgradient concentration, the USEPA Gold Book indicates that ions of manganese are found rarely at concentrations greater than 1 mg/L and, because the tolerance values reported range from 1.5 mg/L to over 1000 mg/L, manganese is not considered to be a problem in fresh waters (USEPA, May 1986). For this reason and because the SCV for manganese is very conservative (Suter and Tsao, 1996), risks to aquatic life from manganese are expected to be negligible.

The SCV for vanadium is 20 µg/L and two times the upgradient concentration is 11 µg/L. Only the maximum concentration of 24.2 µg/L in sample 16-W-05-1001 slightly exceeded the SCV. Vanadium concentrations at all other locations were 14.5 µg/L and less. Additionally, the measured surface water concentrations are total (unfiltered) results. Typically, concentrations in filtered samples are less than concentrations in unfiltered samples because filtered samples represent only the bioavailable portion of chemical concentrations in the surface water column while unfiltered samples represent the bioavailable portion plus sediment particulate concentrations. Because the unfiltered maximum vanadium concentration only slightly exceeded the conservative SCV, it is expected that the unfiltered results (representing the bioavailable portion of the water column) would be less than the SCV. For these reasons, risks to aquatic organisms are unlikely.

7.4.3.4 Food-chain Modeling

Appendix G.4 presents the food-chain modeling calculations. Similar to the surface soil screening for plants and soil invertebrates, an evaluation of maximum concentrations was first conducted. Two scenarios were considered: (1) maximum detected concentrations in surface soil/sediment, conservative exposure factors, and 90th-percentile BAFs and (2) average detected concentrations in surface soil/sediment, less conservative exposure factors, and average BAFs. Tables 7-8 and 7-9 present the HQs for the representative species under the conservative exposure scenario and the average exposure scenario, respectively. The results of the food-chain modeling for SWMU 16 are discussed below.

<u>Herbivores</u>

Under the conservative exposure scenario, NOAEL-based HQs for Aroclor-1254 and five metals (cadmium, chromium, lead, mercury, and zinc) exceeded 1.0. Pesticide HQs under the maximum

(conservative) scenario were less than 1.0 for the representative herbivorous bird and small mammal. Most HQs were greater for the herbivorous bird than for the herbivorous small mammal.

Under the average exposure scenario, all NOAEL- and LOAEL-based HQs were less than 1.0 for the representative herbivorous small mammal (i.e., the cotton mouse). For the mourning dove, the NOAEL-based HQ for chromium exceeded 1.0 (at 2.1) and lead NOAEL- and LOAEL-based HQs were 33 and 3.3, respectively.

The chromium NOAEL-based HQ in the mourning dove food-chain model is greater than 1.0 due to chromium concentrations at location 16SS02 where the average of the original and duplicate sample was 572.5 mg/kg. The average lead concentration at SWMU 16 excluding location 16SS02 is 14.5 mg/kg. The NOAEL-based HQ for the herbivorous bird is less than 1.0 using a concentration of 14.5 mg/kg. Therefore, risks to herbivorous birds from chromium at SWMU 16 are limited to the vicinity of location 16SS02 and negligible at all other locations.

Similar to the elevated chromium HQ, the lead HQs in the mourning dove food-chain model are greater than 1.0 due to lead concentrations at location 16SS02 where the average of the original and duplicate sample was 11,005 mg/kg. The average lead concentration at other locations excluding 16SS02 is 10.2 mg/kg, and NOAEL- and LOAEL-based HQs are less than 1.0 using this concentration. Therefore, risks to herbivorous birds from lead at SWMU 16 are limited to the vicinity of location 16SS02 and are negligible at other locations.

Insectivores

Under the conservative exposure scenario, NOAEL-based HQs for two pesticides, Aroclor-1254, and six metals (cadmium, chromium, copper, lead, mercury, and zinc) exceeded 1.0. Generally, HQs were greater for the insectivorous bird than for the insectivorous small mammal.

Under the average exposure scenario, NOAEL- and LOAEL-based insectivorous bird HQs were greater than 1.0 for Aroclor-1254, chromium, and lead, while only NOAEL-based HQs for cadmium, mercury, and zinc exceeded 1.0 for insectivorous birds. In the insectivorous small mammal food-chain model, Aroclor-1254 NOAEL- and LOAEL-based HQs exceeded 1.0, while only NOAEL-based HQs for cadmium, chromium, and lead were greater than 1.0.

Similar to the HQ exceedances for herbivorous receptors, all HQ exceedances for insectivorous receptors are due to elevated concentrations at location 16SS02. Aroclor-1254 was detected only at location 16SS02, and maximum concentrations of cadmium, chromium, lead, mercury, and zinc were all detected at 16SS02. When the food-chain models are calculated using average concentrations excluding location

16SS02, all NOAEL- and LOAEL-based HQs are less than 1.0 for insectivorous receptors. Therefore, risks to insectivorous small mammals and birds at SWMU 16 are limited to the vicinity of location 16SS02 and negligible at all other locations.

Piscivores

Under the conservative exposure scenario, NOAEL-based HQs for 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Aroclor-1242, and seven metals exceeded 1.0. Generally, HQs were greater for the piscivorous bird than for the piscivorous mammal.

Under the average exposure scenario, all NOAEL- and LOAEL-based HQs were less than 1.0 for the piscivorous mammal. NOAEL-based HQs were greater than 1.0 for 4,4'-DDE, 4,4'-DDT, Aroclor-1242, chromium, lead, mercury, and zinc for piscivorous birds.

Concentrations of 4,4'-DDE ranged from 2.2 to 4.2 µg/kg and concentrations of 4,4'-DDT ranged from 1 to 4.4 µg/kg; therefore, because concentrations were similar in all the samples collected, the average concentrations used in the average exposure scenario food-chain model were not significantly different than the maximum sediment concentrations used in the conservative exposure food-chain model. Additionally, concentrations were low overall and it is questionable as to whether or not pesticide concentrations are actually associated with SWMU activities. Instead, the low concentrations observed in sediment samples are more representative of what would be expected from routine use of pesticides. The upgradient sediment sample at location 23SD08 was not analyzed for 4,4'-DDE; however, the background concentration for 4,4'-DDE in hydric soils is 21 µg/kg (see Table 4-1). 4,4'-DDE and 4,4'-DDT sediment concentrations at SWMU 16 are well below the background value for hydric soils. Additionally, as discussed in Section 7.4.2, the dose was calculated using an H factor (home range divided by contaminated area) of 1.0. This is likely not the case for piscivorous birds because these birds forage over large areas. Estimates of home ranges are not available for the marsh wren; USEPA (December 1993) provides only territory data for this species. The territory of piscivorous birds (and most birds in general) is much smaller than the home range. Although both the NOAEL- and LOAEL-based HQs are greater than 1.0 for 4,4'-DDE (HQs = 13.6 and 2.35, respectively), the actual exposure of piscivorous birds to pesticides is likely low for these reasons. Additionally, the low NOAEL-based HQ (3.4) for 4,4'-DDT for the marsh wren (Table 7-9) is not especially elevated considering that piscivorous birds would obtain only a small portion of their food from the site. In addition, the LOAEL-based HQ for 4,4'-DDT was less than 1.0. Therefore, potential food-chain-related risks are likely minor.

Aroclor-1242 was detected only at location 16SD02 and mercury was detected only at location 16SD05. Therefore, risks to piscivorous birds from PCBs and mercury are isolated to the vicinity of these locations but are applicable only for birds that forage exclusively at these locations, which would not occur.

Chromium, lead, and zinc concentrations are generally similar in sediment samples across the SWMU, except at the upgradient location 16SD01 where concentrations were much less than at other locations. Chromium concentrations ranged from 54.2 to 71.6 mg/kg; lead concentrations ranged from 21 to 46.5 mg/kg, and zinc concentrations ranged from 54 to 158 mg/kg. However, as mentioned previously in Section 7.4.2 and summarized above for 4,4'-DDE, the dose used in the calculation of HQs assumed that birds forage only at SWMU 16. The relatively low NOAEL-based HQs for chromium, lead, and zinc (2.5, 1.1, and 3.8, respectively) are not elevated considering that piscivorous birds would obtain only a small portion of their food from the site. Additionally, the LOAEL-based HQs for these metals were all less than 1.0. Therefore, potential food-chain-related risks are probably insignificant.

7.4.4 Step 3a Discussion - SWMU 17

The Step 3a discussion for SWMU 17 includes evaluations of COPCs in surface soil (plants and terrestrial invertebrates), COPCs in sediment and surface water (benthic and aquatic invertebrates and other aquatic organisms), and food-chain modeling (terrestrial wildlife). This was done because although a chemical may pose potential risks to one receptor group, it might not pose risks to another receptor group.

7.4.4.1 Surface Soil COPCs

Risks to terrestrial plants and invertebrates resulting from exposure to the COPCs in surface soil are evaluated using the methodologies described in Section 7.3. The following is a summary of the Step 3a evaluation for terrestrial invertebrates and plants exposed to the surface soil COPCs.

2-Butanone, acetone, bromomethane, chloroethane, methyl acetate, trichlorofluoromethane, and cis-1,2-DCE

These VOCs were selected as COPCs because screening levels are not available. The only VOC for which an alternate benchmark is available is cis-1,2-DCE. The Region 3 BTAG value for cis-1,2-DCE is 300 µg/kg. The single detected concentration of cis-1,2-DCE is 25 µg/kg at location 17SB17.

Although the lack of toxicity information for these VOCs precludes a thorough risk evaluation, VOCs are typically toxic to environmental receptors including plants and soil invertebrates only at very high concentrations. For example, available Region 3 BTAG values for VOCs are 100 and 300 µg/kg. Additionally, the six VOCs in question were infrequently detected in surface soil samples at SWMU 17. The uncertainties involved in not having toxicity data are discussed in Section 7.5.2.

Chloroform and TCE

These VOCs were initially selected as COPCs because their maximum concentrations exceeded ESVs. The Region 4 ESVs for chloroform and TCE are from the Dutch MHSPE (1994) target values, and the source cannot be verified in the 1994 document. Therefore, concentrations of these VOCs were compared to alternate benchmarks for which the source of toxicological information could be verified.

The Canadian SQG for TCE is 3,000 µg/kg and is the provisional guideline for soil contact (EC, 1999d). Three direct contact studies were considered in the development of the SQG for soil contact and included EC_{25} endpoints of 14 mg/kg for radish seedling emergence, 26 mg/kg for lettuce seedling emergence, and 79 mg/kg for earthworm survival. The SQG is based on the EC_{25} concentration for radish seedling emergence and was divided by an uncertainty factor of five. Only the maximum concentration of 3,200 µg/kg at location 17SB17 exceeded the SQG. Although the maximum concentration slightly exceeded the SQG, risks to plants and soil invertebrates appear unlikely based on actual effects concentrations reported in EC (1999d).

An alternate benchmark for chloroform is not available; however, chloroform was detected at only two locations, 17SB14 (23 µg/kg) and 17SB27 (3 µg/kg). Trichlorofluoromethane was the only other VOC detected at these locations. Locations 17SB14 and 17SB27 were approximately 10 to 15 feet from each other; therefore, it is possible that this area is a potential hot spot for chloroform and trichlorofluoromethane. Nevertheless, risks to plants and soil invertebrates from these VOCs at SWMU 17 overall are low.

PAHs

Anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene were initially selected as COPCs because their maximum concentrations exceeded ESVs.

Total PAHs are evaluated instead of individual PAHs in this Step 3a discussion because the toxicity of PAHs is assumed to be additive. The maximum total PAH concentration was in sample 17-B-02-00 and was 12,882 µg/kg; however, the total PAH concentration in the duplicate sample at this location was 2,368 µg/kg. Although the total PAH concentration exceeded the 1,000 µg/kg Region 4 ESV, the maximum concentration of total PAHs is less than 20,000 µg/kg, which has been described as moderate soil contamination that requires additional study (Friday, 1998). Furthermore, PAH exceedances were sporadic. For these reasons, risks to plants and soil invertebrates from PAHs in surface soil are negligible.

Benzaldehyde, carbazole, and dibenzofuran

These SVOCs were initially selected as COPCs because ESVs are not available. Alternate benchmarks for these SVOCs are also not available; however, they were detected infrequently in SWMU 17 surface soils. Benzaldehyde was detected in only one sample (17-B-05-00) of 17 samples. Carbazole was also detected in only one sample (17-B-02-00) of 17 samples. Dibenzofuran was detected only once in sample 17-B02-00 out of 19 samples. Due to the lack of toxicity information for these SVOCs, further evaluations of benzaldehyde, carbazole, and dibenzofuran are not possible. The uncertainties involved in not having toxicity data are discussed in Section 7.5.2.

bis(2-Ethylhexyl) phthalate and butyl benzyl phthalate

These phthalates were initially selected as COPCs because ESVs are not available. Alternate benchmarks for these phthalates are also not available; therefore, the maximum concentrations were compared to the following other phthalate toxicity guidelines to evaluate risks to plants and invertebrates:

- ORNL plant value (di-n-butyl phthalate) – 200 mg/kg
- ORNL plant value (diethyl phthalate) – 100 mg/kg
- ORNL earthworm value (dimethyl phthalate) – 200 mg/kg

The derivation of the ORNL benchmarks for plants and earthworms were discussed in Section 7.4.3.1. Even though the ORNL benchmark is based on an EC_{50} concentration, the maximum detected concentrations of bis(2-ethylhexyl)phthalate and butyl benzyl phthalate (1,100 and 80 µg/kg, respectively) are much lower than the ORNL plant benchmark, so impacts to plants are not expected. Therefore, risks to plants from bis(2-ethylhexyl) phthalate and butyl benzyl phthalate are expected to be negligible.

Although there are uncertainties in comparing the maximum bis(2-ethylhexyl) phthalate and butyl benzyl phthalate concentrations to toxicity information available for dimethylphthalate, and in applying a safety factor to an LC_{50} value to estimate a toxicity threshold, the maximum bis(2-ethylhexyl) phthalate and butyl benzyl phthalate concentrations are less than the ORNL earthworm benchmark for dimethylphthalate, and impacts to invertebrates are expected to be negligible.

Phthalates are common environmental contaminants due to their use in plastics. Their presence in only one sample each at these low concentrations might be an artifact of the sampling and/or analytical methods. For these reasons, risks to plants and soil invertebrates are considered negligible from these two phthalates.

4,4'-DDD, 4,4'-DDE, and 4,4'-DDT

These pesticides were selected as COPCs because their maximum concentrations were greater than ESVs. However, as previously mentioned in Section 7.4.3.1, the Canadian SQG of 12,000 µg/kg (EC, 1999a) is a better-documented toxicity value, and so it was used to evaluate risks to terrestrial invertebrates and plants from 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT. The derivation of the SQG is discussed in Section 7.4.3.1.

The maximum concentrations at SWMU 17 of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT were 37 µg/kg, 9.2 µg/kg, and 20 µg/kg, respectively, and are less than the Canadian SQG of 12 mg/kg; therefore, risks to plants and soil invertebrates at SWMU 17 are expected to be negligible.

alpha-Chlordane and heptachlor

These pesticides were selected as COPCs because no screening levels are available for comparison; however, the Region 4 ESV for organochlorinated pesticides is 100 µg/kg. The single detected concentration of alpha-chlordane (0.55 µg/kg) and maximum concentration of heptachlor (2.8 µg/kg) are less than the organochlorinated pesticide ESV. Additionally, these pesticides were infrequently detected in SWMU 17 surface soils, in 1 of 19 and 2 of 19 samples collected, respectively. For these reasons, risks to plants and soil invertebrates are expected to be negligible.

Aroclor-1248, Aroclor-1254, and Aroclor-1260

These PCBs were selected as COPCs because their maximum concentrations were greater than the screening levels. As mentioned in Section 7.4.3.1, the Region 4 ESV for PCBs (20 µg/kg) is based on aquatic toxicity data rather than soil data; therefore, PCB concentrations were compared to the Canadian SQG of 33,000 µg/kg (EC, 2001) to evaluate risks to plants and soil invertebrates.

The derivation of the SQG for PCBs is discussed in Section 7.4.3.1. The maximum concentrations of Aroclor-1248, Aroclor-1254, and Aroclor-1260 (570, 870, and 350 µg/kg, respectively) were less than the Canadian SQG. Additionally, these PCBs were detected relatively infrequently in surface soil samples at SMWU 17. Aroclor-1248, Aroclor-1254, and Aroclor-1260 were detected in 1, 4, and 2 of 19 surface soil samples, respectively, at SWMU 17. For these reasons, risks to plants and soil invertebrates are expected to be negligible.

Endrin aldehyde and endrin ketone

Endrin aldehyde and endrin ketone were initially selected as COPCs because their maximum concentrations exceeded the ESV for endrin. Although concentrations at some locations exceeded the

conservative ESV for endrin, the concentrations of endrin aldehyde and endrin ketone overall at SMWU 17 were relatively low (0.26 to 5.4 µg/kg).

Additionally, endrin aldehyde was detected relatively infrequently (in 1 of 19 samples at location 17SB01) at SWMU 17. Other pesticides were either not detected at location 17SB01 or were detected at low concentrations (i.e., less than the ESV or alternate benchmarks). Endrin aldehyde's presence at this location at a relatively low concentration is probably a result of typical spraying activities, particularly because it is located along the boundary of a wooded area and a cleared area. Endrin ketone was detected in 4 of 18 samples collected at SWMU 17 at locations 17SB02, 17SB03, 17SB12, and 17SB19. Although endrin ketone might pose potential risks to plants and soil invertebrates, especially in the vicinity of 17SB12, there is uncertainty regarding whether or not the concentrations are due to typical insecticide application or to wastes from SWMU 17.

delta-BHC and gamma-BHC

delta-BHC was initially selected as a COPC because a screening level is not available, gamma-BHC was selected as a COPC because the maximum concentration exceeded the ESV.

The ESV for gamma-BHC is based on the Dutch MHSPE (1994) target value for which a source cannot be verified in the 1994 document. However, these pesticides were detected in only 1 of 19 samples, at locations 17SB16 and 17SB13, respectively. Other COPCs were detected at relatively low concentrations (i.e., less than the ESV or other appropriate alternate benchmarks) at these locations. The presence of these two pesticides is probably a result of typical application and not SWMU activities, and risks to plants and soil invertebrates are probably low.

Aluminum

The Eco-SSL guidance states that aluminum is considered a COPC only when the soil pH is less than 5.5. Aluminum is the most commonly occurring metallic element in the earth's crust, and concentrations typically range from 10,000 to 30,000 mg/kg in soil (USEPA, February 2005). Soil pH data are not available for SWMU 16 or other sites in the vicinity, so there is uncertainty regarding whether aluminum poses potential risk to plants and soil invertebrates at SWMU 16. However, concentrations are less than the typical range of values, and there is no reason to believe that waste material at SWMU 16 would contain especially high concentrations of aluminum.

Antimony

Antimony was initially selected as a COPC because the maximum concentration exceeded the USEPA Eco-SSL. As discussed in Section 7.4.3.1, the Eco-SSL used in the screening is based on risks to mammals and not risks to plants and soil invertebrates. The Eco-SSL for soil invertebrates is 78 mg/kg. The maximum antimony concentration (31.4 mg/kg) is less than the Eco-SSL for soil invertebrates and so risks to soil invertebrates are negligible.

An Eco-SSL for plants is not available; however, an ORNL plant value of 5 mg/kg is listed in Efroymson et al. (1997a). Antimony was detected in only 2 of 19 samples (17SB11 at 31.4 mg/kg and 17SB12 at 26.6 mg/kg); however, antimony concentrations at these locations exceeded the plant Eco-SSL. Therefore, risks to plants are possible in the vicinity of these locations but are expected to be negligible at all other locations.

Cadmium

Cadmium was initially selected as a COPC because the maximum concentration exceeded the USEPA Eco-SSL. However, the Eco-SSL used in the screening is based on risks to mammals and not risks to plants and soil invertebrates. The Eco-SSLs for plants and soil invertebrates are 32 and 140 mg/kg, respectively. The maximum cadmium concentration of 12.5 mg/kg is less than the Eco-SSLs for plants and soil invertebrates and so risks to these receptors are negligible.

Chromium

Chromium was initially selected as a COPC because the maximum concentration exceeded the USEPA Eco-SSL. However, the Eco-SSL used in the screening is based on risks to birds and not risks to plants and soil invertebrates. Therefore, chromium concentrations were compared to the Canadian SQG to evaluate risks to these receptors.

The Canadian SQG for chromium is 64 mg/kg (EC, 1999b). The derivation of the chromium SQG is discussed in Section 7.4.3.1. Chromium concentrations exceeded the SQG at location 17SB11 (392 mg/kg) and location 17SB12 (68.9 mg/kg). Concentrations at all other locations were 39 mg/kg and less. Therefore, although risks to plants and soil invertebrates within most of the SWMU are unlikely, risks to plants and soil invertebrates in the vicinity of locations 17SB11 and 17SB12 are possible. However the 64 mg/kg SQC was only slightly exceeded in sample 17SB12 (68.9 mg/kg).

Copper

Copper was initially selected as a COPC because the maximum concentration exceeded the screening level. Copper concentrations exceeded the screening level at four locations: 17SB03 (56.4 mg/kg), 17SB11 (1,220 mg/kg), 17SB12 (1,930 mg/kg), and 17SB14 (48.9 mg/kg). Therefore, concentrations at these locations were compared to the following SQG and ORNL values to further evaluate risks to plants and invertebrates:

- Canadian SQG – 63 mg/kg (CCME, 1997)
- ORNL plant value – 100 mg/kg (Efroymson et al., 1997a)
- ORNL earthworm value – 60 mg/kg (Efroymson et al., 1997b)

The derivations of the SQG and ORNL plant and earthworm benchmarks are discussed in Section 7.4.3.1. Copper concentrations at locations 17SB03 and 17SB14 are less than the SQG and ORNL benchmarks, so risks to plants and soil invertebrates at these locations are expected to be negligible. However, copper concentrations at locations 17SB11 and 17SB12 are greater than the SQG and ORNL benchmarks and so risks to plants and soil invertebrates at these locations are possible.

Iron

Iron was initially selected as a COPC because a screening level for evaluating risks to soil invertebrates is not available. Iron was detected in all 19 surface soil samples collected at SWMU 17 at concentrations ranging from 2,810 to 45,500 mg/kg. The greatest concentrations of iron were detected at locations 17SB07, 17SB11, 17SB12, and 17SB17. Other than location 17SB07, samples at these locations had elevated concentrations of other metals; therefore, the elevated iron concentrations seem to be co-located with contamination by other metals. No toxicity data were located to evaluate risks to soil invertebrates from iron; however, because iron is generally considered a non-toxic metal, it is highly unlikely that soil invertebrates are being impacted by iron at the SWMU. Nevertheless, the lack of toxicity information inhibits the evaluation of risk posed by iron. The uncertainties involved in not having toxicity data are discussed in Section 7.5.2.

Lead

Lead was initially selected as a COPC because the maximum concentration exceeded the Eco-SSL. However, the Eco-SSL used in the screening is based on risks to birds and not plants and soil invertebrates. The Eco-SSLs for plants and soil invertebrates are 120 and 1,700 mg/kg, respectively. The derivation of the plant and soil invertebrates Eco-SSLs are discussed in Section 7.4.3.1.

Lead concentrations are less than the Eco-SSL for soil invertebrates but exceed the Eco-SSL for plants at locations 17SB11 and 17SB12 where lead concentrations were 667 and 670 mg/kg, respectively. Lead concentrations at all other locations were 59.8 mg/kg and less. Therefore, risks to soil invertebrates at all locations are negligible, while risks to plants are possible at locations 17SB11 and 17SB12 and negligible at other locations.

Manganese

Manganese was initially selected as a COPC because a screening level is not available; therefore, manganese concentrations were compared to the following ORNL values to evaluate risks to plants and invertebrates:

- ORNL plant value – 500 mg/kg
- ORNL soil microorganisms and microbial processes value – 100 mg/kg

The ORNL plant value is based on a 17-day study in which stem weight of bush beans grown in loam soil was reduced by 29 percent at a concentration of 500 ppm manganese sulfate. The ORNL soil microorganisms and microbial processes value is based on a 21-day study in which nitrification by native soil microflora (in a sandy loam soil) was severely inhibited at 100 ppm manganese, added as a sulfate salt.

The maximum concentration of manganese is less than the ORNL plant benchmark, so risks to plants at SWMU 17 are negligible. However, manganese concentrations at three locations (17SB09 at an average concentration of the original and duplicate of 126.5 mg/kg, 17SB11 at 378 mg/kg, and 17SB12 at 309 mg/kg) are greater than the ORNL soil microorganisms and microbial processes value. Locations 17SB11 and 17SB12 are "hot spots" at which other metal COPC concentrations exceed screening and alternate benchmarks for plants and soil invertebrates. Location 17SB09 is located along the forest edge of the utility right-of-way, and the presence of manganese at this location might be related to the right-of-way or to background conditions more than to the SWMU. Overall, risks to soil invertebrates at locations 17SB11 and 17SB12 are possible, but risks to soil invertebrates at other locations appear negligible.

Mercury

Mercury was initially selected as a COPC because the maximum concentration exceeded the ESV. The ESV is based on the ORNL earthworm benchmark; therefore, mercury concentrations were compared to the Canadian SQG (12 mg/kg) (CCME, 1997) to evaluate risks to plants and further evaluate risks to invertebrates.

As presented in the supporting document for the Canadian SQG for mercury (EC, 1999e), the Canadian guideline of 12 mg/kg for mercury is based on the 25th percentile of effects and no- effects data distribution for plants and invertebrates. The 25th percentile is the sixth of 22 data points and corresponds to an EC_{50} for turnip seedling emergence (50 mg/kg). The EC_{50} value of 50 mg/kg was then divided by an uncertainty factor of four considering the importance of definitive effects data. In Appendix VIII of the supporting document, NOECs for earthworm survival were reported at 96 and 100 mg/kg in soils of pH 4.0 to 4.2 and 7.4, respectively.

Although mercury concentrations at four locations (17SB06, 17SB11, 17SB12, and 17SB17) exceed the ESV (i.e., the ORNL earthworm benchmark), the maximum detected mercury concentration is less than the SQG, which includes effects data for both plants and invertebrates. Additionally, the Canadian SQG is considered a better indicator of actual risks to plants and soil invertebrates at SWMU 17 because it is based on more studies than were used in the development of the ORNL earthworm benchmark. In fact, Efroymson et al. (1997b), which is the source of the Region 4 ESV, indicates that confidence in the earthworm benchmark is low because limited data were available. Only two studies were available for the development of the ORNL earthworm benchmark. The benchmark is based on the lower of the two effects data and corresponds to survival and cocoon production reduction by 65 and 40 percent, respectively, at a concentration of 0.5 ppm mercury. This LOEC was divided by a safety factor of five for the ORNL earthworm benchmark.

Therefore, although risks to soil invertebrates are possible because concentrations at four locations exceed the conservative ORNL earthworm benchmark, for the reasons discussed above, risks to plants and even soil invertebrates are probably minor at worst.

Nickel

Nickel was initially selected as a COPC because the maximum concentration exceeded the screening level. The ESV is based on the ORNL plant benchmark; therefore, nickel concentrations were compared to the Canadian SQG (50 mg/kg) (EC, 1999f) to evaluate risks to earthworms and further evaluate risks to plants.

The Canadian SQG for soil contact is the 25th percentile (8 of 31data points) of 50 mg/kg from a study where unspecified effects on onion growth were noted. Nickel concentrations exceeded the SQG at four locations including 17SB03, 17SB09, 17SB11, and 17SB12. Concentrations at locations 17SB03 (64.6 mg/kg) and 17SB09 (50.8 mg/kg in the duplicate sample; original sample concentration was only 4 mg/kg) only slightly exceeded the SQG; therefore, risks to plants and soil invertebrates at these two locations, although possible, are likely low. However, concentrations at locations 17SB11 and 17SB12 were 348 and 131 mg/kg, respectively. Because these concentrations were seven and three times

greater than the SQG and they appear to be a "hot spot" for other metal COPCs, risks to plants and soil invertebrates at these locations are likely.

Vanadium

Vanadium was initially selected as a COPC because the maximum concentration exceeded the USEPA Eco-SSL. However, the Eco-SSL is based on risks to birds and not risks to plants and soil invertebrates. Eco-SSLs for risks to plants and soil invertebrates are not available; therefore, vanadium concentrations at SWMU 17 were compared to the Canadian SQG (130 mg/kg) (EC, 1999c) to evaluate risks to these receptors.

The Canadian SQG of 130 mg/kg corresponds to the third of 10 data points, which is the 25th percentile based on seedling emergence by lettuce. The maximum vanadium concentration of 51.8 mg/kg in sample 17-B-07-00 is less than the SQG, so risks to plants and invertebrates from vanadium are expected to be negligible.

Zinc

Zinc was initially selected as a COPC because the maximum concentration exceeded the ESV. The ESV is based on the ORNL plant benchmark; therefore, zinc concentrations were compared to the following alternate benchmarks to evaluate risks to earthworms and further evaluate risks to plants:

- Canadian SQG – 200 mg/kg (EC, 1999g)
- ORNL earthworm value – 100 mg/kg (Efroymson et al., 1997b)

The Canadian SQG of 200 mg/kg is the lowest LOEC of the plants and invertebrate dataset and is based on an effect on seedling emergence for radish (EC, 1999g). The ESV (i.e., ORNL plant value) of 50 mg/kg was based on toxicity data from fewer plant studies than were used to develop the Canadian SQG. The majority of the studies had NOEC and LOEC values greater than 50 mg/kg, with many greater than 100 mg/kg and several greater than 200 mg/kg. Therefore, the ORNL plant benchmark appears to be somewhat conservative. The ORNL earthworm value of 100 mg/kg is slightly lower than effects concentrations from available studies. These included measures of cocoon production of *Eisenia fetida* of 136 mg/kg and 142 mg/kg, and an LC_{50} for *Eisenia fetida* divided by five of 132 mg/kg.

Four locations have zinc concentrations exceeding the ESV (i.e., ORNL plant benchmark and lowest of the benchmarks): 17SB03, 17SB11, 17SB12, and 17SB17. Concentrations at 17SB11 (1,510 mg/kg), 17SB12 (1,400 mg/kg), and 17SB17 (309 mg/kg) exceeded both the ORNL earthworm and SQG benchmarks. Although these benchmarks are likely conservative, as discussed above, risks to terrestrial

plants and soil invertebrates are possible at these locations, especially at locations 17SB11 and 17SB12 where elevated levels of other metal COPCs were detected and risk from cumulative metal toxicity is possible.

7.4.4.2 Sediment COPCs

The following is a summary of the Step 3a evaluation for sediment invertebrates exposed to sediment COPCs at SWMU 17. One sediment sample (17-D-01-1001 corresponding to location 17SD01) was collected from the marshy area approximately 400 feet east (and downgradient) of the site.

Carbon disulfide

Carbon disulfide was initially selected as a COPC in sediment because an ESV is not available. No alternate benchmarks for carbon disulfide are available. Because only one sediment sample was collected for evaluation, other Step 3a factors such as frequency of detection and spatial distribution cannot adequately evaluate risks to benthic invertebrates from this COPC. Carbon disulfide occurs naturally in sediment as discussed in Section 7.4.3.2; therefore, further evaluations of carbon disulfide are not possible. The uncertainties involved in not having toxicity data are discussed in Section 7.5.2.

4,4'-DDE

4,4'-DDE was initially selected as a COPC because the detected concentration (3.6 µg/kg) was slightly greater than the ESV. However, the Region 4 ESV is based on the PQL rather than effects to sediment invertebrates. An effects value of 1.58 µg/kg for total DDT is listed by USEPA Region 4 and is the ER-L from Long et al. (1995) for marine and estuarine sediments. The detected concentration of 3.6 µg/kg exceeds the ER-L but is significantly less than the ER-M of 46.1 µg/kg.

The 4,4'-DDE concentration was further compared to the consensus-based TEC for total DDTs of 5.28 µg/kg. Because 4,4'-DDD and 4,4'-DDT were not detected in the sediment sample, the total DDT concentration of 3.6 µg/kg is less than the TEC for total DDTs of 5.28 µg/kg. For this reason and because the 4,4'-DDE concentration only slightly exceeds the ER-L for total DDT, risks to sediment invertebrates are probably minor.

Endosulfan sulfate

Endosulfan sulfate was initially selected as a COPC because an ESV is not available. The alternate benchmark selected for endosulfan sulfate is the USEPA Ecotox Threshold of 5.4 µg/kg for endosulfan (mixed isomers) (USEPA, January 1996). The USEPA Ecotox Threshold is the sediment quality benchmark calculated by equilibrium partitioning and assuming 1 percent organic carbon. The

endosulfan sulfate detected concentration of 2.8 µg/kg is less than the Ecotox Threshold; therefore, risks to sediment invertebrates are negligible.

Heptachlor

Heptachlor was initially selected as a COPC because an ESV is not available. The only available alternate benchmark for heptachlor is the SCV of 68 µg/kg (Jones et al., 1997). The SCV was calculated by equilibrium partitioning and assuming 1 percent organic carbon (Jones et al., 1997). The detected heptachlor concentration of 1.5 µg/kg is less than the SCV; therefore, risks to sediment invertebrates are negligible.

Aluminum

Aluminum was initially selected as a COPC because an ESV is not available. The benchmark selected for aluminum is the TEL of 25,500 mg/kg (Buchman, 1999). The TEL represents the concentration below which adverse effects on survival or growth of the amphipod *Hyalella azteca* are expected to occur only rarely in 28-day tests (MacDonald et al., 2000). Additionally, the upgradient aluminum concentration at location 23SD08 was 26,400 mg/kg.

The maximum concentration of 20,900 mg/kg is less than the TEL and the upgradient concentration at location 23SD08; therefore, risks to sediment invertebrates are negligible.

Arsenic

Arsenic was initially selected as a COPC because the detected concentration of 9.4 mg/kg slightly exceeded the ESV of 7.24 mg/kg. However, the upgradient arsenic concentration at location 23SD08 was 18.3 mg/kg. Therefore, the detected arsenic concentration is within background conditions, and site-related risks to sediment invertebrates are not expected.

Barium

Barium was initially selected as a COPC because an ESV is not available. The only available alternate benchmark for barium is the AET of 48 mg/kg (Buchman, 1999). Additionally, the upgradient barium concentration at location 23SD08 was 36.2 mg/kg.

The detected concentration of 27.6 mg/kg is less than the AET and the upgradient concentration at location 23SD08. Although the paucity of lower-effects toxicity data inhibits a complete evaluation of risks posed by barium, barium is a common element in sediments and it is not generally associated with

significant toxicity (ATSDR, 1992). Additionally, the detected barium concentration is less than the upgradient concentration. For these reasons, risks to sediment invertebrates are negligible.

Beryllium

Beryllium was initially selected as a COPC because an ESV is not available. No alternate benchmarks are available for beryllium. However, beryllium was detected at the upgradient location 23SD08 at a concentration of 1.6 mg/kg. The detected beryllium concentration of 1.3 mg/kg is less than the upgradient concentration, and site-related risks to sediment invertebrates are not expected.

Cobalt

Cobalt was initially selected as a COPC because an ESV is not available. No alternate benchmarks for cobalt are available. The detected cobalt concentration of 10.5 mg/kg is less than the upgradient concentration of 11.3 mg/kg at location 23SD08. Therefore, site-related risks to sediment invertebrates are negligible.

Iron

Iron was initially selected as a COPC because an ESV is not available. Therefore, iron concentrations were compared to the Canadian SQGs. The Canadian LEL of 20,000 mg/kg (OMOE, 1993) indicates the level of sediment contamination that has no effect on and can be tolerated by the majority of sediment-dwelling organisms. The Canadian sediment guidelines were developed by first calculating the 90th percentile of the concentrations evaluated in toxicity studies where a species was present, and then plotting the 90th-percentile concentrations for all of the species considered to develop the guideline. The 5th percentile of the plot was selected as the LEL for metals. The detected concentration of iron (24,500 mg/kg) slightly exceeds the LEL but is less than the upgradient iron concentration of 34,600 mg/kg at location 23SD08. Therefore, although the iron concentration slightly exceeds the conservative LEL, the detected iron concentration is less than the upgradient concentration, and site-related risks to sediment invertebrates are not expected.

Lead

Lead was initially selected as a COPC because the detected concentration of 35.2 mg/kg slightly exceeded the ESV of 30.2 mg/kg. The upgradient concentration at location 23SD08 was 26.8 mg/kg. Although the detected concentration slightly exceeded the conservative screening level and the upgradient concentration at location 23SD08, the detected concentration was not significantly greater than these concentrations, and site-related risks to sediment invertebrates at this location are minor at worst.

Manganese

Manganese was initially selected as a COPC because an ESV is not available. The only available benchmark for manganese is the Canadian Sediment Guidelines LEL of 460 mg/kg (OMOE, 1993). The LEL indicates the level of sediment contamination that has no effect on and can be tolerated by the majority of sediment-dwelling organisms. The upgradient concentration at location 23SD08 is 352 mg/kg.

The detected manganese concentration of 256 mg/kg is less than the LEL and the upgradient concentration at location 23SD08; therefore, risks to sediment invertebrates are negligible.

Mercury

Mercury was initially selected as a COPC because the detected concentration of 0.39 mg/kg exceeded the ESV of 0.13 mg/kg. The mercury concentration at the upgradient location 23SD08 was 0.14 mg/kg. The Region 4 ESV is based on the TEL from MacDonald (1994). The TEL represents the "minimal effects range" and is defined as the upper limit of the range of sediment concentrations dominated by no-effects data. Concentrations less than the TEL are considered to not represent significant hazards to aquatic organisms. The PEL is the lower limit of the range of sediment concentrations that are usually or always associated with adverse biological effects. Sites where contaminant concentrations are greater than the TEL but less than the PEL represent a range where adverse biological effects are possible but not necessarily probable. MacDonald (1994) suggests that site specific conditions will likely control whether or not toxicity to sediment-dwelling organisms occurs.

The PEL for mercury is 0.696 mg/kg. Because only one sediment sample was collected for evaluation, information regarding site-specific conditions is limited. Additionally, other Step 3a factors such as frequency of detection and spatial distribution cannot adequately evaluate risks to sediment invertebrates from this COPC. However, the detected mercury concentration is closer to the TEL than the PEL and, although possible, risks are likely minor.

Vanadium

Vanadium was initially selected as a COPC because an ESV is not available. The only available alternate benchmark for vanadium is the AET of 57 mg/kg (Buchman, 1999), which is based on marine organisms. The detected vanadium concentration of 60.9 mg/kg slightly exceeds the AET but is less than the upgradient concentration of 63.7 mg/kg at location 23SD08. Although the paucity of lower-effects toxicity data inhibits a complete evaluation of risks posed by vanadium, the detected vanadium

concentration is less than the upgradient concentration. For these reasons, risks to sediment invertebrates are negligible.

7.4.4.3 Surface Water COPCs

The following is a summary of the Step 3a evaluation for aquatic organisms exposed to surface water COPCs at SWMU 17.

Aluminum

Aluminum was initially selected as a COPC because the detected concentration of 1,400 µg/L exceeded the freshwater ESV of 87 µg/L. The freshwater ESV is based on the chronic USEPA AWQC. The detected concentration exceeds the ESV (i.e., AWQC) but is less than the upgradient concentration of 1,760 µg/L and two times the upgradient concentration of 3,520 µg/L at location 23SW08. Therefore, although the aluminum concentration slightly exceeds the conservative AWQC, the detected aluminum concentration is less than the upgradient concentration, and site-related risks to aquatic organisms are not expected.

Barium, cobalt, iron, manganese, and vanadium

These inorganics were initially selected as COPCs because screening levels were not available for comparison. The alternate benchmarks selected for comparison are the Tier II values (i.e., ORNL aquatic SCVs) for barium, cobalt, manganese, and vanadium (Suter and Tsao, 1996) and the USEPA AWQC for iron.

The SCV for barium is 4.0 µg/L. Although the detected concentration of barium (47.3 µg/L) exceeds the conservative SCV, the USEPA 1986 Quality Criteria for Water (the Gold Book) states that the soluble barium concentration would have to exceed 50 mg/L (50,000 µg/L) in fresh and marine waters before toxicity to aquatic life is expected. The Gold Book indicates that in most natural waters, a sufficient amount of sulfate or carbonate exists to precipitate barium as an insoluble, non-toxic compound. Additionally, the detected barium concentration is similar to two times the upgradient concentration (46.6 µg/L) at location 23SW08. Therefore, site-related adverse risks to aquatic organisms from barium in surface water are not expected.

The SVC for cobalt is 23 µg/L. The detected concentration of cobalt (2.9 µg/L) is less than the SCV; therefore, risks to aquatic organisms from cobalt are expected to be negligible.

The USEPA AWQC for iron is 1,000 µg/L. The detected iron concentration of 2,740 µg/L exceeds the AWQC; however, as noted in the Gold Book "iron in water may be present in varying quantities dependent upon the geology of the area and other chemical components of the waterway." Because only one surface water sample was collected for evaluation, information regarding site- specific conditions is limited. Additionally, other Step 3a factors such as frequency of detection and spatial distribution cannot adequately evaluate risks to aquatic organisms from this COPC. However, the detected iron concentration is similar to two times the upgradient concentration (2,480 µg/L). Therefore, although risks to aquatic organisms are possible because the detected concentration exceeds the AWQC, site-related risks to aquatic organisms at this location are likely minor at worst.

The SCV for manganese is 120 µg/L. Although the detected manganese concentration (169 µg/L) is greater than the SCV, the USEPA Gold Book indicates that ions of manganese are found rarely at concentrations above 1,000 µg/L and, because the tolerance values reported range from 1,500 µg/L to over 1,000,000 µg/L, manganese is not considered to be a problem in fresh waters (USEPA, May 1986). Although the Gold Book does not discuss tolerance values for saltwater species, the maximum concentration is much less than the 1,000 mg/L reported for fresh waters. For this reason and because the SCV for manganese is very conservative (Suter and Tsao, 1996), risks to aquatic life from manganese are expected to be negligible.

The SCV for vanadium is 20 µg/L. The detected vanadium concentration (5.2 µg/L) is less than the SCV; therefore, risks to aquatic organisms from vanadium are negligible.

Silver

Silver was selected as a COPC because the maximum concentration of 1.3 µg/L exceeded the Region 4 saltwater and freshwater screening values. Silver was not detected in the sample collected from the upgradient location 23SW08. Silver was not detected in surface soil or sediment samples at SWMU 17, so the source of silver in surface water is uncertain. Because the concentration exceeds the ESV, potential risk exists. However, the chronic ESV is based on data available for only one species and may not be truly representative of toxicity at this location. Furthermore, because silver was not detected in surface soil or sediment, the concentration in the single surface water sample does not appear to be site related.

7.4.4.4 Food-chain Modeling

Appendix G.4 presents the food-chain modeling calculations. Similar to the surface soil screening for plants and soil invertebrates, an evaluation of maximum concentrations was first conducted. Two scenarios were considered: (1) maximum detected concentrations in surface soil, conservative exposure

factors, and 90th-percentile BAFs and (2) average detected concentrations in surface soil, less conservative exposure factors, and average BAFs. Tables 7-10 and 7-11 present the HQs for the herbivorous and insectivorous representative species under the conservative exposure scenario and the average exposure scenario, respectively. The results of the food-chain modeling for SWMU 17 are discussed below.

Herbivores

Under the maximum (conservative) exposure scenario, NOAEL-based HQs for all metals detected (cadmium, chromium, copper, lead, mercury, nickel, and zinc) exceeded 1.0. Pesticide and PCB HQs under the maximum screening were less than 1.0 for the representative herbivorous bird and small mammal. Generally, HQs were greater for the herbivorous bird than for the herbivorous small mammal.

Under the average exposure scenario, both NOAEL- and LOAEL-based HQs were less than 1.0 for the representative herbivorous small mammal (i.e., the cotton mouse). Only lead and mercury had NOAEL-based HQs slightly exceeding 1.0 (1.1 and 3.3, respectively) for the herbivorous bird, but all LOAEL-based HQs were less than 1.0.

The lead NOAEL-based HQ for the mourning dove was slightly greater than 1.0 (HQ =1.1) due to lead concentrations at locations 17SB11 (667 mg/kg) and 17SB12 (670 mg/kg). The average lead concentration at SWMU 17 excluding these two locations is 41.42 mg/kg. The NOAEL-based HQ for the herbivorous bird is less than 1.0 using a concentration of 41.42 mg/kg. Therefore, risks to herbivorous receptors at SWMU 17 are limited to the vicinity of locations 17SB11 and 17SB12 but are minor considering that herbivorous birds would obtain only a small portion of their food from the site. Food-chain-related risks are negligible at all other locations.

The mercury NOAEL-based HQ for the mourning dove (HQ = 3.3) is due to the two greatest mercury detections at locations 17SB17 (1.8 mg/kg) and 17SB12 (1.7 mg/kg). The average mercury concentration excluding these two locations is 0.058 mg/kg. The NOAEL-based HQ for the herbivorous bird is less than 1.0 using a concentration of 0.058 mg/kg. Therefore, it appears that risks are limited to locations 17SB17 and 17SB12 but are minor considering that herbivorous birds would obtain only a small portion of their food from the site. Risks to herbivorous birds from mercury are negligible at all other locations.

Insectivores

Under the conservative exposure scenario, NOAEL-based HQs for three pesticides, three PCBs, and all metals detected (cadmium, chromium, copper, lead, mercury, nickel, and zinc) exceeded 1.0. Generally, HQs were greater for the insectivorous bird than for the insectivorous small mammal.

Under the average exposure scenario, only NOAEL-based HQs were greater than 1.0 for insectivorous receptors; all LOAEL-based HQs were less than 1.0. Aroclor-1248 and mercury NOAEL-based HQs were greater than 1.0, at 2.6 and 1.1, respectively, for insectivorous small mammals represented by the shrew. Chromium, lead, mercury, and zinc NOAEL-based HQs exceeded 1.0 for insectivorous birds represented by the woodcock.

Although the Aroclor-1248 NOAEL-based HQ exceeded 1.0 in the average exposure scenario for the short-tailed shrew, Aroclor-1248 was detected in only 1 of 19 surface soil samples (location 17SB11). Although risks to insectivorous small mammals are possible from this PCB in the vicinity of this location, risks are negligible at all other locations. It should be noted that it is highly unlikely that small mammals would be feeding solely at this location, particularly, because 17SB11 represents such a small, potentially contaminated area. This location is bounded to the west by the adjacent roadway and to the southeast by location 17SB26 where Aroclor-1248 was not detected. Location 17SB11 however is not bounded to the immediate south and north/northeast. Risks to insectivorous birds could not be quantified due to the lack of PCB TRVs for avian receptors.

The NOAEL-based HQ for chromium exceeded 1.0 in the average exposure scenario for the American woodcock. This exceedance is attributed to the location of the maximum concentration (392 mg/kg) at location 17SB11. The average concentration excluding location 17SB11 is 17.9 mg/kg. The NOAEL-based HQ for the American woodcock is less than 1.0 using a concentration of 17.9 mg/kg and the average exposure parameters. Therefore, risks to insectivorous birds from chromium are limited to the vicinity of location 17SB11 and negligible at all other locations. As noted above, it is unlikely that insectivorous birds will feed solely at this location.

In the average exposure scenario (Table 7-11), lead HQs were less than 1.0 for mammal insectivores and exceeded 1.0 for avian insectivores represented by the woodcock (HQ =3.7) only for the NOAEL-based HQ; the LOAEL-based HQ was 0.37. The NOAEL based HQ of 3.7 is not particularly elevated considering that insectivorous birds would obtain only a small portion of their food from the site. For example, the home range of the woodcock is approximately 61 acres (Table 7-7), but SWMU 17 encompasses only about 0.4 acre. The NOAEL-based HQ would be significantly less than 1.0 if a woodcock area use factor was incorporated. Therefore, risks to insectivorous birds from lead appear to be minimal.

The mercury NOAEL-based HQ for the short-tailed shrew only slightly exceeded 1.0 (HQ = 1.1). Mercury concentrations were greatest at locations 17SB17 (1.8 mg/kg) and 17SB12 (1.7 mg/kg). The average mercury concentration excluding these two locations is 0.058 mg/kg. Mercury food-chain HQs for the shrew are less than 1.0 using a concentration of 0.058 mg/kg. Therefore, it appears that risks to insectivorous small mammals are limited to the vicinity of locations 17SB17 and 17SB12 and negligible at all other locations. NOAEL-based HQs for the American woodcock are not particularly elevated considering the relatively large home ranges for this species or other insectivorous birds.

The zinc NOAEL-based HQ was greater than 1.0 (HQ = 5.7) in the average exposure scenario for the American woodcock. Two locations, 17SB11 and 17SB12, had particularly elevated concentrations of zinc with respect to other locations across the SWMU. In fact, maximum concentrations of many metals were detected at these locations. The average zinc concentration excluding these two locations is 42.3 mg/kg. The NOAEL-based HQ for zinc in the American woodcock food-chain model is only slightly greater than 1.0 (HQ = 1.27) using a concentration of 42.3 mg/kg, which is not significant considering that insectivorous birds would obtain only a small portion of their food from the site.

7.6 UNCERTAINTY

Uncertainty is associated with all aspects of the ecological assessment methodology presented in the preceding sections. This section provides a summary of the uncertainties.

7.6.1 Uncertainty in the Problem Formulation

Measurement endpoints are used to evaluate the assessment endpoints selected for the SERA. For the SERA, the measures of effects are not the same as the assessment endpoints. Therefore, the measures are used to predict effects to the assessment endpoints by selecting surrogate species that were evaluated. For example, a decrease in reproduction of a shrew is used to assess a decrease in reproduction of the insectivorous small mammal population. However, predicting a decrease in reproduction of a shrew may either underprotect or overprotect the insectivorous small mammal population based on differences in factors such as ingestion rates, toxicity, food preferences, and home ranges between different species.

As discussed in Section 7.1.1, several endangered and threatened species or species of special concern are present at NSWC Crane, and a few may occasionally forage at SWMU 16. Risks to these species were not specifically calculated, but are probably minimal since these species do not significantly utilize habitats at the site. Risks to carnivorous mammals and birds were not evaluated because the contaminated portions of SWMU 16 and SWMU 17 represent only a small portion of these receptors

home range, although there is uncertainty with this conclusion because risks were not quantitatively evaluated.

Risks to reptiles and amphibians are not quantitatively evaluated because exposure factors are not established for most species and toxicity data are very limited.

7.6.2 Uncertainty in the Ecological Effects Characterization

The contaminant dose to terrestrial wildlife is calculated using an equation that incorporates ingestion rates, body weights, BAFs, and other exposure factors. These exposure factors are obtained from literature studies or predicted using various equations. Ingestion rates and body weights vary among species, especially among species inhabiting different areas.

Literature-based BAFs used in food-chain modeling often vary between species and sites. Additionally, bioaccumulation of contaminants into various biological media (e.g., plants, invertebrates, benthic invertebrates, and fish) depends on characteristics of the media such as pH, organic carbon, etc. Therefore, actual BAFs at the sites may be different than those used in the SERA and obtained from the literature. BAFs for estimating concentrations of pesticides in benthic invertebrate tissue were not available, so BAFs for estimating concentrations in fish were used for the marsh wren food-chain models. Similarly, BAFs for estimating metals concentrations in fish were not available, so sediment BAFs for estimating metals concentrations in benthic invertebrates were used for the raccoon food-chain models.

Also, the bioavailability of contaminants reported in toxicity studies is typically greater than the contaminants in environmental media. Typically, highly bioavailable forms of the chemicals are used when conducting toxicity tests and/or conducting dosing studies for wildlife. For example, many of the toxicity tests used to develop screening levels for inorganics use highly bioavailable forms of the metal, such as metal salts, which in many cases are much more toxic than equivalent concentrations of the inorganics in field collected soils (Allen, 2002).

There is uncertainty in the chemical data collected at the site. Measured levels of chemicals are only estimates of the true site chemical concentrations. Samples were deliberately biased toward known or suspected high concentrations so predicted doses are higher than actual doses. Whereas this is a conservative approach in predicting exposure concentrations, actual exposure of ecological receptors to chemical concentrations at SWMUs 16 and 17 are likely overestimated. In particular, wildlife typically roam over multiple sample locations and are unlikely to obtain all their food from within the most contaminated areas at SMWUs 16 and 17. However, it is possible that "hot spots" in SWMU 17 surface soil were missed, considering the random nature of historical operations. Because the contaminated

areas occupy only a very small portion of the overall ecological habitat at SWMUs 16 and 17, discussions of the overall risks to ecological receptors were included in Sections 7.4.3.4 and 7.4.4.4.

Laboratory-derived NOAELs and LOAELs might not adequately represent toxicity thresholds for receptors under field conditions. In addition, NOAELs and LOAELs derived for species used in toxicity tests might not adequately represent toxicity thresholds for other species. These uncertainties may overestimate or underestimate potential risks.

Toxicological data for a few of the chemicals (for a few of the receptor types) are limited or do not exist. This occurred for several COPCs in surface soil, sediment, and surface water, but it did not affect the outcome of the risk assessment because the chemicals without toxicity data were evaluated using surrogate chemicals, other Step 3a considerations, or were only detected at locations where concentrations for other COPCs were particularly elevated. Although there is uncertainty in using a surrogate chemical when evaluating toxicity, attempts were made to lessen the uncertainties by providing the toxicological basis of the alternate benchmarks when they were used.

7.6.3 Uncertainty in the Exposure Assessment

Several alternate benchmark values were used to gain a better understanding of the relationship between the concentrations of the selected COPCs to the overall ecological assessment of the site. Additionally, alternate benchmarks were used in cases where it appeared that the screening was too conservative to adequately representative toxicological exposure to ecological receptors. Freshwater alternate benchmarks were also used for sediment and surface water in the Step 3a evaluation in the absence of saltwater values. However, freshwater alternate benchmarks were only used when no other toxicity data were available. There is some uncertainty involved when using alternate benchmarks (and substituting freshwater benchmarks for saltwater values); however, attempts were made to lessen the uncertainties by providing the toxicological basis of the alternate benchmarks when they were used.

Soil samples evaluated in this risk assessment consisted of samples no deeper than 1 foot below the soil surface. However, tree roots extend deeper than 1 foot below the surface, and mammals such as moles could burrow deeper than 1 foot. With the exception of moles and trees, terrestrial species at the site would rarely (if ever) be exposed to soils deeper than 1 foot below the surface. The uncertainty resulting in evaluating only surface soils; therefore, is negligible.

7.6.4 Uncertainty in the Risk Characterization

Risk characterization uncertainties result from the combination of the above uncertainties. For example, the assessment of risks to herbivorous, insectivorous, and piscivorous receptors via the food chain is

hindered by uncertainties such as the derivation of the TRVs, the process used to derive BAFs, and the choice of the best species to represent small mammal and bird receptors. A weight-of-evidence approach to assess risks was used to reduce the overall uncertainty in these situations.

Uncertainty in risk characterization also results from the lack of data regarding the toxicity of multiple chemicals. For example, soil concentrations of some COPCs were particularly elevated at the same locations. The extent to which these concentrations might contribute to cumulative toxicity at these locations is uncertain.

7.7 SUMMARY AND CONCLUSIONS

A SERA was performed for SWMUs 16 and 17 at NWS Charleston. Several chemicals were retained as COPCs as a result of the initial screening of surface soil, sediment, and surface water. These chemicals were further evaluated and data were scrutinized as a part of the Step 3a refinement.

7.7.1 SWMU 16

Plants and Soil Invertebrates

In surface soil, many chemicals were initially selected as COPCs. Concentrations of Aroclor-1254, antimony, cadmium, chromium, lead, mercury, and zinc pose risks to soil invertebrates and plants. However, elevated concentrations for these final COPCs are limited to location 16SS02. Although localized impacts from these COPCs could occur in the vicinity of 16SS02, no impacts to plants and invertebrates at SWMU 16 are expected at other locations.

Benthic Invertebrates and Aquatic Organisms

In sediment, several chemicals were initially selected as COPCs. Potential risk due to concentrations of alpha- and gamma-BHC, Aroclor-1242, copper, mercury, and nickel are possible because concentrations at some locations exceeded toxicity data. However, maximum screening HQs based on Region 4 ESVs were relatively low (alpha-BHC HQ = 4.2, gamma-BHC HQ = 1.9, Aroclor-1242 HQ = 4.8, copper HQ = 5.3, mercury HQ = 2.2, and nickel HQ = 1.8).

In surface water, several chemicals were initially selected as COPCs. Aluminum and iron were detected at concentrations greater than alternate benchmarks at locations 16SW05 and 16SW07; these locations are located south and downgradient of the debris area in the southeastern boundary of the SWMU, and it is possible that contaminants in surface soil have migrated to these locations. However, at all other surface water locations risks are negligible.

Summary of Food-chain Modeling

Potential risks to insectivorous and herbivorous small mammals and birds from bioaccumulative contaminants in surface soil were evaluated. Based on the food-chain modeling results, Aroclor-1254, cadmium, chromium, lead, mercury, and zinc pose potential risks to insectivorous and/or representative herbivorous receptors, but only in the vicinity of location 16SS02.

Risks to piscivorous small mammals and birds from bioaccumulative contaminants in sediment were also evaluated. Aroclor-1242 and mercury pose potential risks to piscivorous receptors only for any receptors that forage exclusively at locations 16SD02 and 16SD05, respectively.

7.7.2 SWMU 17

Plants and Soil Invertebrates

In surface soil, several chemicals were initially selected as COPCs. Concentrations of chromium, copper, lead, manganese, nickel, and zinc pose risks to soil invertebrates and plants. Concentrations of these metals were greater than alternate toxicity guidelines for plants and invertebrates at some locations, in particular locations 17SB11 and 17SB12. Potential risk is probably minimal at other locations.

Benthic Invertebrates and Aquatic Organisms

In sediment, several chemicals were initially selected as COPCs; however, after the Step 3a refinement, no chemicals were determined to pose potential risks overall.

In surface water, several chemicals were initially selected as COPCs; however, after the Step 3a refinement, no chemicals were determined to pose potential site-related risks.

Summary of Food-chain Modeling

Based on the food-chain modeling results, Aroclor-1248, chromium, lead, mercury, and zinc concentrations pose potential risks to insectivorous and/or herbivorous small mammals and birds. However, risks were isolated to the vicinity of 17SB11 and 17SB12, and to a lesser extent, 17SB17.

TABLE 7-1

ECOLOGICAL COPC SELECTION - SURFACE SOIL
SWMU 16
CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Sample of Maximum Detection	Average of Positive Detections	Average of All Samples	Region 4 ESV	Hazard Quotient	COPC[4]
Volatile Organics (ug/kg)									
Acetone	2/4	1300 J	1700 J	16-S-04-00	1500	764	NA	NA	YES
Semivolatile Organics (ug/kg)									
Benzaldehyde	2/4	450	460	16-S-03-00	455	1184	NA	NA	YES
Bis(2-Ethylhexyl) phthalate	3/4	240 J	6100000	16-S-02-00-D	1650163	1237673	NA	NA	YES
Butyl Benzyl Phthalate	1/4	9400	16000	16-S-02-00-D	12700	3330	NA	NA	YES
Di-n-butyl phthalate	1/4	14000	26000	16-S-02-00-D	20000	5155	200,000	0.13	NO
Di-n-octyl phthalate	1/4	34000 J	70000 J	16-S-02-00-D	52000	13155	NA	NA	YES
Diethyl Phthalate	1/4	870 J	1900 J	16-S-02-00-D	1385	501	100,000	0.02	NO
Pesticides/PCBs (ug/kg)									
4,4'-DDD	1/4	1.4 J	1.4 J	16-S-03-00	1.4	93	2.5	0.56	NO
4,4'-DDE	2/4	3.1 J	4.6	16-S-04-00	3.9	94	2.5	1.8	YES
4,4'-DDT	1/4	4.8	4.8	16-S-04-00	4.8	93	2.5	1.9	YES
Total DDT	2/4	4.5	9.4	16-S-04-00	--	--	2.5	3.8	YES
Aroclor-1254	1/4	40000	59000	16-S-02-00	49500	12383	20	2950	YES
Inorganics (mg/kg)									
Aluminum	4/4	3030	14200	16-S-01-00	8734	8734	pH[1][2]	NA	YES
Antimony	1/4	98.3	122	16-S-02-00-D	110	28	0.27[1]	452	YES
Arsenic	4/4	1.1	3.9	16-S-01-00 16-S-03-00 16-S-04-00	3.2	3.2	18[1]	0.22	NO
Barium	4/4	13.5	207	16-S-02-00-D	56.9	56.9	330[1]	0.63	NO
Cadmium	3/4	0.16	60.7	16-S-02-00	17.6	13.2	0.36[1]	169	YES
Calcium	4/4	274	1440	16-S-02-00	561	561	NA	NA	NO
Chromium	4/4	11	667	16-S-02-00-D	154	154	26[1]	26	YES
Cobalt	3/4	0.52	1.1	16-S-01-00	0.84	0.73	13[1]	0.1	NO
Copper	4/4	2.4	58.1	16-S-02-00-D	16	16	40	1.5	YES
Iron	4/4	1520 J	15800 J	16-S-01-00	10936	10936	pH[1][3]	NA	YES
Lead	4/4	7.8	12400	16-S-02-00-D	2759	2759	11[1]	1127	YES
Magnesium	4/4	626	1230	16-S-01-00	881	881	NA	NA	NO
Manganese	4/4	9.4	41.4 J	16-S-04-00	24	24	100	0.41	NO
Mercury	4/4	0.02	0.11	16-S-02-00-D	0.04	0.04	0.1	1.1	YES
Nickel	4/4	1.6	4.7	16-S-04-00	3.1	3.1	30	0.16	NO
Potassium	4/4	236	641	16-S-01-00	476	476	NA	NA	NO
Selenium	2/4	0.67	0.69	16-S-04-00	0.7	1.3	0.81	0.85	NO
Sodium	4/4	1590	4160	16-S-01-00	2675	2675	NA	NA	NO
Vanadium	4/4	3.8	34.1	16-S-01-00	22	22	7.8[1]	4.4	YES
Zinc	4/4	5.4	157	16-S-02-00	41	41	50	3.1	YES

TABLE 7-1

ECOLOGICAL COPC SELECTION - SURFACE SOIL
SWMU 16
CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Sample of Maximum Detection	Average of Positive Detections	Average of All Samples	Region 4 ESV	Hazard Quotient	COPC[4]
Miscellaneous Parameters (mg/kg)									
Total Organic Carbon	2/2	19000	25000	16-S-04-00	22000	22000	NA	NA	NO
Total Solids (%)	4/4	43	84	16-S-01-00	72	72	NA	NA	NO

1 - USEPA Ecological Soil Screening Level.
2- Aluminum is considered a COPC only when the soil pH is less than 5.5. Soil pH data are not available for SWMU 16 or vicinity.
3 - Iron is not expected to be toxic to plants with a soil pH between 5 and 8. Soil pH data are not available for SWMU 16 or vicinity.
4 - Chemicals retained as COPCs are further evaluated in the Step 3a evaluation (see Section 7.4.3.1).

J = Estimated value.

TABLE 7-2

ECOLOGICAL COPC SELECTION - SEDIMENT
SWMU 16
CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Sample of Maximum Detection	Average of Positive Detections	Average of All Samples	Region 4 ESV	Hazard Quotient	COPC[2]
Volatile Organics (ug/kg)									
Carbon Disulfide	5/7	2 J	17 J	16-D-03-1001	8.5	9.5	NA	NA	YES
Semivolatile Organics (ug/kg)									
Anthracene	1/7	68 J	68 J	16-D-03-1001	68	484	330	0.2	NO
Benzo(a)anthracene	4/7	44 J	200 J	16-D-03-1001	101	283	330	0.6	NO
Benzo(a)pyrene	3/7	19 J	160 J	16-D-03-1001	79	384	330	0.5	NO
Benzo(b)fluoranthene	4/7	21 J	1100 J	16-D-02-1001	365	466	NA	NA	YES
Benzo(g,h,i)perylene	1/7	130 J	130 J	16-D-03-1001	130	493	NA	NA	YES
Chrysene	2/7	190 J	710 J	16-D-02-1001	450	510	330	2.2	YES
Fluoranthene	4/7	42 J	350 J	16-D-03-1001	141	305	330	1.1	YES
Indeno(1,2,3-cd)pyrene	1/7	120 J	120 J	16-D-03-1001	120	492	NA	NA	YES
Phenanthrene	1/7	190 J	190 J	16-D-03-1001	190	502	330	0.6	NO
Pyrene	3/7	81 J	940 J	16-D-02-1001	460	493	330	2.8	YES
Total PAHs	6/7	40	2,750	16-D-02-1001	--	--	1684	1.6	YES
Pesticides/PCBs (ug/kg)									
4,4'-DDD	3/7	1.4 J	5.3 J	16-D-06-1001	3.2	5.2	3.3	1.6	YES
4,4'-DDE	6/7	2.2 J	4.2 J	16-D-03-1001	3.3	3.8	3.3	1.3	YES
4,4'-DDT	4/7	1 J	4.4 J	16-D-06-1001	2.9	4.6	3.3	1.3	YES
Total DDT	6/7	2.2	13.2	16-D-06-1001	--	--	3.3	4.0	YES
Alpha-Chlordane	1/7	3.7 J	3.7 J	16-D-02-1001	3.7	3.1	1.7	2.2	YES
Aroclor-1242	1/7	160 J	160 J	16-D-02-1001	160	48.6	33 (total)	4.8	YES
Aroclor-1260	1/7	26 J	26 J	16-D-02-1001	26	30	33 (total)	0.8	NO
Gamma-Chlordane	1/7	3.3 J	3.3 J	16-D-02-1001	3.3	3.1	1.7	1.9	YES
alpha-BHC	3/7	7 J	14 J	16-D-03-1001	11	6.2	3.3(1)	4.2	YES
gamma-BHC (Lindane)	3/7	5 J	6.4 J	16-D-03-1001	5.5	3.8	3.3	1.9	YES
Inorganics (mg/kg)									
Aluminum	7/7	3640	45100 J	16-D-05-1001	31219	31219	NA	NA	YES
Arsenic	6/7	14.6 J	20.6 J	16-D-05-1001	17.5	15.1	7.24	2.8	YES
Barium	7/7	5.7	49.6 J	16-D-05-1001	34	34	NA	NA	YES
Beryllium	7/7	0.18	1.8 J	16-D-03-1001 16-D-04-1001 16-D-05-1001	1.3	1.3	NA	NA	YES
Calcium	7/7	714	3240 J	16-D-03-1001	2384	2384	NA	NA	NO
Chromium	7/7	6.9	71.6 J	16-D-04-1001	53	53	52.3	1.4	YES
Cobalt	7/7	0.69	14.1 J	16-D-06-1001	9.4	9.4	NA	NA	YES
Copper	7/7	1.2	100 J	16-D-02-1001	40.6	40.6	18.7	5.3	YES

TABLE 7-2

ECOLOGICAL COPC SELECTION - SEDIMENT
SWMU 16
CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Sample of Maximum Detection	Average of Positive Detections	Average of All Samples	Region 4 ESV	Hazard Quotient	COPC[2]
Iron	7/7	3720	51400 J	16-D-05-1001	31796	31796	NA	NA	YES
Lead	7/7	5.4	46.5 J	16-D-02-1001	31	31	30.2	1.5	YES
Magnesium	7/7	486	7960 J	16-D-03-1001	5889	5889	NA	NA	NO
Manganese	7/7	12.8	234 J	16-D-05-1001	144	144	NA	NA	YES
Mercury	1/7	0.29 J	0.29 J	16-D-05-1001	0.3	0.09	0.13	2.2	YES
Nickel	4/7	19.2 J	29.1 J	16-D-02-1001	23.5	15.6	15.9	1.8	YES
Potassium	7/7	284	3980 J	16-D-03-1001	3046	3046	NA	NA	NO
Selenium	4/7	1	2.6 J	16-D-05-1001	1.6	1.1	NA	NA	YES
Sodium	7/7	1480	18500 J	16-D-03-1001	12589	12589	NA	NA	NO
Vanadium	7/7	7.1	79.4 J	16-D-04-1001	61.6	61.6	NA	NA	YES
Zinc	7/7	8.4	158 J	16-D-02-1001	95	95	124	1.3	YES
Miscellaneous Parameters									
Total Solids (%)	7/7	20	77	16-D-01-1001-D	32.5	32.5	NA	NA	NO

1 - Region 4 screening value for gamme-BHC.
2 - Chemicals retained as COPCs are further evaluated in the Step 3a evaluation (see Section 7.4.3.2).

J = Estimated value.

TABLE 7-3

ECOLOGICAL COPC SELECTION - SURFACE WATER
SWMU 16
CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Sample of Maximum Detection	Average of Positive Detections	Average of All Samples	Region 4 ESV (Saltwater)	Region 4 ESV (Freshwater)	Region 4 ESV Selected for Screening[3]	Hazard Quotient	COPC[4]
Volatile Organics (ug/L)											
Isobutanol	1/1	6 J	6 J	16-W-02-1001	6	6	NA	NA	NA	NA	YES
Tetrachloroethene	1/7	0.7 J	0.7 J	16-W-07-1001	0.7	2.2	45	84	45	0.02	NO
Explosives (ug/L)											
2,4-Dinitrotoluene	1/14	0.66 J	0.66 J	16-W-01-1001	0.4	2.6	NA	310	310	0.002	NO
2,6-Dinitrotoluene	1/14	0.41 J	0.41 J	16-W-01-1001	0.3	2.6	NA	NA	NA	NA	YES
2,4,6-Trinitrotoluene	1/7	0.21	0.21	16-W-07-1001	0.2	0.12	NA	NA	NA	NA	YES
Inorganics (ug/L)											
Aluminum	6/7	524	11000	16-W-05-1001	3401	2927	NA	87	87	126	YES
Antimony	2/7	11.2	11.8	16-W-04-1001	11.5	4.6	NA	160	160	0.07	NO
Arsenic	1/7	3.9	4.5	16-W-01-1001-D	4.2	3.2	36	190	36	0.1	NO
Barium	7/7	17.6	63.4	16-W-05-1001	30	30	NA	NA	NA	NA	YES
Calcium	7/7	142000	186000	16-W-02-1001	159857	159857	NA	NA	NA	NA	NO
Copper	2/7	11.7	12.8	16-W-02-1001	12.3	4.4	2.9	38.66[1]	2.9	4.4	YES
Iron	6/7	704	9980	16-W-05-1001	3136	2691	NA	NA	NA	NA	YES
Lead	4/7	2.1	15.5	16-W-05-1001	6.1	4.4	8.5	18.58[1]	8.5	1.8	YES
Magnesium	7/7	419000	512000	16-W-02-1001	476714	476714	NA	NA	NA	NA	NO
Manganese	7/7	1.5	388	16-W-07-1001	113	113	NA	NA	NA	NA	YES
Mercury	2/7	0.05	0.09	16-W-05-1001	0.07	0.04	0.025	0.012	0.012	7.5	YES
Potassium	7/7	138000	160000	16-W-01-1001	150714	150714	NA	NA	NA	NA	NO
Silver	1/7	1.2	1.2	16-W-01-1001	0.9	1.01	0.23	0.012[2]	0.012	100	YES
Sodium	7/7	3250000	4270000	16-W-01-1001	3717857	3717857	NA	NA	NA	NA	NO
Vanadium	6/7	2.1	24.2	16-W-05-1001	9.2	8.2	NA	NA	NA	NA	YES
Zinc	5/7	2	71	16-W-02-1001	36.7	27.8	86	343.08	86	0.8	NO

1 - Criterion is adjusted for a water hardness of 400 mg/L.
2 - Criterion has not been adjusted for water hardness because an equation for the chronic value is not available. Value shown is assuming a water hardness of 50 mg/L, and the value is likely very conservative.
3 - Value selected for screening is the lesser of the saltwater and freshwater criteria.
4 - Chemicals retained as COPCs are further evaluated in the Step 3a evaluation (see Section 7.4.3.3).

J = Estimated value.

TABLE 7-4

ECOLOGICAL COPC SELECTION - SURFACE SOIL
SWMU 17
CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Sample of Maximum Detection	Average of Positive Detections	Average of All Samples	Region 4 ESV	Hazard Quotient	COPC[6]
Volatile Organics (ug/kg)									
2-Butanone	3/29	4 J	6 J	17-B-06-00	4.6	14	NA	NA	YES
Acetone	3/29	21 J	65	17-B-15-00-D	30	24	NA	NA	YES
Bromomethane	1/29	3 J	3 J	17-B-26-00	3	6.7	NA	NA	YES
Chloroethane	1/29	2 J	2 J	17-B-19-00	2	6.6	NA	NA	YES
Chloroform	2/29	3 J	23	17-B-14-00	13	7.4	1	23	YES
Methyl Acetate	1/27	16	16	17-B-07-00	16	3.7	NA	NA	YES
Methylene Chloride	4/29	11 J	14 J	17-B-26-00	12	8.2	2,000	0.007	NO
Styrene	1/29	2 J	2 J	17-B-06-00	2	6.6	100	0.02	NO
Trichloroethene	4/29	5	3200	17-B-17-00 17-B-17-00-D	825	120	1	3200	YES
Trichlorofluoromethane	10/29	6 J	47	17-B-26-00	18	12	NA	NA	YES
cis-1,2-dichloroethene	1/29	7	25	17-B-17-00	16	7.1	NA	NA	YES
Semivolatile Organics (ug/kg)									
4-Methylphenol	1/17	42 J	42 J	17-B-11-00	42	220	500	0.08	NO
Acenaphthene	1/19	170 J	170 J	17-B-02-00	170	205	20,000	0.01	NO
Acenaphthylene	1/19	52 J	52 J	17-B-11-00	52	221	100[1]	0.5	NO
Anthracene	2/19	66 J	450 J	17-B-02-00	258	211	100	4.5	YES
Benzaldehyde	1/17	460	460	17-B-05-00	460	245	NA	NA	YES
Benzo(a)anthracene	4/19	28 J	1000 J	17-B-02-00	244	214	100[1]	10	YES
Benzo(a)pyrene	4/19	20 J	740 J	17-B-02-00	229	211	100	7.4	YES
Benzo(b)fluoranthene	5/19	36 J	1100 J	17-B-02-00	351	243	100[1]	11	YES
Benzo(g,h,i)perylene	3/19	23 J	370 J	17-B-02-00	231	209	100[1]	3.7	YES
Benzo(k)fluoranthene	3/19	33 J	340 J	17-B-02-00	218	207	100[1]	3.4	YES
Bis(2-Ethylhexyl) phthalate	1/19	1100 J	1100 J	17-B-02-00	665	234	NA	NA	YES
Butyl Benzyl Phthalate	1/19	80 J	80 J	17-B-11-00	80	223	NA	NA	YES
Carbazole	1/17	450 J	450 J	17-B-02-00	450	218	NA	NA	YES
Chrysene	4/19	26 J	910 J	17-B-02-00	255	217	100[1]	9.1	YES
Dibenzo(a,h)anthracene	2/19	90 J	130 J	17-B-02-00	110	195	100[1]	1.3	YES
Dibenzofuran	1/19	74 J	74 J	17-B-02-00	74	200	NA	NA	YES
Fluoranthene	4/19	26 J	1700 J	17-B-02-00	371	241	100[1]	17	YES
Fluorene	1/19	170 J	170 J	17-B-02-00	170	205	30,000	0.01	NO
Indeno(1,2,3-cd)pyrene	3/19	23 J	410 J	17-B-02-00	212	206	100[1]	4.1	YES
Naphthalene	1/19	92 J	92 J	17-B-02-00	92	201	100	0.9	NO

TABLE 7-4

ECOLOGICAL COPC SELECTION - SURFACE SOIL
SWMU 17
CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Sample of Maximum Detection	Average of Positive Detections	Average of All Samples	Region 4 ESV	Hazard Quotient	COPC[6]
Phenanthrene	3/19	19 J	1400 J	17-B-02-00	273	215	100	14	YES
Pyrene	5/19	41 J	1700 J	17-B-02-00	401	256	100	17	YES
Total PAHs	6/19	80	10,682	17-B-02-00	--	--	1000	10.7	YES
Pesticides/PCBs (ug/kg)									
4,4'-DDD	2/18	3.6 J	37	17-B-12-00	20.3	4	2.5	15	YES
4,4'-DDE	5/18	0.54 J	9.2	17-B-14-00	2.97	2.3	2.5	3.7	YES
4,4'-DDT	8/19	0.65 J	20	17-B-14-00	4.6	3.1	2.5	8	YES
Total DDT	9/19	0.65	37	17-B-12-00	--	--	2.5	14.8	YES
Aldrin	1/19	2.2 J	2.2 J	17-B-12-00	2.2	1.1	2.5	0.88	NO
alpha-Chlordane	1/19	0.55 J	0.55 J	17-B-07-00	0.55	1	NA	NA	YES
Aroclor-1248	1/19	570	570	17-B-11-00	570	40	20	29	YES
Aroclor-1254	4/19	5.1 J	870	17-B-11-00	334	79	20	44	YES
Aroclor-1260	2/19	170	350	17-B-11-00	260	37	20	18	YES
Endrin Aldehyde	1/19	1.3 J	1.3 J	17-B-01-00	1.3	1.9	1[2]	1.3	YES
Endrin Ketone	4/18	0.26 J	5.4	17-B-12-00	2.2	2.1	1[2]	5.4	YES
Heptachlor	2/19	0.48 J	2.8 J	17-B-11-00	1.6	1.1	NA	NA	YES
alpha-BHC	1/19	0.67 J	0.67 J	17-B-13-00	0.7	1	2.5	0.3	NO
beta-BHC	1/19	0.9 J	0.9 J	17-B-04-00	0.9	1.01	1	0.9	NO
delta-BHC	1/19	1.8 J	1.8 J	17-B-16-00-D	1.8	1.1	NA	NA	YES
gamma-BHC (Lindane)	1/19	0.87 J	0.87 J	17-B-13-00	0.9	1.01	0.05	17	YES
Inorganics (mg/kg)									
Aluminum	19/19	3370	31800	17-B-07-00	11818	11818	pH[3][4]	NA	YES
Antimony	2/19	26.6	31.4	17-B-11-00	29	3.2	0.27[3]	116	YES
Arsenic	15/19	1.5	11.5	17-B-07-00	4.1	3.4	18[3]	0.6	NO
Barium	19/19	19	244	17-B-11-00	52	52	330[3]	0.7	NO
Beryllium	12/19	0.47	1.7	17-B-16-00	0.7	0.5	21[3]	0.1	NO
Cadmium	4/19	0.96	12.5	17-B-12-00	5.8	1.3	0.36[3]	35	YES
Calcium	19/19	171	4840	17-B-02-00-D	1034	1034	NA	NA	NO
Chromium	19/19	4.5	392	17-B-11-00	38	38	26[3]	15	YES
Cobalt	15/19	0.9	12.8	17-B-11-00	2.96	2.43	13[3]	0.98	NO
Copper	19/19	2.1	1930	17-B-12-00	176	176	40	48	YES
Iron	19/19	2810	45500	17-B-12-00	13059	13059	pH[3][5]	NA	YES
Lead	19/19	10.3	670	17-B-12-00	94	94	11[3]	61	YES

TABLE 7-4

ECOLOGICAL COPC SELECTION - SURFACE SOIL
SWMU 17
CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Sample of Maximum Detection	Average of Positive Detections	Average of All Samples	Region 4 ESV	Hazard Quotient	COPC[6]
Magnesium	19/19	226	1920	17-B-17-00	652	652	NA	NA	NO
Manganese	19/19	22.6 J	378	17-B-11-00	80	80	100	3.8	YES
Mercury	13/19	0.04	1.8	17-B-17-00-D	0.31	0.22	0.1	18	YES
Nickel	18/19	2.4	348	17-B-11-00	36	34	30	12	YES
Potassium	19/19	160	1110	17-B-07-00	342	342	NA	NA	NO
Sodium	3/19	25.1	343	17-B-11-00	204	62	NA	NA	NO
Vanadium	19/19	6.9	51.8	17-B-07-00	20	20	7.8[3]	6.6	YES
Zinc	18/19	9.2	1510	17-B-11-00	201	191	50	30	YES
Miscellaneous Parameters									
Total Solids (%)	10/10	75	88	17-B-22-00	81.9	81.9	NA	NA	NO

1 - Screening value is Region 4 screening value for benzo(a)pyrene.
2 - Screening value is Region 4 screening value for endrin.
3 - USEPA Ecological Soil Screening Level.
4- Aluminum is considered a COPC only when the soil pH is less than 5.5. Soil pH data are not available for SWMU 16 or vicinity.
5 - Iron is not expected to be toxic to plants with a soil pH between 5 and 8. Soil pH data are not available for SWMU 16 or vicinity.
6 - Chemicals retained as COPCs are further evaluated in the Step 3a evaluation (see Section 7.4.4.1).

J = Estimated value.

TABLE 7-5

ECOLOGICAL COPC SELECTION - SEDIMENT
SWMU 17
CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Sample of Maximum Detection	Average of Positive Detections	Average of All Samples	Region 4 ESV	Hazard Quotient	COPC[1]
Volatile Organics (ug/kg)									
Carbon Disulfide	1/1	19 J	19 J	17-D-01-1001	19	19	NA	NA	YES
Pesticides (ug/kg)									
4,4'-DDE	1/1	3.6 J	3.6 J	17-D-01-1001	3.6	3.6	3.3	1.1	YES
Total DDT	1/1	3.6	3.6	17-D-01-1001	--	--	3.3	1.1	YES
Endosulfan Sulfate	1/1	2.8 J	2.8 J	17-D-01-1001	2.8	2.8	NA	NA	YES
Heptachlor	1/1	1.5 J	1.5 J	17-D-01-1001	1.5	1.5	NA	NA	YES
Inorganics (mg/kg)									
Aluminum	1/1	20900	20900	17-D-01-1001	20900	20900	NA	NA	YES
Arsenic	1/1	9.4	9.4	17-D-01-1001	9.4	9.4	7.24	1.3	YES
Barium	1/1	27.6	27.6	17-D-01-1001	27.6	27.6	NA	NA	YES
Beryllium	1/1	1.3	1.3	17-D-01-1001	1.3	1.3	NA	NA	YES
Calcium	1/1	2410	2410	17-D-01-1001	2410	2410	NA	NA	NO
Chromium	1/1	40.2	40.2	17-D-01-1001	40.2	40.2	52.3	0.77	NO
Cobalt	1/1	10.5	10.5	17-D-01-1001	10.5	10.5	NA	NA	YES
Copper	1/1	18.4	18.4	17-D-01-1001	18.4	18.4	18.7	0.98	NO
Iron	1/1	24500	24500	17-D-01-1001	24500	24500	NA	NA	YES
Lead	1/1	35.2	35.2	17-D-01-1001	35.2	35.2	30.2	1.2	YES
Magnesium	1/1	5070	5070	17-D-01-1001	5070	5070	NA	NA	NO
Manganese	1/1	256	256	17-D-01-1001	256	256	NA	NA	YES
Mercury	1/1	0.39	0.39	17-D-01-1001	0.39	0.39	0.13	3	YES
Potassium	1/1	2480	2480	17-D-01-1001	2480	2480	NA	NA	NO
Sodium	1/1	11500	11500	17-D-01-1001	11500	11500	NA	NA	NO
Vanadium	1/1	60.9	60.9	17-D-01-1001	60.9	60.9	NA	NA	YES
Zinc	1/1	73.4	73.4	17-D-01-1001	73.4	73.4	124	0.59	NO
Miscellaneous Parameters									
Total Solids (%)	1/1	30	30	17-D-01-1001	30	30	NA	NA	NO

1 - Chemicals retained as COPCs are further evaluated in the Step 3a evaluation (see Section 7.4.4.2).

J = Estimated value.

TABLE 7-6

ECOLOGICAL COPC SELECTION - SURFACE WATER
SWMU 17
CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Sample of Maximum Detection	Average of Positive Detections	Average of All Samples	Region 4 ESV (Saltwater)	Region 4 ESV (Freshwater)	Region 4 ESV Selected for Screening[3]	Hazard Quotient	COPC[4]
Inorganics (ug/L)											
Aluminum	1/1	1400	1400	17-W-01-1001	1400	1400	NA	87	87	16	YES
Antimony	1/1	5.5	5.5	17-W-01-1001	5.5	5.5	NA	160	160	0.03	NO
Arsenic	1/1	4.4	4.4	17-W-01-1001	4.4	4.4	36	190	36	0.12	NO
Barium	1/1	47.3	47.3	17-W-01-1001	47.3	47.3	NA	NA	NA	NA	YES
Calcium	1/1	167000	167000	17-W-01-1001	167000	167000	NA	NA	NA	NA	NO
Cobalt	1/1	2.9	2.9	17-W-01-1001	2.9	2.9	NA	NA	NA	NA	YES
Iron	1/1	2740	2740	17-W-01-1001	2740	2740	NA	NA	NA	NA	YES
Magnesium	1/1	488000	488000	17-W-01-1001	488000	488000	NA	NA	NA	NA	NO
Manganese	1/1	169	169	17-W-01-1001	169	169	NA	NA	NA	NA	YES
Potassium	1/1	143000	143000	17-W-01-1001	143000	143000	NA	NA	NA	NA	NO
Silver	1/1	1.3	1.3	17-W-01-1001	1.3	1.3	0.23	0.012[1]	0.012	108	YES
Sodium	1/1	4100000	4100000	17-W-01-1001	4100000	4100000	NA	NA	NA	NA	NO
Vanadium	1/1	5.2	5.2	17-W-01-1001	5.2	5.2	NA	NA	NA	NA	YES
Zinc	1/1	16.4	16.4	17-W-01-1001	16.4	16.4	86	343.08[2]	86	0.2	NO

1 - Criterion has not been adjusted for water hardness because an equation for the chronic value is not available.
2 - Criterion is adjusted for a water hardness of 400 mg/L.
3 - Value selected for screening is the lower of the saltwater and freshwater criteria.
4 - Chemicals retained as COPCs are further evaluated in the Step 3a evaluation (see Section 7.4.4.3).

TABLE 7-7

EXPOSURE PARAMETERS FOR THE TERRESTRIAL WILDLIFE MODEL
SWMUs 16 AND 17
CHARLESTON, SOUTH CAROLINA

Species/Exposure Inputs	Conservative Inputs		Average Inputs		Source
	Values	Units	Values	Units	
Cotton Mouse					
Body Weight = BW	1.480E-02	kg	2.100E-02	kg	USEPA, 1993
Food Ingestion Rate = If	2.126E-03	kg/day	8.453E-04	kg/day	USEPA, 1993
Soil Ingestion Rate - Is (2%)	4.253E-05	kg/day	1.691E-05	kg/day	USEPA, 1993
Home Range = HR	Assume 100% on site		1.520E-01	acres	USEPA, 1993
Short-Tailed Shrew					
Body Weight = BW	1.525E-02	kg	1.687E-02	kg	USEPA, 1993
Food Ingestion Rate = If	2.592E-03	kg/day	1.648E-03	kg/day	USEPA, 1993
Soil Ingestion Rate - Is (3%, 0.9%)	7.776E-05	kg/day	1.483E-05	kg/day	USEPA, 2005
Home Range = HR	Assume 100% on site		9.700E-01	acres	USEPA, 1993
Marsh Wren					
Body Weight = BW	9.400E-03	kg	1.038E-02	kg	USEPA, 1993
Food Ingestion Rate = If	3.890E-03	kg/day	2.990E-03	kg/day	USEPA, 1993
Sediment Ingestion Rate - Is(16.4%, 6.4%)	6.380E-04	kg/day	1.914E-04	kg/day	USEPA, 2005
Home Range = HR	Assume 100% on site		0.133[1]	acres	USEPA, 1993
Raccoon					
Body Weight = BW	3.670E+00	kg	5.598E+00	kg	USEPA, 1993
Food Ingestion Rate = If	5.000E-02	kg/day	7.100E-02	kg/day	USEPA, 1993
Sediment Ingestion Rate - Is (9.4%)	4.700E-03	kg/day	6.674E-03	kg/day	USEPA, 1993
Home Range = HR	Assume 100% on site		1.556E+03	acres	USEPA, 1993
Mourning Dove					
Body Weight = BW	1.200E-01	kg	1.200E-01	kg	USEPA, 2005
Food Ingestion Rate = If	2.280E-02	kg/day	1.640E-02	kg/day	USEPA, 2005
Soil Ingestion Rate - Is (13.9%, 6.1%)	3.169E-03	kg/day	1.000E-03	kg/day	USEPA,2005
Home Range = HR	Assume 100% on site		Assume 100%		USEPA, 1993
American Woodcock					
Body Weight = BW	1.660E-01	kg	1.895E-01	kg	USEPA, 1993
Food Ingestion Rate = If	3.032E-02	kg/day	2.526E-02	kg/day	USEPA, 1993
Soil Ingestion Rate - Is(16.4%, 6.4%)	4.972E-03	kg/day	1.617E-03	kg/day	USEPA, 2005
Home Range = HR	Assume 100% on site		6.133E+01	acres	USEPA, 1993

A description of how the exposure inputs were calculated and the sources of each are presented in Appendix E.2.

1 - Home range data were not available; values for the marsh wren are territory size (see Section 7.4.2 for discussion).

TABLE 7-8

MAXIMUM HAZARD QUOTIENTS - TERRESTRIAL WILDLIFE FOOD-CHAIN MODELS
SWMU 16
NSW CHARLESTON, SOUTH CAROLINA

Chemical	Insectivores				Herbivores				Piscivores			
	Short-Tailed Shrew		American Woodcock		Cotton Mouse		Mourning Dove		Marsh Wren		Raccoon	
	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ
Pesticides/PCBs												
4,4'-DDD	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	1.8E-01	3.7E-04	7.4E-05
4,4'-DDE	1.3E-02	2.5E-03	1.2E+00	2.1E-01	3.2E-05	6.4E-06	1.5E-02	2.7E-03	2.1E+01	3.7E+00	7.9E-03	1.6E-03
4,4'-DDT	1.3E-02	2.7E-03	1.3E+00	2.2E-01	2.4E-05	4.8E-06	1.5E-02	2.6E-03	4.9E+00	8.5E-01	1.8E-03	3.6E-04
Alpha-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	4.9E-02	9.9E-03	7.6E-04	3.8E-04
Aroclor-1242	NA	NA	NA	NA	NA	NA	NA	NA	1.5E+02	1.5E+01	8.4E-01	8.4E-02
Aroclor-1254	2.4E+03	2.4E+02	9.6E+02	9.6E+01	4.1E+00	4.1E-01	9.5E+00	9.5E-01	NA	NA	NA	NA
Gamma-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	2.1E-02	4.1E-03	3.1E-04	1.6E-04
alpha-BHC	NA	NA	NA	NA	NA	NA	NA	NA	2.7E-01	6.7E-02	3.5E-01	3.5E-02
gamma-BHC (Lindane)	NA	NA	NA	NA	NA	NA	NA	NA	3.5E-02	3.5E-03	2.8E-04	2.8E-05
Inorganics												
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	3.0E+00	9.9E-01	1.7E+00	1.7E-01
Cadmium	4.2E+02	4.2E+01	3.1E+02	2.3E+01	2.9E+01	2.9E+00	2.7E+01	2.0E+00	NA	NA	NA	NA
Chromium	1.1E+02	2.8E+01	4.1E+02	8.1E+01	3.0E+00	7.6E-01	2.8E+01	5.6E+00	1.9E+01	3.7E+00	1.7E-01	4.2E-02
Copper	1.3E+00	1.0E+00	3.8E-01	2.9E-01	4.6E-01	3.6E-01	1.8E-01	1.4E-01	4.8E+00	3.6E+00	6.2E-01	4.8E-01
Lead	4.1E+02	4.1E+01	3.4E+03	3.4E+02	1.1E+02	1.1E+01	1.3E+03	1.3E+02	1.3E+01	1.3E+00	5.6E-02	5.6E-03
Mercury	1.2E+01	2.4E+00	6.5E+01	6.5E+00	2.5E+00	5.0E-01	1.7E+01	1.7E+00	5.7E+01	5.7E+00	3.7E-01	7.3E-02
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	3.9E-01	2.8E-01	2.4E-02	1.2E-02
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	3.1E+00	1.6E+00	1.9E-01	1.2E-01
Zinc	2.2E+00	1.1E+00	2.6E+01	2.8E+00	2.6E-01	1.3E-01	4.0E+00	4.5E-01	3.5E+01	3.8E+00	1.0E-01	5.1E-02

Cells are shaded if the HQ is greater than 1.0.
NOAEL = No Observed Adverse Effect Level.
LOAEL = Lowest Observed Adverse Effect Level.
HQ = Hazard Quotient.
NA = Not Available or Not Applicable.

TABLE 7-9

AVERAGE HAZARD QUOTIENTS - TERRESTRIAL WILDLIFE FOOD-CHAIN MODELS
SWMU 16
NWS CHARLESTON, SOUTH CAROLINA

Chemical	Insectivores				Herbivores				Piscivores			
	Short-Tailed Shrew		American Woodcock		Cotton Mouse		Mourning Dove		Marsh Wren		Raccoon	
	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ
Pesticides/PCBs												
4,4'-DDD	NA	NA	NA	NA	NA	NA	NA	NA	6.8E-01	1.2E-01	3.4E-04	6.7E-05
4,4'-DDE	7.3E-03	1.5E-03	8.9E-01	1.5E-01	9.0E-06	1.8E-06	5.6E-03	9.7E-04	1.4E+01	2.4E+00	6.7E-03	1.3E-03
4,4'-DDT	7.6E-03	1.5E-03	9.3E-01	1.6E-01	6.7E-06	1.3E-06	5.0E-03	8.7E-04	3.4E+00	5.9E-01	1.7E-03	3.4E-04
Alpha-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	2.9E-02	5.8E-03	5.9E-04	3.0E-04
Aroclor-1242	NA	NA	NA	NA	NA	NA	NA	NA	1.8E+01	1.8E+00	2.4E-01	2.4E-02
Aroclor-1254	1.2E+02	1.2E-01	6.2E+01	6.2E+00	2.4E-01	2.4E-02	7.0E-01	7.0E-02	NA	NA	NA	NA
Gamma-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	1.3E-02	2.6E-03	2.7E-04	1.4E-04
alpha-BHC	NA	NA	NA	NA	NA	NA	NA	NA	8.3E-02	2.1E-02	1.5E-01	1.5E-02
gamma-BHC (Lindane)	NA	NA	NA	NA	NA	NA	NA	NA	1.4E-02	1.4E-03	1.6E-04	1.6E-05
Inorganics												
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	3.7E-01	1.2E-01	3.6E-01	3.6E-02
Cadmium	1.0E+01	1.0E+00	9.5E+00	6.9E-01	3.2E-01	3.2E-02	8.1E-01	5.9E-02	NA	NA	NA	NA
Chromium	1.4E+00	3.6E-01	7.6E+00	1.5E+00	1.2E-01	2.9E-02	2.1E+00	4.3E-01	2.5E+00	5.0E-01	4.0E-02	1.0E-02
Copper	7.0E-02	5.4E-02	2.6E-02	2.0E-02	7.9E-03	6.1E-03	8.6E-03	6.5E-03	4.0E-01	3.1E-01	7.2E-02	5.6E-02
Lead	9.3E+00	9.3E-01	1.1E+02	1.1E+01	8.2E-01	8.2E-02	3.3E+01	3.3E+00	1.1E+00	1.1E-01	8.1E-03	8.1E-04
Mercury	2.2E-01	4.4E-02	1.6E+00	1.6E-01	3.6E-02	7.2E-03	6.5E-01	6.5E-02	4.7E+00	4.7E-01	4.3E-02	8.5E-03
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	3.2E-02	2.3E-02	2.9E-03	1.4E-03
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	8.7E-01	4.4E-01	7.9E-02	4.8E-02
Zinc	8.0E-02	4.0E-02	1.2E+00	1.4E-01	4.0E-03	2.0E-03	1.7E-01	1.8E-02	3.8E+00	4.2E-01	1.5E-02	7.7E-03

Cells are shaded if the HQ is greater than 1.0.
NOAEL = No Observed Adverse Effect Level.
LOAEL = Lowest Observed Adverse Effect Level.
HQ = Hazard Quotient.
NA = Not Available or Not Applicable.

TABLE 7-10

MAXIMUM HAZARD QUOTIENTS - TERRESTRIAL WILDLIFE FOOD-CHAIN MODELS
SWMU 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical	Insectivores				Herbivores			
	Short-Tailed Shrew		American Woodcock		Cotton Mouse		Mourning Dove	
	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ
Pesticides/PCBs								
4,4'-DDD	1.0E-01	2.0E-02	9.9E+00	1.7E+00	2.4E-04	4.8E-05	1.2E-01	2.1E-02
4,4'-DDE	2.5E-02	5.1E-03	2.5E+00	4.3E-01	6.4E-05	1.3E-05	3.1E-02	5.3E-03
4,4'-DDT	5.5E-02	1.1E-02	5.3E+00	9.2E-01	1.0E-04	2.0E-05	6.2E-02	1.1E-02
Aldrin	6.2E-03	1.2E-03	NA	NA	1.1E-03	2.2E-04	NA	NA
Alpha-Chlordane	1.0E-04	5.1E-05	2.4E-04	4.8E-05	7.8E-07	3.9E-07	8.0E-06	1.6E-06
Aroclor-1248	1.5E+02	1.5E+01	NA	NA	2.9E-01	2.9E-02	NA	NA
Aroclor-1254	3.5E+01	3.5E+00	1.4E+01	1.4E+00	6.1E-02	6.1E-03	1.4E-01	1.4E-02
Aroclor-1260	1.4E+01	1.4E+00	5.7E+00	5.7E-01	1.7E-02	1.7E-03	5.2E-02	5.2E-03
Endrin Aldehyde	8.7E-03	8.7E-04	8.9E-02	8.9E-03	2.1E-04	2.1E-05	5.5E-03	5.5E-04
Endrin Ketone	3.6E-02	3.6E-03	3.7E-01	3.7E-02	8.6E-04	8.6E-05	2.3E-02	2.3E-03
Heptachlor	4.8E-02	4.8E-03	NA	NA	5.6E-04	5.6E-05	NA	NA
delta-BHC	1.1E-01	1.1E-02	3.0E-03	7.5E-04	1.7E-02	1.7E-03	6.3E-04	1.6E-04
gamma-BHC (Lindane)	9.3E-05	9.3E-06	4.1E-04	4.1E-05	4.5E-06	4.5E-07	3.4E-05	3.4E-06
Inorganics								
Cadmium	8.7E+01	8.7E+00	6.4E+01	4.7E+00	5.9E+00	5.9E-01	5.6E+00	4.0E-01
Chromium	6.5E+01	1.6E+01	2.4E+02	4.8E+01	1.8E+00	4.5E-01	1.7E+01	3.3E+00
Copper	4.4E+01	3.4E+01	1.3E+01	9.7E+00	1.5E+01	1.2E+01	6.0E+00	4.5E+00
Lead	2.2E+01	2.2E+00	1.8E+02	1.8E+01	5.9E+00	5.9E-01	6.8E+01	6.8E+00
Mercury	2.0E+02	3.9E+01	1.1E+03	1.1E+02	4.1E+01	8.1E+00	2.7E+02	2.7E+01
Nickel	7.0E+00	3.5E+00	4.0E+00	2.9E+00	1.8E+00	8.9E-01	1.3E+00	9.6E-01
Zinc	2.1E+01	1.0E+01	2.5E+02	2.7E+01	2.5E+00	1.2E+00	3.9E+01	4.3E+00

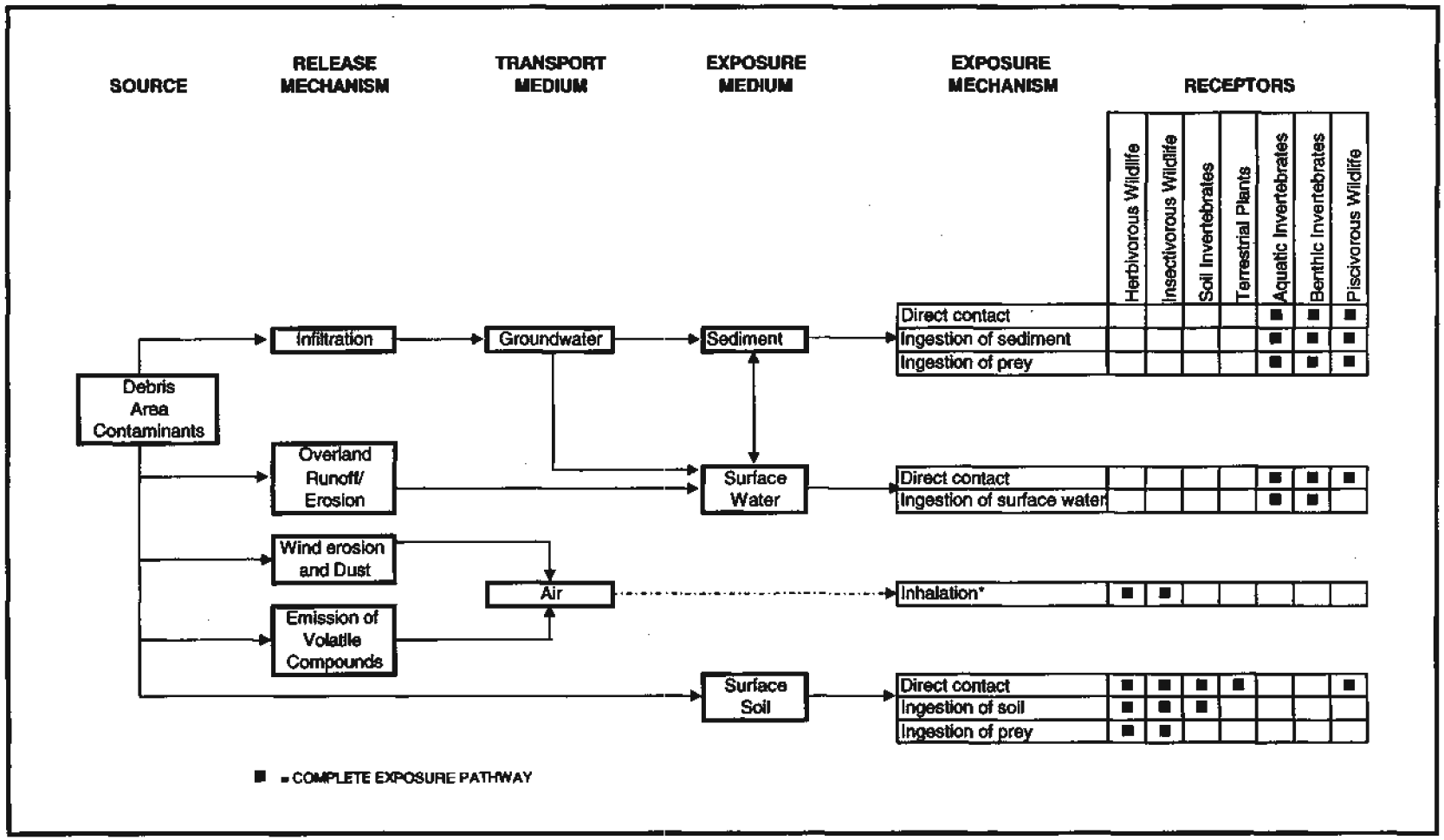
Cells are shaded if the HQ is greater than 1.0.
NOAEL = No Observed Adverse Effect Level.
LOAEL = Lowest Observed Adverse Effect Level.
HQ = Hazard Quotient.
NA = Not Available or Not Applicable.

TABLE 7-11

AVERAGE HAZARD QUOTIENTS - TERRESTRIAL WILDLIFE FOOD-CHAIN MODELS
SWMU 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical	Insectivores				Herbivores			
	Short-Tailed Shrew		American Woodcock		Cotton Mouse		Mourning Dove	
	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ	NOAEL HQ	LOAEL HQ
Pesticides/PCBs								
4,4'-DDD	6.3E-03	1.3E-03	7.7E-01	1.3E-01	7.2E-06	1.4E-06	4.6E-03	8.0E-04
4,4'-DDE	3.6E-03	7.2E-04	4.4E-01	7.6E-02	4.4E-06	8.9E-07	2.8E-03	4.8E-04
4,4'-DDT	4.9E-03	9.7E-04	5.9E-01	1.0E-01	4.3E-06	8.6E-07	3.2E-03	5.5E-04
Aldrin	1.8E-03	3.5E-04	NA	NA	1.6E-04	3.1E-05	NA	NA
Alpha-Chlordane	5.9E-05	2.9E-05	1.7E-04	3.5E-05	2.2E-07	1.1E-07	3.0E-06	6.0E-07
Aroclor-1248	2.6E+00	2.6E-01	NA	NA	5.8E-03	5.8E-04	NA	NA
Aroclor-1254	7.5E-01	7.5E-02	3.9E-01	3.9E-02	1.5E-03	1.5E-04	4.4E-03	4.4E-04
Aroclor-1260	3.5E-01	3.5E-02	1.8E-01	1.8E-02	5.0E-04	5.0E-05	1.8E-03	1.8E-04
Endrin Aldehyde	5.0E-03	5.0E-04	6.4E-02	6.4E-03	5.8E-05	5.8E-06	2.5E-03	2.5E-04
Endrin Ketone	7.9E-03	7.9E-04	1.0E-01	1.0E-02	9.2E-05	9.2E-06	4.0E-03	4.0E-04
Heptachlor	1.1E-02	1.1E-03	NA	NA	6.1E-05	6.1E-06	NA	NA
delta-BHC	3.7E-02	3.7E-03	1.3E-03	3.2E-04	2.8E-03	2.8E-04	2.5E-04	6.2E-05
gamma-BHC (Lindane)	5.3E-05	5.3E-06	2.9E-04	2.9E-05	1.3E-06	1.3E-07	2.0E-05	2.0E-06
Inorganics								
Cadmium	9.5E-01	9.5E-02	9.0E-01	6.5E-02	3.1E-02	3.1E-03	7.7E-02	5.6E-03
Chromium	3.5E-01	8.8E-02	1.9E+00	3.7E-01	2.8E-02	7.0E-03	5.2E-01	1.0E-01
Copper	7.7E-01	5.9E-01	2.9E-01	2.2E-01	8.7E-02	6.7E-02	9.5E-02	7.2E-02
Lead	3.2E-01	3.2E-02	3.7E+00	3.7E-01	2.8E-02	2.8E-03	1.1E+00	1.1E-01
Mercury	1.1E+00	2.3E-01	8.0E+00	8.0E-01	1.8E-01	3.7E-02	3.3E+00	3.3E-01
Nickel	8.9E-02	4.5E-02	6.6E-02	4.8E-02	1.3E-03	6.5E-04	4.8E-03	3.4E-03
Zinc	3.7E-01	1.9E-01	5.7E+00	6.4E-01	1.9E-02	9.3E-03	7.7E-01	8.5E-02

Cells are shaded if the HQ is greater than 1.0.
NOAEL = No Observed Adverse Effect Level.
LOAEL = Lowest Observed Adverse Effect Level.
HQ = Hazard Quotient.
NA = Not Available or Not Applicable.

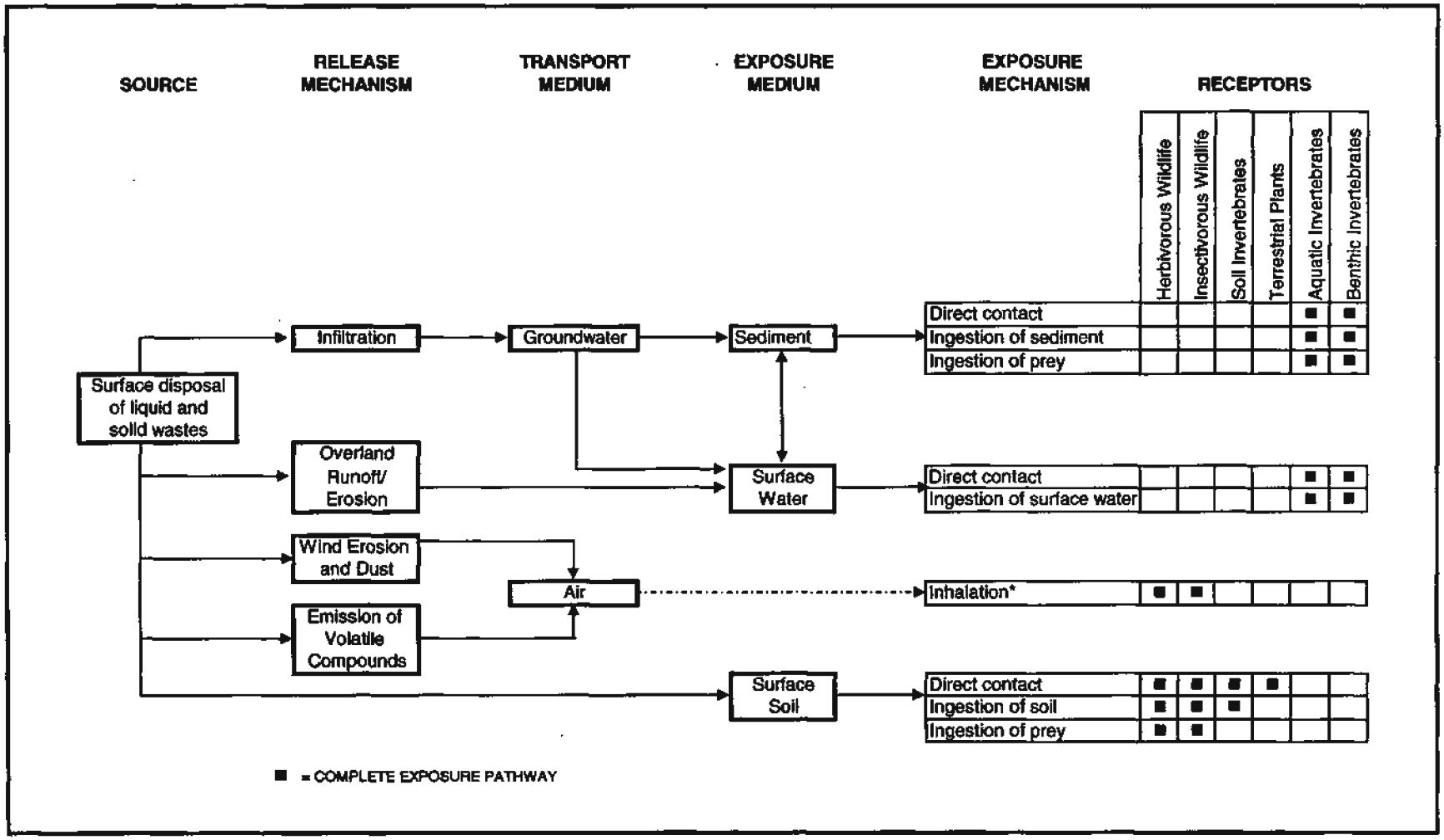


*Although the wind erosion and emission of VOCs represents a complete pathway, risks to ecological receptors via this pathway are negligible because the SWMU is swampy wetlands covered by grass, trees, and shrubs.

Ingestion of surface water by piscivorous wildlife does not represent a complete exposure pathway because surface water at SWMU 16 is saltwater.

FIGURE 7-1

ECOLOGICAL CONCEPTUAL SITE MODEL
SWMU 16
NWS CHARLESTON



*Although the wind erosion and emission of VOCs represents a complete pathway, risks to ecological receptors via this pathway are negligible because the SWMU is forested wetlands covered by grass, trees, and shrubs.

FIGURE 7-2

ECOLOGICAL CONCEPTUAL SITE MODEL
SWMU 17
NWS CHARLESTON

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 CONCLUSIONS

Results from the field activities, conducted from 2000 through 2005, indicate contamination at both SWMU 16 and 17.

8.1.1 SWMU 16 Conclusions

SWMU 16 was a landfill containing industrial waste. Specifically for soil samples, this leads to variability in types and concentrations of contaminants and locations of detections and also leads to uncertainties in the evaluation of sample analytical results. Although many of the detections were erratic and relatively low level compared to criteria (generally one order of magnitude or less), one source area of more elevated contamination was identified as follows:

- A debris area is present with elevated levels of PCBs (Aroclor 1254), BEHP, and inorganics (primarily lead and chromium). Subsurface samples could not be collected in this area because of UXO clearance issues.

Groundwater results indicate a chlorinated VOC plume migrating outwardly from SWMU 16 (toward SWMU 17). The plume originates in the area of SWMU 16 where former landfill trenches were located. Numerous VOCs were detected and PCE was the primary groundwater contaminant. Data collected from permanent monitoring wells in 2001 compared to data collected in 2005 showed varied relationships. Several of the permanent wells displayed a decrease in concentrations of inorganics, while others increased dramatically. At SWMU 16, concentrations of VOCs (particularly TCE) increased.

Several contaminants were detected in SWMU 16 surface water and sediment samples; however, risks were low and there was no correlation between chemical concentrations in surface water versus sediment. Antimony was the only chemical detected in surface water at concentrations exceeding its drinking water standard, yet there was no correlation of contaminants between surface water and groundwater.

In terms of human health risk assessment for SWMU 16, significant potential health risks for current/future trespassers, current/future occupational workers and future construction/excavation workers were estimated primarily as a result of exposure to lead in surface soil at the debris pile hot spot area. In addition, for the current/future occupational worker, other contributors to the risks were BEHP and PCBs (and chromium to a minor extent) based on concentrations detected at the same "hot spot" location for

surface soils. Risks estimated for subsurface soil, groundwater, surface water, and sediment were acceptable based on the target range. A residential exposure scenario was not evaluated for SWMU 16, considering site conditions. Land use controls will be required to address any site restrictions. Considering that SWMU 16 is a known landfill and subsurface soils were not adequately characterized, risks are likely significantly underestimated.

In terms of ecological risk assessment for SWMU 16, PCBs, lead, and other metals to a lesser extent (antimony, cadmium, chromium, mercury, and zinc) in surface soil posed elevated risks to soil invertebrates and plants. However, risks are limited to the debris pile and no impacts to plants and invertebrates at SWMU 16 are expected at other locations. For sediment, low-level potential risks are possible for benthic invertebrates and aquatic organisms due to pesticides, PCBs, and metals (copper, mercury, and nickel). For surface water, aluminum and iron pose potential risks at locations south and downgradient of the debris area. It is possible that contaminants in surface soil have migrated to these locations; however, at all other surface water locations risks are negligible. Based on food-chain modeling results, potential risks to insectivorous and herbivorous small mammals and birds from lead in surface soil posed significant potential risks to insectivorous and/or representative herbivorous receptors, but only in the debris pile area. Other more minor contributors to risk at this location were PCBs and metals (cadmium, chromium, mercury, and zinc). Food-chain modeling also indicates potential risks to piscivorous small mammals and birds from PCBs, and to a lesser extent mercury, in sediment, but only for any receptors that forage exclusively at the localized area south and downgradient of the debris pile.

8.1.2 SWMU 17 Conclusions

SWMU 17 was likely subjected to the sporadic draining of drums. Specifically for soil samples, this leads to variability in types and concentrations of contaminants and locations of detections and also leads to uncertainties in the evaluation of sample analytical results. Although many of the detections were erratic and relatively low level compared to criteria (generally one order of magnitude or less), three source areas of more elevated contamination were identified as follows:

- At SWMU 17, the center of the depression area, an apparent source of the southern plume at the site, was contaminated with chlorinated VOCs (primarily TCE). Also, corresponding TCE impacts to groundwater from this source area are evident.

- At SWMU 17, north of the depression area, an area near an empty rusted drum had subsurface soil concentrations of carbon tetrachloride and chloroform of concern. For the entire site, there were several exceedances of these two VOCs and so additional source areas are likely.

- At SWMU 17, one final source location of lesser significance was identified in an unvegetated area near the road (Wilkinson Way) toward the western site boundary. Of most significance were metals (lead, chromium, copper, and zinc) and PCBs. Migration of contamination to subsurface soil or groundwater was not evident.

Groundwater results indicated two chlorinated VOC plumes migrating outwardly from two source areas. One plume originates in the area of SWMU 16 where former landfill trenches were located and extends into SWMU 17, and another originates in the depression area of SWMU 17. Numerous VOCs were detected with concentrations radiating from the SWMU 17 depression areas; TCE was the primary groundwater contaminant. Vinyl chloride and 1,2-DCE were also detected at multiple locations in this area. Several inorganics were detected; arsenic and beryllium were detected at levels exceeding drinking water standards, yet were located beyond the SWMU 17 eastern border. Data collected from permanent monitoring wells in 2001 compared to data collected in 2005 showed varied relationships. Several of the permanent wells displayed a decrease in concentrations of inorganics, while others increased dramatically. At SWMU 17, southern plume, a large decrease in PCE was observed.

Several contaminants were detected in SWMU 17 surface water and sediment samples; however, risks were low and there was no correlation between chemical concentrations in surface water versus sediment.

In terms of human health risk assessment for SWMU 17, under current land use, risks for the trespasser and occupational worker are acceptable. However, under future industrial land use for both future occupational workers and future residents, a significant potential concern exists from inhalation of TCE from subsurface soil should it be brought to the surface in a future excavation project. Minor risks were calculated for excavation/construction and occupational workers from inhalation of TCE from groundwater to ambient air. Under future residential land use, elevated noncarcinogenic and carcinogenic risks were calculated for potential exposure to several chlorinated VOCs and several metals in groundwater. Also for the future resident, exposure to benzo(a)pyrene and arsenic in surface soil was estimated as a minor concern. No contaminants were present at concentrations of concern for sediment and surface water.

In terms of ecological risk assessment, for surface soil, zinc, and other metals to a lesser extent (chromium, copper, lead, manganese, and nickel) posed potential risks to soil invertebrates and plants, in particular within the unvegetated area of the site. For sediment and surface water, no chemicals were determined to pose potential risks overall to benthic invertebrates and aquatic organisms. Based on the food-chain modeling results, PCBs, and metals (chromium, lead, mercury, and zinc) posed minor potential risks to insectivorous and/or herbivorous small mammals and birds. Risks were isolated to the vicinity of the unvegetated area near the road (Wilkinson Way), and to a lesser extent, within the depression area of the site.

8.2 RECOMMENDATIONS

8.2.1 SWMU 16 Recommendations

Considering risks at SWMU 16 and its historical use as an industrial landfill, a Corrective Measures Study (CMS) is warranted to explore remedial alternatives. Interim measures may be considered to address localized surface soil/debris contamination (lead, PCBs, and BEHP) associated with the debris pile area. Refer to Table 8-1 for a summary of risks and recommendations.

8.2.2 SWMU 17 Recommendations

Considering risks at SWMU 17 and the random nature of historical waste disposal operations, a CMS is warranted to explore remedial alternatives. Interim measures may be considered to address localized subsurface soil contamination (i.e., TCE) in the depression area that appears to be a source of groundwater contamination. Interim measures may also be considered to address surface debris (e.g., rusted empty drums). Refer to Table 8-2 for a summary of risks and recommendations.

TABLE 8-1

SUMMARY OF RECEPTOR-SPECIFIC HUMAN HEALTH AND ECOLOGICAL RISKS AND RECOMMENDATIONS
SWMU 16 – OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Receptor Population	Concern for Ecological and/or Human Health?	Critical Pathways and Chemicals of Concern	Recommendations
Human Health			**Recommendations for Surface Soil**
Current/Future Occupational Worker	Yes (localized)	Incidental ingestion and/or dermal contact with BEHP, lead and PCBs (Aroclor-1254) at location 16SS02 [RME ILCR=1.E-4; HI=6; unacceptable lead blood level]	Considering that SWMU 16 was an industrial landfill, it would be difficult to adequately characterize its contents with certainty. Instead, the purpose of the investigation was to identify "hot spots" of contamination; even that limited scope was reduced when UXO clearance concerns were encountered. The risk assessment was based on four surface soil samples (16SS01 through 16SS04) in suspect areas based on the geophysical survey and visual observations. Surface soil investigation was limited because of the existing soil cover in place. One "hot spot" was encountered, located at the debris pile (location 16SS02). Both human health and ecological risks are indicated at this location, primarily from lead; other significant contributors to risk are PCBs and BEHP. Therefore, an interim measure is recommended to address the debris pile. The surface debris is suspected to have been placed after the landfill cover project was completed; otherwise the debris would have been removed as part of the soil cover project. Moreover, regardless of risk, SWMU 16 was an industrial landfill and a presumptive remedy of a soil/vegetation or other type cover, shoreline erosion
Current/Future Trespasser (Adolescent)	Yes (localized)	Incidental ingestion of lead at location 16SS02 [unacceptable blood level]	
Future Construction Worker	Yes (localized)	Incidental ingestion of lead at location 16SS02 [unacceptable lead blood level]	
Ecological			
Plants and Soil Invertebrates	Yes (localized)	Direct contact by plants and direct contact and soil ingestion by soil invertebrates with PCBs (Aroclor-1254 [HQ=2950]) and metals (antimony [HQ=452], cadmium [HQ=169], chromium [HQ=26], lead [HQ=1127], mercury [HQ=1.1], and zinc [HQ=3.1]) at location 16SS02 *Note: HQs presented are maximum HQs via COPC screening of surface soil.*	

TABLE 8-1

SUMMARY OF RECEPTOR-SPECIFIC HUMAN HEALTH AND ECOLOGICAL RISKS AND RECOMMENDATIONS
SWMU 16 – OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Receptor Population	Concern for Ecological and/or Human Health?	Critical Pathways and Chemicals of Concern	Recommendations
Herbivorous and Insectivorous Terrestrial Wildlife	Yes (localized)	Direct contact, incidental soil ingestion, and ingestion of prey with PCBs (Aroclor-1254 [avg HQ=6.2]) and metals (cadmium [avg HQ=9.5], chromium [avg HQ=7.6], lead [avg HQ=110], mercury [avg HQ=1.6], and zinc [avg HQ=1.2) *Note: HQs presented are average HQs via food-chain modeling and the maximum HQ of all receptors.*	
Human Health			**Recommendations for Subsurface Soil**
Future Construction Worker	Potentially	None	Considering that SWMU 16 was an industrial landfill, it would be difficult to adequately characterize its contents with certainty. The purpose of the investigation was to identify "hot spots" of contamination; even that limited scope was reduced when UXO clearance concerns were encountered. The risk assessment is based on only four soil borings (16SB01 through 16SB04 with up to three subsurface soil samples per boring) located in anomalous areas based on the geophysical survey; no "hot spots" were identified. However, considering the limited sampling program and considering that SWMU 16 was an industrial landfill, calculated risks are likely underestimated.

TABLE 8-1

SUMMARY OF RECEPTOR-SPECIFIC HUMAN HEALTH AND ECOLOGICAL RISKS AND RECOMMENDATIONS
SWMU 16 – OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Receptor Population	Concern for Ecological and/or Human Health?	Critical Pathways and Chemicals of Concern	Recommendations
			Regardless of risk, SWMU 16 was an industrial landfill and a presumptive remedy of a soil/vegetation or other type cover and groundwater monitoring would be required at a minimum to address exposure to subsurface soil contamination. This and other alternatives will be explored in the CMS.
Human Health			**Recommendations for Groundwater**
Future Construction Worker	No	None	Current land use scenarios do not result in exposure to groundwater and future land use for the construction worker was acceptable (although groundwater samples were all collected from the site perimeter and so concentrations are likely greater within the landfill). The future residential land use risks were not calculated because residential purposes are not feasible considering the flooded site conditions. However, considering that SWMU 16 was an industrial landfill, the site remedy necessitates a presumptive remedy of a soil/vegetation or other type cover and long-term groundwater monitoring at a minimum to address migration of the plume. These recommendations will be explored in more detail in the CMS.

TABLE 8-1

SUMMARY OF RECEPTOR-SPECIFIC HUMAN HEALTH AND ECOLOGICAL RISKS AND RECOMMENDATIONS
SWMU 16 – OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Receptor Population	Concern for Ecological and/or Human Health?	Critical Pathways and Chemicals of Concern	Recommendations
Human Health			**Recommendations for Surface Water**
Current/Future Trespasser (Adolescent)	No	None	Aluminum and iron driving the ecological risks were elevated at only two locations. Considering that SWMU 16 is a landfill, the site remedy necessitates a soil/vegetation or other type cover that is more effective than that presently in place. The presumed cover and shoreline erosion protection would address exposure to both landfill soils and sediment/surface water from drainage pathways within SWMU 16. Furthermore, periodic sediment monitoring off shore at Goose Creek may be included in the future as part of a long-term monitoring program. These recommendations will be explored in more detail in the CMS.
Ecological			
Aquatic and Benthic Invertebrates	Potentially	Direct contact and ingestion of water with metals (aluminum [HQ=126] and iron [HQ=NA]) at locations (16SW05 and 16SW07) *Note: HQs presented are maximum HQs via COPC screening of surface water.*	

TABLE 8-1

SUMMARY OF RECEPTOR-SPECIFIC HUMAN HEALTH AND ECOLOGICAL RISKS AND RECOMMENDATIONS
SWMU 16 – OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Receptor Population	Concern for Ecological and/or Human Health?	Critical Pathways and Chemicals of Concern	Recommendations
Human Health			**Recommendations for Sediment**
Current/Future Trespasser (Adolescent)	No	None	Potential ecological risks are likely minor, considering the relatively low HQs and frequencies of detection and considering that for food chain modeling piscivorous birds would obtain only a small portion of their food from the site. Also, pesticide concentrations were low overall and it is questionable whether pesticides are site related or associated with routine use. Furthermore, PCBs, mercury, and copper were present at only one location and the maximum nickel concentration did not significantly exceed the upgradient location. Considering that SWMU 16 was an industrial landfill, the site remedy necessitates a soil/vegetation or other type cover that is more effective than that presently in place. The presumed cover and shoreline erosion protection would address exposure to both landfill soils and sediment/surface water from drainage pathways within SWMU 16. Furthermore, periodic sediment monitoring off shore at Goose Creek may be included in the future as part of a long-term monitoring program. These recommendations will be explored in more detail in the CMS.
Ecological			
Aquatic and Benthic Invertebrates	Minor	Direct contact and ingestion of sediment with pesticides (alpha-BHC [HQ=4.2] and gamma-BHC [HQ=1.9]), PCBs (Aroclor-1242 [HQ=4.8]), and metals (copper [HQ=5.3], mercury [HQ=2.2], and nickel [HQ=1.8]) *Note: HQs presented are maximum HQs via COPC screening of sediment.*	
Piscivorous Terrestrial Wildlife	Minor	Direct contact, incidental sediment ingestion, and ingestion of prey with PCBs (Aroclor-1242 [avg HQ=18]) at location ((16SD02) and mercury [avg HQ=4.7] at location (16SD05) *Note: HQs presented are average HQs via food-chain modeling and the maximum HQ of all receptors.*	

TABLE 8-2

SUMMARY OF RECEPTOR-SPECIFIC HUMAN HEALTH AND ECOLOGICAL RISKS AND RECOMMENDATIONS
SWMU 17 – OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Receptor Population	Concern for Ecological and/or Human Health?	Critical Pathways and Chemicals of Concern	Recommendations
Human Health			**Recommendations for Surface Soil**
Current/Future Occupational Worker	No	None	Human health risks for surface soil were within the USEPA's risk management range [10-6 to 10-4]. Noncarcinogenic risks were acceptable when evaluated on a target organ basis. Risks were based on hypothetical future residential land use. The average concentration of arsenic (3.4 mg/kg) was well below the facility background level (9.45 mg/kg) and the maximum concentration (11.5 mg/kg) slightly exceeded background and so is likely naturally occurring. Ecological risks for surface soil are also minor and largely limited to two locations 17SB11 and 17SB12 at an unvegetated area near Wilkinson Way. Considering the historical operations and contamination encountered, surface soils need to be addressed. At a minimum, the Navy anticipates removing empty drums and debris on the surface and installing a soil/vegetation cover that
Current/Future Trespasser (Adolescent)	No	None	
Future Construction/Excavation Worker	No	None	
Future On-Site Resident (Child)	Minor	Incidental ingestion and dermal contact with benzo(a)pyrene and arsenic [ILCR=3.E-05; HI=3]	
Future On-Site Resident (Adult)	Minor	Incidental ingestion and dermal contact with benzo(a)pyrene and arsenic [ILCR=1.E-05; HI=0.3]	
Future On-Site Resident (Lifelong)	Minor	Incidental ingestion and dermal contact with benzo(a)pyrene and arsenic [ILCR=4.E-05; HI=NA]	

TABLE 8-2

SUMMARY OF RECEPTOR-SPECIFIC HUMAN HEALTH AND ECOLOGICAL RISKS AND RECOMMENDATIONS
SWMU 17 – OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Receptor Population	Concern for Ecological and/or Human Health?	Critical Pathways and Chemicals of Concern	Recommendations
Ecological			encompasses contaminated areas of SWMU 17, including the drum areas, and nonvegetated area. Small trees, vines, and brush would likely be removed to accommodate the cover; however, large trees will likely remain since phytoremediation is evident from the USGS work to date. These recommendations will be explored in a CMS.
Plants and Soil Invertebrates	Minor (localized)	Direct contact by plants and direct contact and soil ingestion by soil invertebrates with metals (chromium [HQ=15], copper [HQ=48], lead [HQ=61], manganese [HQ=3.8], nickel [HQ=12], and zinc [HQ=30]) at locations 17SB11 and 17SB12 *Note: HQs presented are maximum HQs via COPC screening of surface soil.*	
Herbivorous and Insectivorous Terrestrial Wildlife	Minor	Direct contact, incidental soil ingestion, and ingestion of prey with PCBs (Aroclor-1248 [avg HQ=2.6]), metals (chromium [avg HQ=1.9], lead [avg HQ=3.7], mercury [avg HQ=8.0], and zinc [avg HQ=5.7]). Risks largely attributed to locations 17SB11 and 17SB12, and to a lesser extent 17SB17 *Note: HQs presented are average HQs via food-chain modeling and the maximum HQ of all receptors.*	

TABLE 8-2

SUMMARY OF RECEPTOR-SPECIFIC HUMAN HEALTH AND ECOLOGICAL RISKS AND RECOMMENDATIONS
SWMU 17 – OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Receptor Population	Concern for Ecological and/or Human Health?	Critical Pathways and Chemicals of Concern	Recommendations
Human Health			**Recommendations for Subsurface Soil**
Future Construction/Excavation Worker	No	None	Construction worker risks for exposure to subsurface soil were acceptable. However, considering the random nature of drum emptying (based on the presence of scattered, rusted drums within the site), calculated risks could be underestimated. Moreover, although occupational workers and residents would not typically be exposed to subsurface soils, the uncertainty analysis included an exposure scenario if subsurface soil is brought to the surface during excavation, due to a localized risk associated with TCE at the source depression area. The depression area is an apparent source of the southern groundwater plume. Considering the historical operations and contamination encountered, subsurface soils need to be addressed. At a minimum, the Navy anticipates installing a soil/vegetation cover that encompasses contaminated areas of SWMU 17, including the drum areas. Furthermore, elevated VOC concentrations in soil and groundwater support the need for remediation for source area soil at the depression area. These recommendations will be explored in a CMS.
Future Occupational Worker and On-Site Resident	Yes (if subsurface soil brought to the surface during an excavation task)	[ILCR=4x10-04; HI=3]	

TABLE 8-2

SUMMARY OF RECEPTOR-SPECIFIC HUMAN HEALTH AND ECOLOGICAL RISKS AND RECOMMENDATIONS
SWMU 17 – OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Receptor Population	Concern for Ecological and/or Human Health?	Critical Pathways and Chemicals of Concern	Recommendations
Human Health			**Recommendations for Groundwater** Elevated risks for groundwater were primarily due to exposure to chlorinated VOCs (especially TCE) by ingestion and inhalation based on future residential use of groundwater. Elevated risks for metals were due to the ingestion of groundwater. However, groundwater at SWMU 17 may not be potable because of mixed salinity. It is recommended that groundwater be addressed in a CMS.
Future Construction/Excavation Worker	Minor	Inhalation of TCE in a trench [RME ILCR=2.E-05; HI=1]	
Current Occupational Worker	No	None	
Future Occupational Worker	Minor	Inhalation of TCE indoor air [RME ILCR= 1.E-05; HI=0.04]	
Future On-Site Resident (Child)	Yes	Ingestion, dermal contact, and/or inhalation of VOCs (1,1,2,2-TCA, 1,1,2-TCA, 1,2-DCA, carbon tetrachloride, PCE, TCE, benzene, chloroform, and vinyl chloride) and metals (arsenic, beryllium, cobalt, and manganese) [RME ILCR=2.E-02; HI=151]	
Future On-Site Resident (Adult)	Yes	Ingestion, dermal contact, and/or inhalation of VOCs (1,1,2,2-TCA, 1,1,2-TCA, 1,2-DCA, carbon tetrachloride, PCE, TCE, benzene, chloroform, and vinyl chloride) and metals (arsenic, cobalt, and manganese), and BEHP (ingestion and dermal contact) [RME ILCR=4.E-02; HI=65]	

TABLE 8-2

SUMMARY OF RECEPTOR-SPECIFIC HUMAN HEALTH AND ECOLOGICAL RISKS AND RECOMMENDATIONS
SWMU 17 – OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Receptor Population	Concern for Ecological and/or Human Health?	Critical Pathways and Chemicals of Concern	Recommendations
Future On-Site Resident (Lifelong)	Yes	Ingestion, dermal contact, and/or inhalation of VOCs (1,1,2,2-TCA, 1,1,2-TCA, 1,2-DCA, carbon tetrachloride, PCE, TCE, benzene, chloroform, and vinyl chloride), arsenic, and BEHP (ingestion and dermal contact) [RME ILCR=6.E-02; HI = NA]	
Human Health			**Recommendations for Surface Water**
Current/Future Trespasser (Adolescent)	No	None	Risks for all potential receptors were acceptable. Recommend that surface water media does not require remediation, although groundwater contamination should be addressed in a CMS to ensure protection of surface water in the future.
Future On-Site Resident (Child)	No	None	
Future On-Site Resident (Adult)	No	None	
Future On-Site Resident (Lifelong)	No	None	
Ecological			
Aquatic and Benthic Invertebrates	No	None	

TABLE 8-2

SUMMARY OF RECEPTOR-SPECIFIC HUMAN HEALTH AND ECOLOGICAL RISKS AND RECOMMENDATIONS
SWMU 17 – OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Receptor Population	Concern for Ecological and/or Human Health?	Critical Pathways and Chemicals of Concern	Recommendations
Human Health			**Recommendations for Sediment**
Current/Future Trespasser (Adolescent)	No	None	Risks for all potential receptors were acceptable. Recommend that sediment media does not require remediation, although groundwater contamination should be addressed in a CMS to ensure protection of sediment in the future.
Future On-Site Resident (Child)	No	None	
Future On-Site Resident (Adult)	No	None	
Future On-Site Resident (Lifelong)	No	None	
Ecological			
Aquatic and Benthic Invertebrates	No	None	
Piscivorous Terrestrial Wildlife	No	None	

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Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-94-D-0888

Rev. 1
09/08

RFI Report
for
SWMU 16 - Old Southside Landfill and
SWMU 17 - Old Southside Missile and Waste Oil Disposal Area

VOLUME II OF III - APPENDICES A THROUGH C

Naval Weapons Station Charleston
Charleston, South Carolina

Contract Task Order 0137

September 2008

USEPA ID No. SC8 170 022 620

NAVFAC
Naval Facilities Engineering Command
NAVFAC SOUTHEAST

NAS Jacksonville
Jacksonville, Florida 32212-0030

TETRA TECH NUS, Inc.

APPENDIX A
FIELD FORMS

APPENDIX A-1
DRILLING PERMIT AUTHORIZATIONS

DHEC
RESPECT PROTECT PROSPER
600 Bull Street
Columbia, SC 29201-1708

May 23, 2001

CERTIFIED MAIL

Mr. Barry Lewis
NSC, Code 099, Building 36
2316 Red Bank Road
Goosecreek, SC 29445

RE: Naval Weapons Station Charleston (NWS)
Charleston, South Carolina
SC8 710 022 620

Monitoring Well Request (Klink to Danielsen) Dated 3-22-2001
SWMU 16

Dear Mr. Lewis:

The above referenced request has been reviewed with respect to R.61-79.265 Subpart F of the South Carolina Hazardous Waste Management Regulations and R.61-71 of the South Carolina Well Standards and Regulations. This request is for the installation of five shallow permanent monitoring wells, 16MW01, 16MW02, 16MW03, 16MW04, 16MW05, and four soil borings, 16SB01, 16SB02, 16SB03, and 16SB04.

All monitoring wells will be installed in the surficial aquifer and will be installed by hollow stem auger drilling methods. The wells will be finished as stick-up wells and have concrete filled guard posts installed. The shallow wells will be installed to allow the ten-foot screens to straddle the water table. The shallow wells are anticipated to be completed to a maximum depth of approximately fifteen feet below ground surface. The soil borings are anticipated to be completed to a depth of seven feet bgs.

The workplan also states that the integrity of existing wells will be determined for sampling use. If any existing wells cannot be used for sampling they will be abandoned in accordance with the South Carolina Well Standards and Regulations R.61-71.10.B or used for piezometers. The status of all existing wells must be reported to the Department with the survey data for RFI purposes. In addition, painting and repair of existing wells should be conducted as needed.

Note. All soil borings must be grouted upon termination of lithologic studies and/or sampling starting from a depth of 20 feet bgs and continuously pressure grouted to the ground surface.

DD010387.MWD

Attached, please find a Monitoring Well Approval Form and a copy of the proposed well locations. A copy of this monitor well approval form should be on site during drilling operations. Please be advised, additional assessment may be required at this site. Should there be any questions, please contact me at (803) 896-4194.

Respectfully,

Michael W. Danielsen, Hydrogeologist
Hazardous Waste Section
Division of Hydrogeology
Bureau of Land and Waste Management

Enclosures
MWD/mwd
MWA: HW-01-034

CC: Christine Sanford-Coker, Trident District EQC
Matt Tetrault, Hazardous Waste Permitting Section
Art Sanford, Southern Division, Charleston
Linda Klink, TetraTech Nus, Inc., 661 Andersen Drive, Pittsburgh, PA, 15220-2745

D H E C
R TE PROTECT PROSPER
500 Bull Street
olumbia, SC 29201-1708

Monitoring Well Approval

Approval is hereby granted to: Naval Weapons Station Charleston
Attention: Barry Lewis

Facility: Naval Weapons Station Charleston
SC8 710 022 620
Charleston County

For the installation of five permanent monitoring wells (16MW01, 16MW02, 16MW03, 16MW04, and 16MW05) at the locations specified and in accordance with the construction plans and specifications in the monitoring well approval request (*Klink to Danielsen*), dated 7-10-2000, the revised SWMU 16/17 RFI Workplan, dated May 2001, and the attached figure.

All monitoring wells are to be installed and screened in the surficial aquifer/unit for the purpose of accessing groundwater quality.

Conditions:

1. A driller certified to operate in the State of South Carolina must install the wells.

2. That the latitude and longitude, surveyed elevations, boring and/or geologist logs, and actual (as built) construction details for each permanent monitoring well be submitted to the Department within two weeks of receipt of the surveyors report. However, the Navy must inform the Department of unexpected analytes and/or elevated concentrations as data is received from the analytical laboratory.

3. All monitoring wells must be properly developed until clear, sediment-free water samples are obtained. Specific Conductance, temperature, turbidity, and pH measurements should be taken during development. A log recording the values of these parameters should be maintained during development of the wells. This log should be submitted along with the "as-built" construction details required by Condition 2 above.

4. All well construction and sampling derived wastes, including but not limited to, drill cuttings, drilling fluids, development and purge water, must be managed properly and in accordance with all applicable state and federal requirements. If containerized, each vessel shall be clearly labeled with regard to contents, source, and date of activity.

5. That each well be labeled with an identification plate constructed of a durable material affixed to the casing or surface pad where it is readily visible. The plate shall provide monitoring well identification number, date of construction, static water level, and driller

name and South Carolina certification number.

6. That the wells determined to be unusable for sampling purposes be abandoned as outlined in R.61-71.10.B and their status reported to the Department with the data required in condition 2 above.

7. Field equipment (including sampling probes) must be decontaminated by steam cleaning before use and between sampling locations. Well screens and casing must be decontaminated before installation or certified clean by the manufacturer.

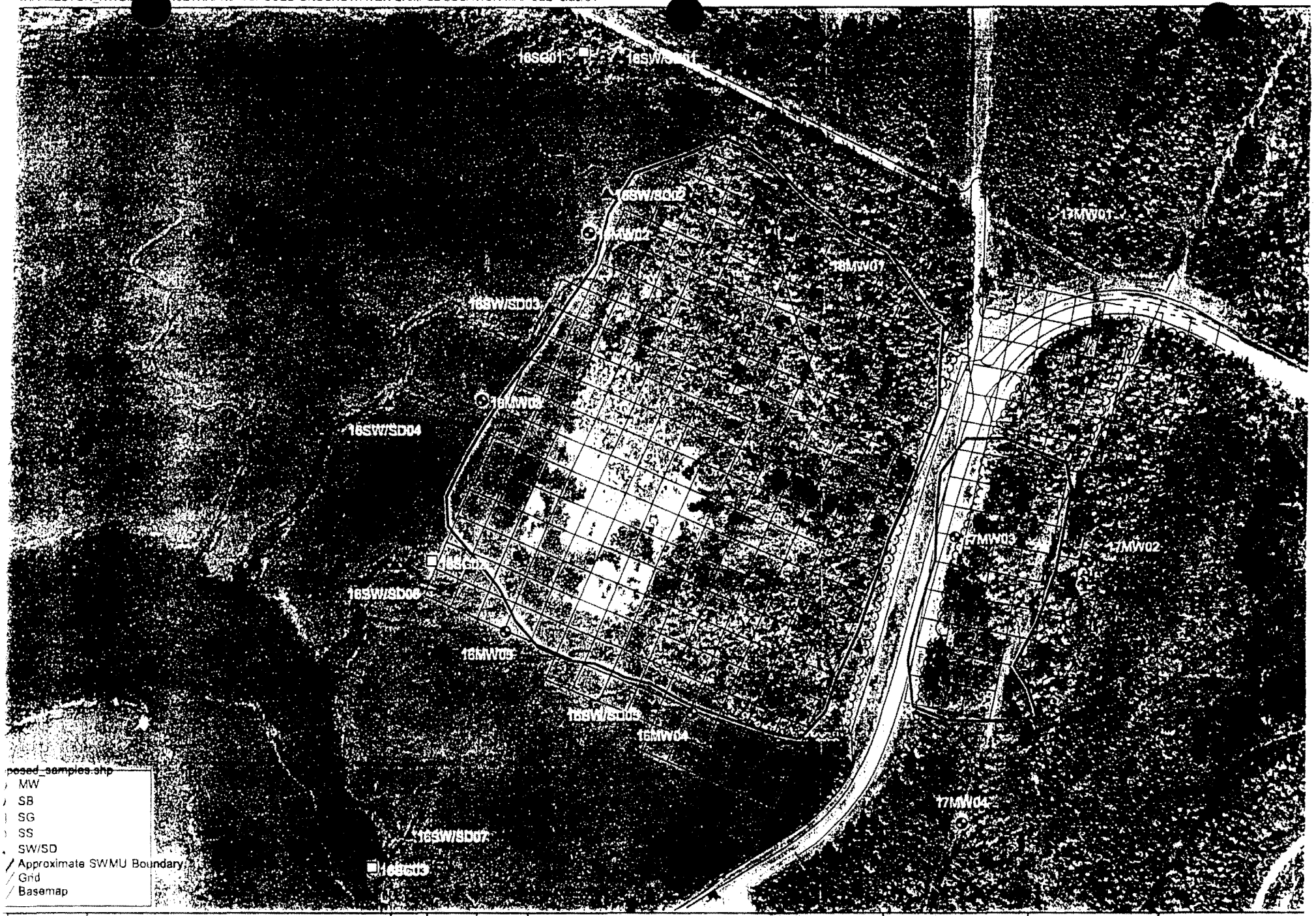
8. That notice be given during regular business hours to the issuer of this approval, Michael W. Danielsen at 803-896-4194, and the Trident District EQC Office, Christine Sanford-Coker, District Hydrogeologist at 843-740-1590, a minimum of forty-eight hours prior to the initiation of drilling activities.

This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and R.61-71 of the South Carolina Well Standards and Regulations, dated June 2, 1985.

Date of Issuance: 5-23-01
Approval #: HW-01-034

Michael W. Danielsen, Hydrogeologist
RCRA Hydrogeology Section
Division of Hydrogeology
Bureau of Land and Waste Management

CHARLESTON_NWS\S 16&17.APR\PROPOSED GROUNDWATER SAMPLE LOCATION MAP JCB 3/20/01



DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY	DATE
J. BELLONE	3/15/01
CHECKED BY	DATE
COST/SCHED-AREA	

PROPOSED GI
LO
SW

D H E C
PROTECT PROSPER
00 Bull Street
olumbia, SC 29201-1708

May 23, 2001

CERTIFIED MAIL

Mr. Barry Lewis
NSC, Code 099, Building 36
2316 Red Bank Road
Goosecreek, SC 29445

RE: Naval Weapons Station Charleston (NWS)
Charleston, South Carolina
SC8 710 022 620

Monitoring Well Request (Klink to Danielsen) Dated 3-22-2001
SWMU 17

Dear Mr. Lewis:

The above referenced request has been reviewed with respect to R.61-79.265 Subpart F of the South Carolina Hazardous Waste Management Regulations and R.61-71 of the South Carolina Well Standards and Regulations. This request is for the installation of four shallow permanent monitoring wells, 17MW01, 17MW02, 17MW03, 17MW04, and twenty soil borings, 17SB01 through 17SB19.

All monitoring wells and the staff gauge will be installed in the surficial aquifer and will be installed by hollow stem auger drilling methods. The wells will be finished as stick-up wells and have guard posts installed. The shallow wells will be installed to allow the ten-foot screens to straddle the water table. The shallow wells are anticipated to be completed to a maximum depth of approximately fifteen feet below ground surface. Well number 17 MW01 is expected to be completed to twenty-five foot bgs. The soil borings are anticipated to be completed to a depth of seven feet bgs. One soil boring near 17MW01 will be advanced to the top of the Ashley formation for lithologic analysis.

The workplan also states that the integrity of existing wells will be determined for sampling use. If any existing wells cannot be used for sampling they will be abandoned in accordance with the South Carolina Well Standards and Regulations R.61-71.10.B or used for piezometers. The status of all existing wells must be reported to the Department with the survey data for RFI purposes. In addition, painting and repair of existing wells should be conducted as needed.

DD010388.MWD

Note. All soil borings must be grouted upon termination of lithologic studies and/or sampling starting from a depth of 20 feet bgs and continuously pressure grouted to the ground surface.

Attached, please find a Monitoring Well Approval Form and a copy of the proposed well locations. A copy of this monitor well approval form should be on site during drilling operations. Please be advised, additional assessment may be required at this site. Should there be any questions, please contact me at (803) 896-4194.

Respectfully,

Michael W. Danielsen, Hydrogeologist
Hazardous Waste Section
Division of Hydrogeology
Bureau of Land and Waste Management

Enclosures
MWD/mwd
MWA: HW-01-035

CC: Christine Sanford-Coker, Trident District EQC
Matt Tetrault, Hazardous Waste Permitting Section
Art Sanford, Southern Division, Charleston
Linda Klink, TetraTech Nus, Inc., 661 Andersen Drive, Pittsburgh, PA, 15220-2745

D H E C
RE TE PROTECT PROSPER
600 Bull Street
Columbia, SC 29201-1708

Monitoring Well Approval

Approval is hereby granted to: Naval Weapons Station Charleston
Attention: Barry Lewis

Facility: Naval Weapons Station Charleston
SC8 710 022 620
Charleston County

For the installation of four permanent monitoring wells (17MW01, 17MW02, 17MW03, and 17MW04) at the locations specified and in accordance with the construction plans and specifications in the monitoring well approval request (*Klink to Danielsen*), dated 7-10-2000, the revised RFI Workplan for SWMU 16/17, dated May 2001, and the attached figure.

All monitoring wells are to be installed and screened in the surficial aquifer/unit for the purpose of accessing groundwater quality.

Conditions:

1. A driller certified to operate in the State of South Carolina must install the wells.

2. That the latitude and longitude, surveyed elevations, boring and/or geologist logs, and actual (as built) construction details for each permanent monitoring well be submitted to the Department within two weeks of receipt of the surveyors report. However, the Navy must inform the Department of unexpected analytes and/or elevated concentrations as data is received from the analytical laboratory.

3. All monitoring wells must be properly developed until clear, sediment-free water samples are obtained. Specific Conductance, temperature, turbidity, and pH measurements should be taken during development. A log recording the values of these parameters should be maintained during development of the wells. This log should be submitted along with the "as-built" construction details required by Condition 2 above.

4. All well construction and sampling derived wastes, including but not limited to, drill cuttings, drilling fluids, development and purge water, must be managed properly and in accordance with all applicable state and federal requirements. If containerized, each vessel shall be clearly labeled with regard to contents, source, and date of activity.

5. That each well be labeled with an identification plate constructed of a durable material affixed to the casing or surface pad where it is readily visible. The plate shall provide monitoring well identification number, date of construction, static water level, and driller

name and South Carolina certification number.

6. That the wells determined to be unusable for sampling purposes be abandoned as outlined in R.61-71.10.B and their status reported to the Department with the data required in condition 2 above.

7. Field equipment (including sampling probes) must be decontaminated by steam cleaning before use and between sampling locations. Well screens and casing must be decontaminated before installation or certified clean by the manufacturer.

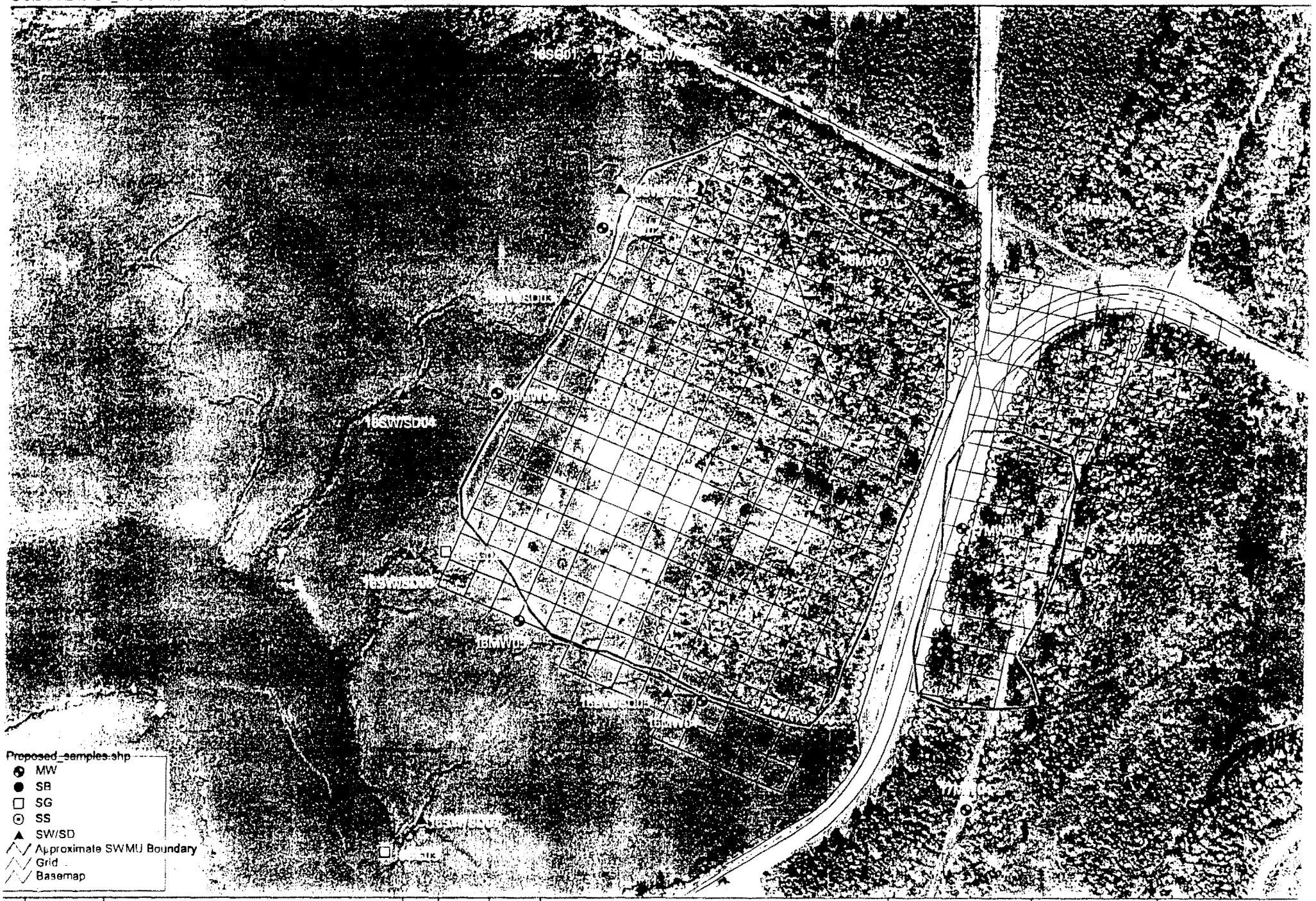
8. That notice be given during regular business hours to the issuer of this approval, Michael W. Danielsen at 803-896-4194, and the Trident District EQC Office, Christine Sanford-Coker, District Hydrogeologist at 843-740-1590, a minimum of forty-eight hours prior to the initiation of drilling activities.

This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and R.61-71 of the South Carolina Well Standards and Regulations, dated June 2, 1985.

Date of Issuance: 5-23-01
Approval #: HW-01-035

Michael W. Danielsen, Hydrogeologist
RCRA Hydrogeology Section
Division of Hydrogeology
Bureau of Land and Waste Management

GIS\CHARLESTON_NWS\SWMU 16&17.APR\PROPOSED GROUNDWATER SAMPLE LOCATION MAP JCB 3/20/01



NO	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY J. BELLONE	DATE 3/15/01	PROPOSED GI LO SW
							CHECKED BY	DATE	
							COST/SCHED-AREA		

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

February 14, 2002

CERTIFIED MAIL

Mr. Barry Lewis
NSC, Code 099, Building 36
2316 Red Bank Road
Goosecreek, SC 29445

RE: Naval Weapons Station Charleston (NWS)
Charleston, South Carolina
SC8 710 022 620

Monitoring Well Request (Klink to Danielsen) Dated 2-7-2002
SWMU 17

Dear Mr. Lewis:

The above referenced request has been reviewed with respect to R.61-79.265 Subpart F of the South Carolina Hazardous Waste Management Regulations and R.61-71 of the South Carolina Well Standards and Regulations. This request is for the installation of three shallow permanent monitoring wells (17MW05S, 17MW06S, 17MW07S), and 15 temporary wells. Five of the temporary wells will be installed as single shallow wells (17TW01S-17TW05S) and the remaining 10 temporary wells will be installed as shallow/deep clusters (17TW06S/D- 17TW10S/D).

All permanent wells will be installed in the surficial aquifer and will be installed by hollow stem auger drilling methods. The wells will be finished as stick-up wells and have guard posts installed. The permanent shallow wells will be installed to allow the ten-foot screens to straddle the water table where possible. The shallow wells are anticipated to be completed to a maximum depth of approximately fifteen feet below ground surface.

The temporary wells will be installed by DPT technology. The temporary well screens will be five-foot in length. The shallow temporary well screens will be placed to straddle the water table, where possible, and are anticipated to be completed to a depth of 15 feet bgs. The deep temporary well screens will be placed on top of the local confining unit, and are anticipated to be completed to 20 feet below ground surface.

Attached, please find a Monitoring Well Approval Form and a copy of the proposed well locations. A copy of this monitor well approval form should be on site during drilling operations. Please be advised, additional assessment may be required at this site. Should there be any questions, please contact me at (803) 896-4194.

Respectfully,

Michael W. Danielsen, Hydrogeologist
RCRA Hydrogeology I Section
Division of Hydrogeology
Bureau of Land and Waste Management

Enclosures
MWD/mwd
MWA: HW-02-016

CC: Christine Sanford-Coker, Trident District EQC
Matt Tetrault, Hazardous Waste Permitting Section
Art Sanford, Southern Division, Charleston
Linda Klink, TetraTech Nus, Inc., 661 Andersen Drive, Pittsburgh, PA, 15220-2745

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

Monitoring Well Approval

Approval is hereby granted to:	Naval Weapons Station Charleston EPA ID #SC8 710 022 620 Berkeley County
Attention:	Barry Lewis
Date of issuance:	February 14, 2002
Approval Number:	HW-02-016
Facility:	Naval Weapons Station Charleston SWMU 17 Berkeley County

For the installation of three shallow permanent monitoring wells (17MW05S, 17MW06S, 17MW07S), and 15 temporary wells. Five of the temporary wells will be installed as single shallow wells (17TW01S-17TW05S) and the remaining will be installed as shallow/deep clusters (17TW06S/D- 17TW10S/D) at the locations specified and in accordance with the construction plans and specifications in the monitoring well approval request (*Klink to Danielsen*), dated 2-7-2002, the revised RFI Workplan for SWMU 16/17, dated May 2001, and the attached figure.

All monitoring wells are to be installed and screened in the surficial aquifer/unit for the purpose of assessing groundwater quality.

Conditions:

1. A driller certified to operate in the State of South Carolina must install the wells.

2. That the latitude and longitude, surveyed elevations, boring and/or geologist logs, and actual (as built) construction details for each monitoring well be submitted to the Department within two weeks of receipt of the surveyors report. However, the Navy must inform the Department of unexpected analytes and/or elevated concentrations as data is received from the analytical laboratory.

3. All permanent monitoring wells must be properly developed until clear, sediment-free water samples are obtained. Specific Conductance, temperature, turbidity, and pH measurements should be taken during development. A log recording the values of these parameters should be maintained during development of the wells. This log should be submitted along with the "as-built" construction details required by Condition 2 above.

4. All well construction and sampling derived wastes, including but not limited to, drill cuttings, drilling fluids, development and purge water, must be managed properly and in accordance with all applicable state and federal requirements. If containerized, each vessel shall be clearly labeled with regard to contents, source, and date of activity.

5. That each permanent well be labeled with an identification plate constructed of a durable material affixed to the casing or surface pad where it is readily visible. The plate shall provide monitoring well identification number, date of construction, static water level, and driller name and South Carolina certification number.

6. That all temporary wells will be abandoned as outlined in R.61-71.10.B, upon completion of lithologic/sampling efforts.

7. Field equipment (including sampling probes) must be decontaminated by steam cleaning before use and between sampling locations. Well screens and casing must be decontaminated before installation or certified clean by the manufacturer.

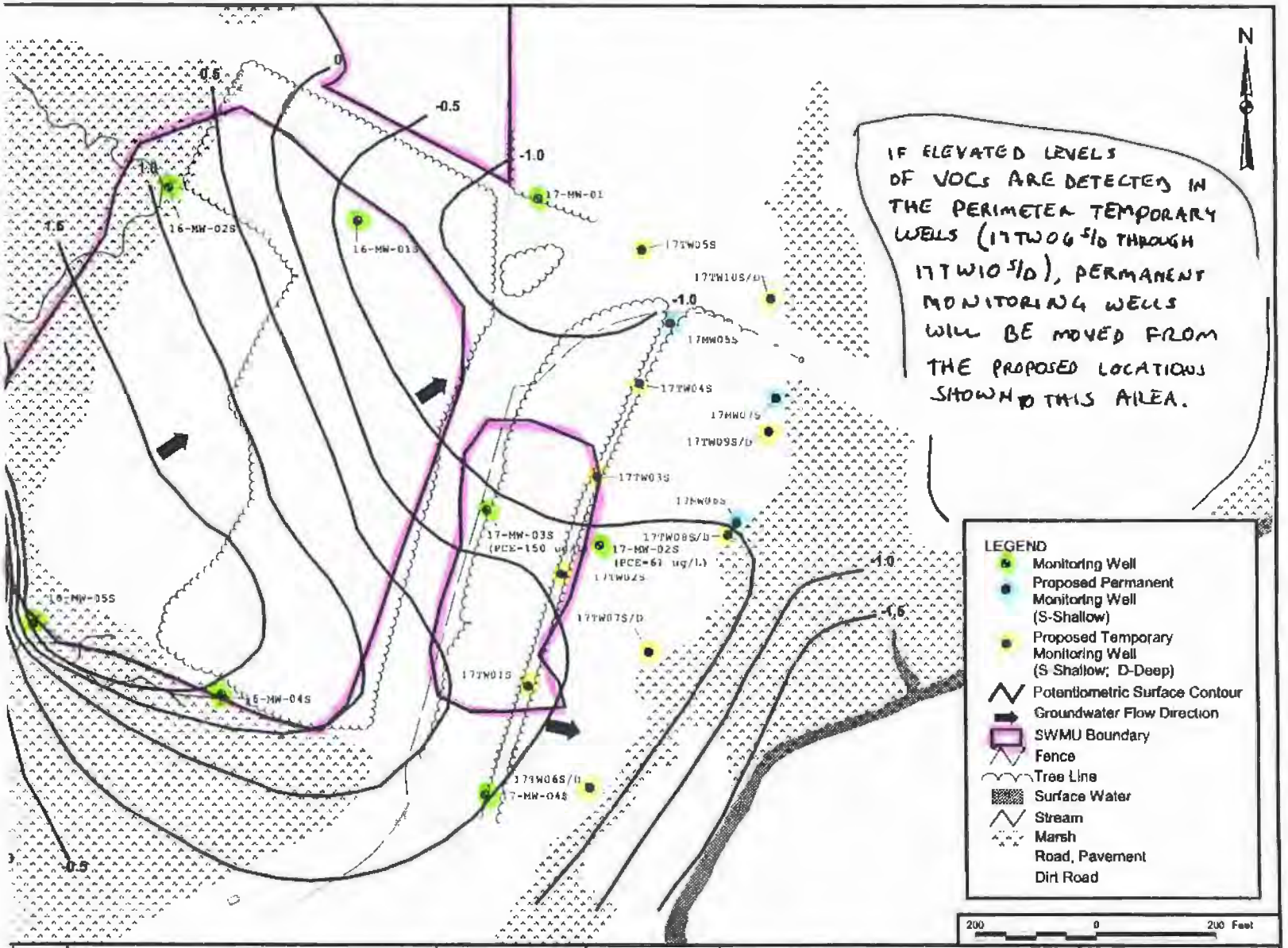
8. That notice be given during regular business hours to the issuer of this approval, Michael W. Danielsen at 803-896-4194, and the Trident District EQC Office, Christine Sanford-Coker, District Hydrogeologist at 843-740-1590, a minimum of forty-eight hours prior to the initiation of drilling activities.

This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and R.61-71 of the South Carolina Well Standards and Regulations, dated June 2, 1985.

Michael W. Danielsen, Hydrogeologist
RCRA Hydrogeology I Section
Division of Hydrogeology
Bureau of Land and Waste Management

DD020106.MWD

MONITORING WELL LOCATIONS 2/6/02 JAL



APPD	REFERENCES	DRAWN BY J LAMEY	DATE 2/4/02	SUPPLEMENTAL GROUNDWATER INVESTIGATION PROPOSED TEMPORARY/PERMANENT MONITORING WELL LOCATIONS SWMU 17 NWS CHARLESTON, SOUTH CAROLINA	CONTRACT NO. 0628
		CHECKED BY	DATE		APPROVED BY / DATE
		COST/SCHED-AREA			APPROVED BY / DATE
		SCALE AS NOTED			DRAWING NO FIGURE 1 / REV 0

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

April 8, 2003

FIRST CLASS MAIL

Mr. Barry Lewis
NSC, Code 099, Building 36
2316 Red Bank Road
Goosecreek, SC 29445

RE: Naval Weapons Station Charleston (NWS)
Charleston, South Carolina
SC8 710 022 620

Monitoring Well Request (Klink to Danielsen) Dated 4-2-2003
SWMU 17

Dear Mr. Lewis:

The above referenced request has been reviewed with respect to R.61-79.264 Subpart F of the South Carolina Hazardous Waste Management Regulations and R.61-71 of the South Carolina Well Standards and Regulations. This request is for the installation of 43 temporary wells and 10 soil borings. 22 of the 43 temporary wells will be installed as MIP points 17MIP01 through 17MIP22. The temporary monitoring wells, 17TW11 through 17TW32, will be installed at locations adjacent to the MIP points except for 17MIP22.

The MIP points will be installed down to the first confining unit, of varying depths, with an approximate maximum depth of 30 feet bgs. MIP point 17MIP22 will be installed as a correlation control point for site lithology.

The temporary wells and soil borings will be installed by DPT technology after the MIP points are installed and the maximum contamination concentration depths are determined. The temporary well screens will be five-foot in length. The shallow temporary well screens will be placed to straddle the corresponding maximum contamination concentration depth determined from the MIP effort. The anticipated completion depth will vary according to the MIP effort.

The soil borings, 17SB20 through 17SB29, will be sampled continuously for lithology until the water table is encountered. The results of the MIP effort may dictate the final location of the soil samples as determined in the field.

DD030257.MWD

Attached, please find a Monitoring Well Approval Form and a copy of the proposed well/sample locations. A copy of this monitor well approval form should be on site during drilling operations. Please be advised, additional assessment may be required at this site. Should there be any questions, please contact me at (803) 896-4194.

Respectfully,

Michael W. Danielsen, Hydrogeologist
RCRA Hydrogeology I Section
Division of Hydrogeology
Bureau of Land and Waste Management

Enclosures
MWD/mwd
MWA: HW-03-019

CC: Christine Sanford-Coker, Trident District EQC
Matt Tetrault, Hazardous Waste Permitting Section
Art Sanford, Southern Division, Charleston
Linda Klink, TetraTech Nus, Inc., 661 Andersen Drive, Pittsburgh, PA, 15220-2745
NWS Bureau File #50551

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

Monitoring Well Approval

Approval is hereby granted to:	Naval Weapons Station Charleston EPA ID #SC8 710 022 620 Berkeley County
Attention:	Barry Lewis
Date of issuance:	April 8, 2003
Approval Number:	HW-03-019
Facility:	Naval Weapons Station Charleston SWMU 17 Berkeley County

For the installation of 43 temporary wells and 10 soil borings. 22 of the 43 temporary wells will be installed as MIP points 17MIP01 through 17MIP22. The temporary monitoring wells, 17TW11 through 17TW32, will be installed at locations adjacent to the MIP points except for 17MIP22, at the locations specified and in accordance with the construction plans and specifications in the monitoring well approval request (*Klink to Danielsen*), dated 4-2-2003, the revised RFI Workplan for SWMU 16/17, dated May 2001, and the attached figures.

All monitoring wells are to be installed and screened in the surficial aquifer/unit for the purpose of assessing groundwater quality.

Conditions:

1. A driller certified to operate in the State of South Carolina must install the wells.

2. That the latitude and longitude, surveyed elevations, boring and/or geologist logs, and actual (as built) construction details for each monitoring well be submitted to the Department within two weeks of receipt of the surveyors report. However, the Navy must inform the Department of unexpected analytes and/or elevated concentrations as data is received from the analytical laboratory.

3. All well construction and sampling derived wastes, including but not limited to, drill cuttings, drilling fluids, development and purge water, must be managed properly and in accordance with all applicable state and federal requirements. If containerized, each vessel shall be clearly labeled with regard to contents, source, and date of activity.

4. That all temporary wells, MIP points, and soil borings will be abandoned as outlined in R.61-

71.10.B, upon completion of lithologic/sampling efforts.

5. Field equipment (including sampling probes) must be decontaminated by steam cleaning before use and between sampling locations. Well screens and casing must be decontaminated before installation or certified clean by the manufacturer.

6. That notice be given during regular business hours to the issuer of this approval, Michael W. Danielsen at 803-896-4194, and the Trident District EQC Office, Christine Sanford-Coker, District Hydrogeologist at 843-740-1590, a minimum of forty-eight hours prior to the initiation of drilling activities.

This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and R.61-71 of the South Carolina Well Standards and Regulations, dated April 26, 2002.

Michael W. Danielsen, Hydrogeologist
RCRA Hydrogeology I Section
Division of Hydrogeology
Bureau of Land and Waste Management

LEGEND
Proposed Soil Sample Location
Sample Location (Carbon Tet/Chloroform Detected)
Sample Location (PCE Detected)
Sample Location (TCE Detected)
Sample Location (No Contamination Detected)
Tree (No Contamination Detected on 9/11/02)
Tree (CDCE Detected on 9/11/02)
Tree (TCE Detected on 9/11/02)
Tree (PCE Detected on 9/11/02)
Staff Gauge
Drum

P:\GIS\CHARLESTON_NWS\APRS\SWMU17.APR PROPOSED GROUNDWATER SAMPLING MAP 4/1/03 JAL

DRAWN BY J. LAMEY DATE 3/17/03		PROPOSED GROUNDWATER SAMPLING MAP	CONTRACT NUMBER 4213
CHECKED BY DATE		SWMU 17	APPROVED BY DATE
COST/SCHEDULE-AREA		NAVAL WEAPONS STATION	APPROVED BY DATE
SCALE AS NOTED		CHARLESTON, SOUTH CAROLINA	DRAWING NO. REV 0

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

February 3, 2004

FIRST CLASS MAIL

Mr. Barry Lewis
NSC, Code 099, Building 36
2316 Red Bank Road
Goosecreek, SC 29445

RE: Naval Weapons Station Charleston (NWS)
Charleston, South Carolina
SC8 710 022 620

Monitoring Well Request (Beckwith/Zawtocki to Danielsen) Dated 1-15-2004
SWMU 17

Dear Mr. Lewis:

The above referenced request has been reviewed with respect to R.61-79.265 Subpart F of the South Carolina Hazardous Waste Management Regulations and R.61-71 of the South Carolina Well Standards and Regulations. This request is for the installation of 16 shallow injection wells, 11 permanent shallow monitoring wells and 2 shallow soil gas monitoring wells. This approval will only address the groundwater monitoring and soil gas monitoring wells. Todd Adams, with the Bureau of Water, will issue the Underground Injection Control Permit to Construct to address the injection wells. The monitoring wells installed for the vegetable oil pilot study must be named as 17PS-01 through 17PS11 (Pilot Study) for the monitoring wells, 17PSG-01 and PSG-02 (Pilot Study Gas) for the soil gas monitoring wells, to avoid confusion with the RCRA investigation wells on site. As a suggestion, the injection wells should also be named 17PSI-01 through 17PSI-16 (Pilot Study Injection) for easy recognition in reports.

All monitoring wells will be installed in the surficial aquifer and will be installed by direct push technology (DPT) drilling methods. The monitoring wells will be finished as stick-up wells and have guard posts installed where determined during the 1-21-04 conference call. The shallow wells will be installed to allow the ten-foot screens to rest on top of the local confining unit. (Please note. The monitoring wells require a minimum of 6 inch sand pack below the screen.) The shallow wells are anticipated to be completed to a maximum depth of approximately sixteen feet below ground surface (bgs).

All soil borings not converted to monitoring wells within five days of installation must be grouted upon termination of lithologic studies and/or sampling starting from a maximum depth of 20 feet bgs and continuously pressure grouted to the ground surface.

Attached, please find a Monitoring Well Approval Form and a copy of the proposed well locations. A copy of this monitor well approval form should be on site during drilling operations. Please be advised, additional assessment may be required at this site. Should there be any questions, please contact me at (803) 896-4194 or danielmw@dhec.sc.gov .

Respectfully,

Michael W. Danielsen, Hydrogeologist
RCRA Hydrogeology I Section
Division of Hydrogeology
Bureau of Land and Waste Management

Enclosures
MWD/mwd
MWA: HW-04-010

CC: Christine Sanford-Coker, Trident District EQC
Matt Tetrault, Hazardous Waste Permitting Section
Todd Adams, Bureau of Water
Art Sanford, Southern Division, Charleston
Linda Klink, TetraTech Nus, Inc.
Walter J. Beckwith, P.G. and Christie Zawtocki, P.E., Solutions-IES, 3722 Benson Drive, Raleigh, NC, 27609
NWS Bureau File #50551

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

Monitoring Well Approval

Approval is hereby granted to:	Naval Weapons Station Charleston EPA ID #SC8 710 022 620 Berkeley County
Attention:	Barry Lewis
Date of issuance:	February 3, 2004
Approval Number:	HW-04-010
Facility:	Naval Weapons Station Charleston SWMU 17 Berkeley County

For the installation of 11 permanent shallow monitoring wells (17PS-01 through 17PS11) and 2 shallow soil gas monitoring wells (17PSG-01 and 17PSG-02) at the locations specified and in accordance with the construction plans and specifications in the monitoring well approval request (Beckwith/Zawtocki to Danielsen), dated 1-15-2004, the 1-21-04 conference call between SCDHEC, the NAVY and Solutions-IES, and the attached figures.

All monitoring wells are to be installed and screened in the surficial aquifer/unit to access groundwater quality for the vegetable oil injection pilot study.

Conditions:

1. A driller certified to operate in the State of South Carolina must install the wells.

2. That the latitude and longitude, surveyed elevations, boring and/or geologist logs, and actual (as built) construction details for each permanent monitoring well be submitted to the Department within thirty days of completion of the last well. However, the Navy must inform the Department of unexpected analytes and/or elevated concentrations as data is received from the analytical laboratory.

3. All monitoring wells must be properly developed until clear, sediment-free water samples are obtained. Specific Conductance, temperature, turbidity, and pH measurements should be taken during development. A log recording the values of these parameters should be maintained during development of the wells. This log should be submitted along with the "as-built" construction details required by Condition 2 above.

4. All well construction and sampling derived wastes, including but not limited to, drill cuttings, drilling fluids, development and purge water, must be managed properly and in accordance with all applicable state and federal requirements. If containerized, each vessel shall be clearly labeled with regard to contents, source, and date of activity.

5. That each well be labeled with an identification plate constructed of a durable material affixed to the casing or surface pad where it is readily visible. The plate shall provide monitoring well identification number, date of construction, static water level, and driller name and South Carolina certification number.

6. Field equipment (including sampling probes) must be decontaminated by steam cleaning before use and between sampling locations. Well screens and casing must be decontaminated before installation or certified clean by the manufacturer.

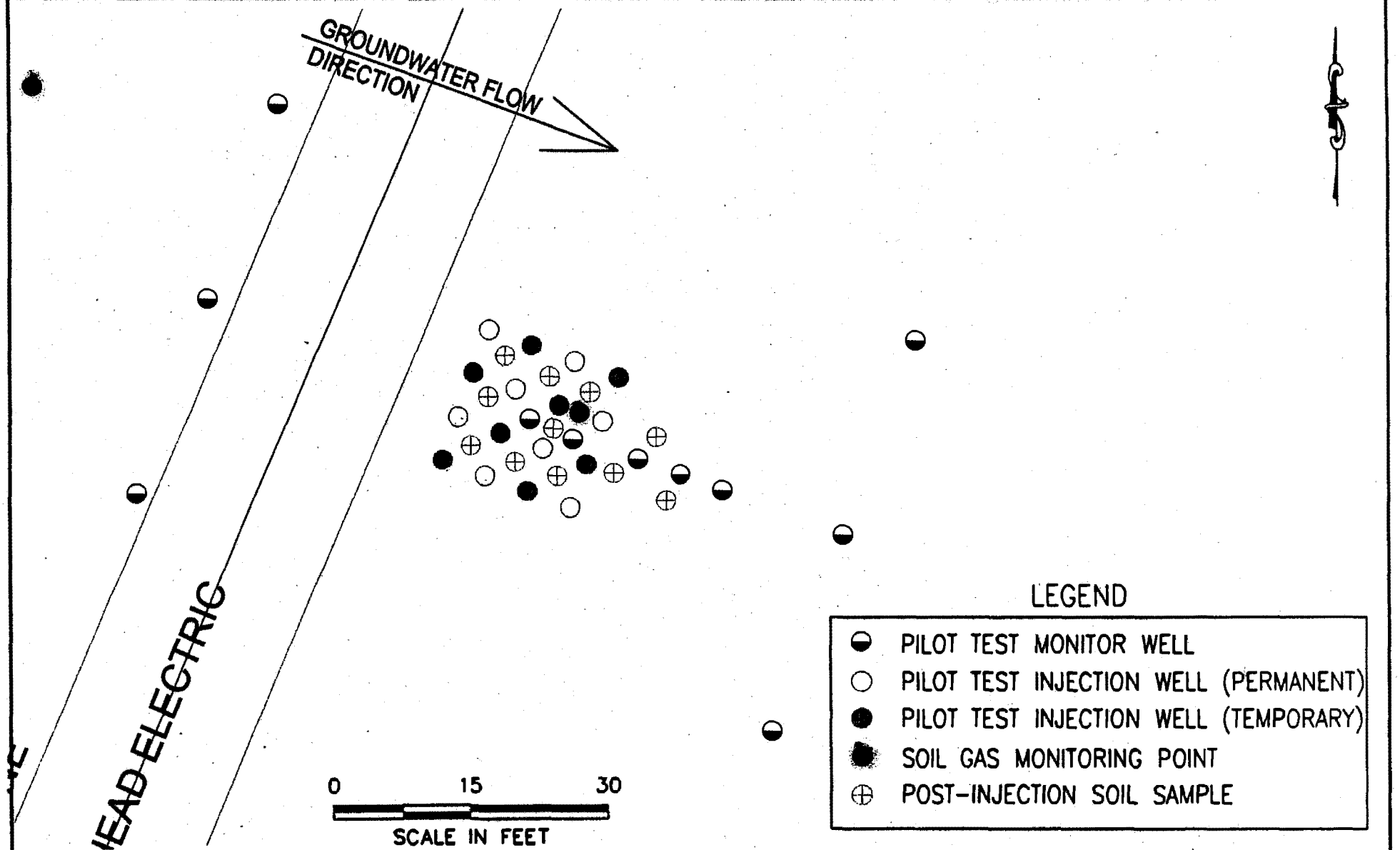
7. That all temporary wells/soil borings not converted into permanent wells will be abandoned as outlined in R.61-71.H.4.c, upon completion of lithologic/sampling efforts.

8. That notice be given during regular business hours to the issuer of this approval, Michael W. Danielsen at 803-896-4194, and the Trident District EQC Office, Christine Sanford-Coker, District Hydrogeologist at 843-740-1590 or sanforcc@dhec.sc.gov , a minimum of forty-eight hours prior to the initiation of drilling activities.

This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and R.61-71 of the South Carolina Well Standards and Regulations, dated April 26, 2002.

Michael W. Danielsen, Hydrogeologist
RCRA Hydrogeology I Section
Division of Hydrogeology
Bureau of Land and Waste Management

FILE	DATE	PROJECT MANAGER	CHECKED BY	DRAFTER	PROJECT NUMBER
Figure 4 letter.DWG	1/13/2004	CZ	CZ	DKH	



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3722 BENSON DRIVE
RALEIGH, NORTH CAROLINA 27609
TEL.: (919) 873-1060 FAX.: (919) 873-1074

POST-INJECTION SOIL SAMPLE LOCATIONS

SWMU 17
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA

FIGURE: 4

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PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

February 11, 2004

FIRST CLASS MAIL

Mr. Barry Lewis
NSC, Code 099, Building 36
2316 Red Bank Road
Goosecreek, SC 29445

RE: Naval Weapons Station Charleston (NWS)
Charleston, South Carolina
SC8 710 022 620

Monitoring Well Request (Email: Zawtocki to Danielsen)
Dated 2-6-2004
SWMU 17

Dear Mr. Lewis:

The above referenced request has been reviewed with respect to R.61-79.265 Subpart F of the South Carolina Hazardous Waste Management Regulations and R.61-71 of the South Carolina Well Standards and Regulations. This request is for the installation of 1 permanent monitoring well, 12 shallow temporary monitoring wells, and modifications to the HW-04-010 monitoring well approval issued 2-3-04. The 1-inch ID permanent monitoring wells installed for the vegetable oil pilot study must be named as 17PS-01 through 17PS12 (Pilot Study). The temporary monitoring wells that will be installed for the MIP survey must be named 17PSMIP-01 through 17PSMIP-12 (Pilot Study Membrane Interface Probe), to avoid confusion with the RCRA investigation wells on site. The permanent 2-inch ID monitoring wells must be named in sequence with the existing well numbering for the RCRA investigation monitoring wells.

All temporary monitoring wells/soil borings will be installed in the surficial aquifer and will be installed by direct push technology (DPT) drilling methods.

This monitoring well approval will also serve as modification to HW-04-010 as allowing the previously ten-foot well screens to be installed as five-foot screens, and changing seven permanent monitoring wells to be installed by hollow stem augering methods by the SouthDiv contractor. The shallow monitoring wells will be installed to allow the five-foot screens to rest on top of the local confining unit. (Please note. The monitoring wells require a minimum of 6 inch sand pack below the screen.) The shallow wells are anticipated to be completed to a

maximum depth of approximately sixteen feet below ground surface (bgs).

All soil borings not converted to monitoring wells within five days of installation must be grouted upon termination of lithologic studies and/or sampling starting from a maximum depth of 20 feet bgs and continuously pressure grouted to the ground surface.

Attached, please find a Monitoring Well Approval Form and a copy of the proposed well locations. A copy of this monitor well approval form should be on site during drilling operations. Please be advised, additional assessment may be required at this site. Should there be any questions, please contact me at (803) 896-4194 or danielmw@dhec.sc.gov .

Respectfully,

Michael W. Danielsen, Hydrogeologist
RCRA Hydrogeology I Section
Division of Hydrogeology
Bureau of Land and Waste Management

Enclosures
MWD/mwd
MWA: HW-04-013

CC: Christine Sanford-Coker, Trident District EQC
Matt Tetrault, Hazardous Waste Permitting Section
Todd Adams, Bureau of Water
Art Sanford, Southern Division, Charleston
Linda Klink, TetraTech Nus, Inc.
Walter J. Beckwith, P.G. and Christie Zawtocki, P.E., Solutions-IES, 3722 Benson Drive, Raleigh, NC, 27609
NWS Bureau File #50551

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

Monitoring Well Approval

Approval is hereby granted to:	Naval Weapons Station Charleston EPA ID #SC8 710 022 620 Berkeley County
Attention:	Barry Lewis
Date of issuance:	February 11, 2004
Approval Number:	HW-04-013
Facility:	Naval Weapons Station Charleston SWMU 17 Berkeley County

For the installation of 1 permanent shallow monitoring well, 12 shallow temporary monitoring wells 17PSMIP-01 through 17PSMIP-12 (Pilot Study Membrane Interface Probe), at the locations specified and in accordance with the construction plans and specifications in the monitoring well approval request (Email: Zawtocki to Danielsen), dated 2-6-2004, the 2-9-04 email correspondence between SCDHEC, the NAVY and Solutions-IES, and the attached figures.

In addition, the 2-inch ID monitoring wells must be installed according to the approved May 2001 SWMU 16/17 RFI Work Plan.

All monitoring wells are to be installed and screened in the surficial aquifer/unit to access groundwater quality for the vegetable oil injection pilot study.

Conditions:

1. A driller certified to operate in the State of South Carolina must install the wells.

2. That the latitude and longitude, surveyed elevations, boring and/or geologist logs, and actual (as built) construction details for each permanent monitoring well be submitted to the Department within thirty days of completion of the last well. However, the Navy must inform the Department of unexpected analytes and/or elevated concentrations as data is received from the analytical laboratory.

3. All monitoring wells must be properly developed until clear, sediment-free water samples are obtained. Specific Conductance, temperature, turbidity, and pH measurements should

be taken during development. A log recording the values of these parameters should be maintained during development of the wells. This log should be submitted along with the "as-built" construction details required by Condition 2 above.

4. All well construction and sampling derived wastes, including but not limited to, drill cuttings, drilling fluids, development and purge water, must be managed properly and in accordance with all applicable state and federal requirements. If containerized, each vessel shall be clearly labeled with regard to contents, source, and date of activity.

5. That each well be labeled with an identification plate constructed of a durable material affixed to the casing or surface pad where it is readily visible. The plate shall provide monitoring well identification number, date of construction, static water level, and driller name and South Carolina certification number.

6. Field equipment (including sampling probes) must be decontaminated by steam cleaning before use and between sampling locations. Well screens and casing must be decontaminated before installation or certified clean by the manufacturer.

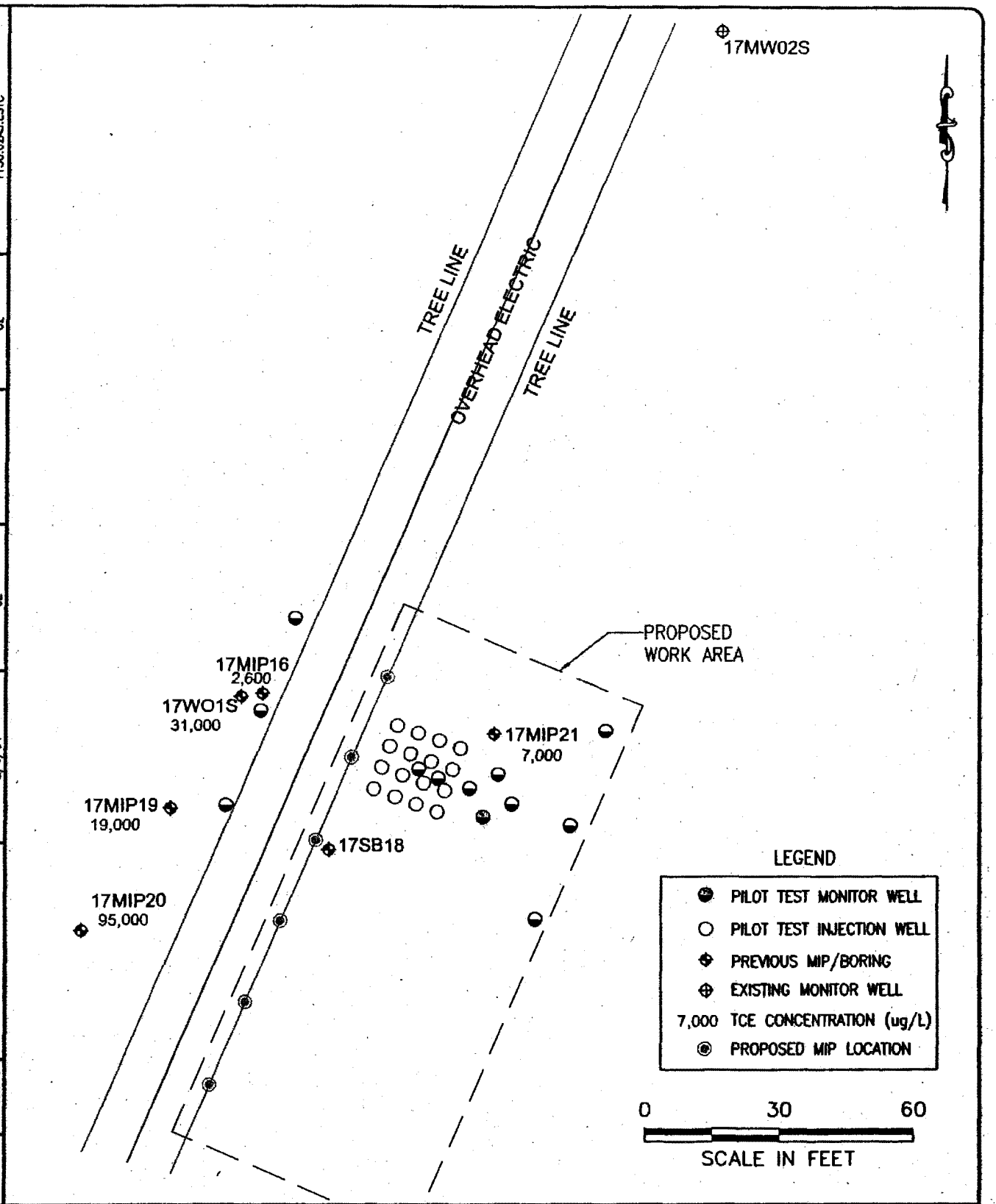
7. That all temporary wells/soil borings not converted into permanent wells will be abandoned as outlined in R.61-71.H.4.c, upon completion of lithologic/sampling efforts.

8. That notice be given during regular business hours to the issuer of this approval, Michael W. Danielsen at 803-896-4194, and the Trident District EQC Office, Christine Sanford-Coker, District Hydrogeologist at 843-740-1590 or sanforcc@dhec.sc.gov , a minimum of forty-eight hours prior to the initiation of drilling activities.

This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and R.61-71 of the South Carolina Well Standards and Regulations, dated April 26, 2002.

Michael W. Danielsen, Hydrogeologist
RCRA Hydrogeology I Section
Division of Hydrogeology
Bureau of Land and Waste Management

DD040099.MWD



PROJECT NUMBER 1130.02A3.ESTC
DRAFTER CZ
CHECKED BY
PROJECT MANAGER CZ
DATE 2/6/04
FILE Figure1letter.dwg

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TEL.: (919) 873-1060 FAX.: (919) 873-1074

PROPOSED PILOT TEST LAYOUT

SWMU 17
NAVAL WEAPONS STATION
CHARLESTON, SC

FIGURE: 1

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

October 19, 2004

FIRST CLASS MAIL

Mr. Barry Lewis
NSC, Code 099, Building 36
2316 Red Bank Road
Goosecreek, SC 29445

RE: Naval Weapons Station Charleston (NWS)
Charleston, South Carolina
SC8 710 022 620

Monitoring Well Request (Email: Zawtocki to Danielsen)
Dated 10-14-2004
SWMU 17

Dear Mr. Lewis:

The above referenced request has been reviewed with respect to R.61-71 of the South Carolina Well Standards and Regulations and other appropriate regulation/guidance. This request is for the installation of 12 shallow temporary monitoring wells (17PSTW-4 through 17PSTW-15), and 6 soil borings (17PSSB-1 through 17PSSB-6) at SWMU 17 to evaluate groundwater flow direction and to assess soil and groundwater conditions.

All temporary monitoring wells/soil borings will be installed in the surficial aquifer and will be installed by direct push technology (DPT) drilling methods. The temporary wells are expected to be completed to a maximum depth of 16 feet bgs and the soil borings are expected to be terminated at 18 feet bgs.

All soil borings and temporary monitoring wells must be grouted upon termination of lithologic studies and/or sampling starting from the bottom of the boring and continuously pressure grouted to the ground surface with neat cement, bentonite-cement, or 20% high solids sodium bentonite grout through a tremie pipe.

All sampling should follow the methods described in the November 2001 EPA EISOPQAM.

DD040683.MWD

The boring and/or geologist logs for each monitoring well/soil boring should be submitted to the Department within 30 days of completion of the last bore hole.

All well construction and sampling derived wastes, including but not limited to, drill cuttings, drilling fluids, development and purge water, must be managed properly and in accordance with all applicable state and federal requirements. If containerized, each vessel shall be clearly labeled with regard to contents, source, and date of activity.

Field equipment (including sampling probes) must be decontaminated by steam cleaning, or other approved method, before use and between sampling locations. Well screens and casing must be decontaminated before installation or must be certified clean by the manufacturer.

Attached, please find a Monitoring Well Approval Form and a copy of the proposed monitoring well locations. A copy of this monitoring well approval form should be on site during drilling operations.

The April 26, 2002 South Carolina Well Standards Regulation R.61-71 apply to the monitoring well installations for the above referenced sites.

Please be advised, additional assessment may be required at this site. Should there be any questions, please contact me at (803) 896-4194 or danielmw@dhec.sc.gov .

Respectfully,

Michael W. Danielsen, Hydrogeologist
RCRA Hydrogeology I Section
Division of Hydrogeology
Bureau of Land and Waste Management

Enclosure
MWA: HW-04-074

CC: Christine Sanford-Coker, Trident District EQC
Matt Tetrault, Hazardous Waste Permitting Section
Todd Adams, Bureau of Water
Jeff Adams, Southern Division, Charleston
Linda Klink, TetraTech Nus, Inc.
Tony Lieberman and Christie Zawtocki, P.E., Solutions-IES, 3722 Benson Drive, Raleigh, NC, 27609
NWS Bureau File #50551

DD040683.MWD

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

Temporary Monitoring Well Approval

Approval is hereby granted to: Barry Lewis
Naval Weapons Station Charleston
EPA ID #SC8 710 022 620
Berkeley County

Facility: Naval Weapons Station Charleston
SWMU 17
Berkeley County

This approval is for the installation of 12 temporary groundwater monitoring wells. The temporary monitoring wells are to be installed in the locations as illustrated on Figure 1A and 1B, and per the proposed construction details provided in the October 14, 2004 correspondence. The monitoring wells are to be installed following all of the applicable requirements of R.61-71.

Please note that R.61-71 requires the following:

1. All wells shall be drilled, constructed, and abandoned by a South Carolina certified well driller per R.61-71.D.1.

2. A Water Well Record Form or other form provided or approved by the Department shall be completed and submitted to the Department within 30 days after well completion or abandonment unless another schedule has been approved by the Department. The form should contain the "as-built" construction details and all other information required by R.61-71.H.1.f

3. All analytical data and water levels obtained from each monitoring well shall be submitted to the Department within 30 days of receipt of laboratory results unless another schedule has been approved by the Department as required by R.61-71.H.1.d.

4. All temporary monitoring wells shall be abandoned within 5 days of borehole completion using appropriate methods as required by R.61-71.H.4.c.

DD040683.MWD

5. If any of the information provided to the Department changes, the Author (Michael W. Danielsen) shall be notified a minimum of twenty-four hours prior to well construction as required by R.61-71.H.1.a.

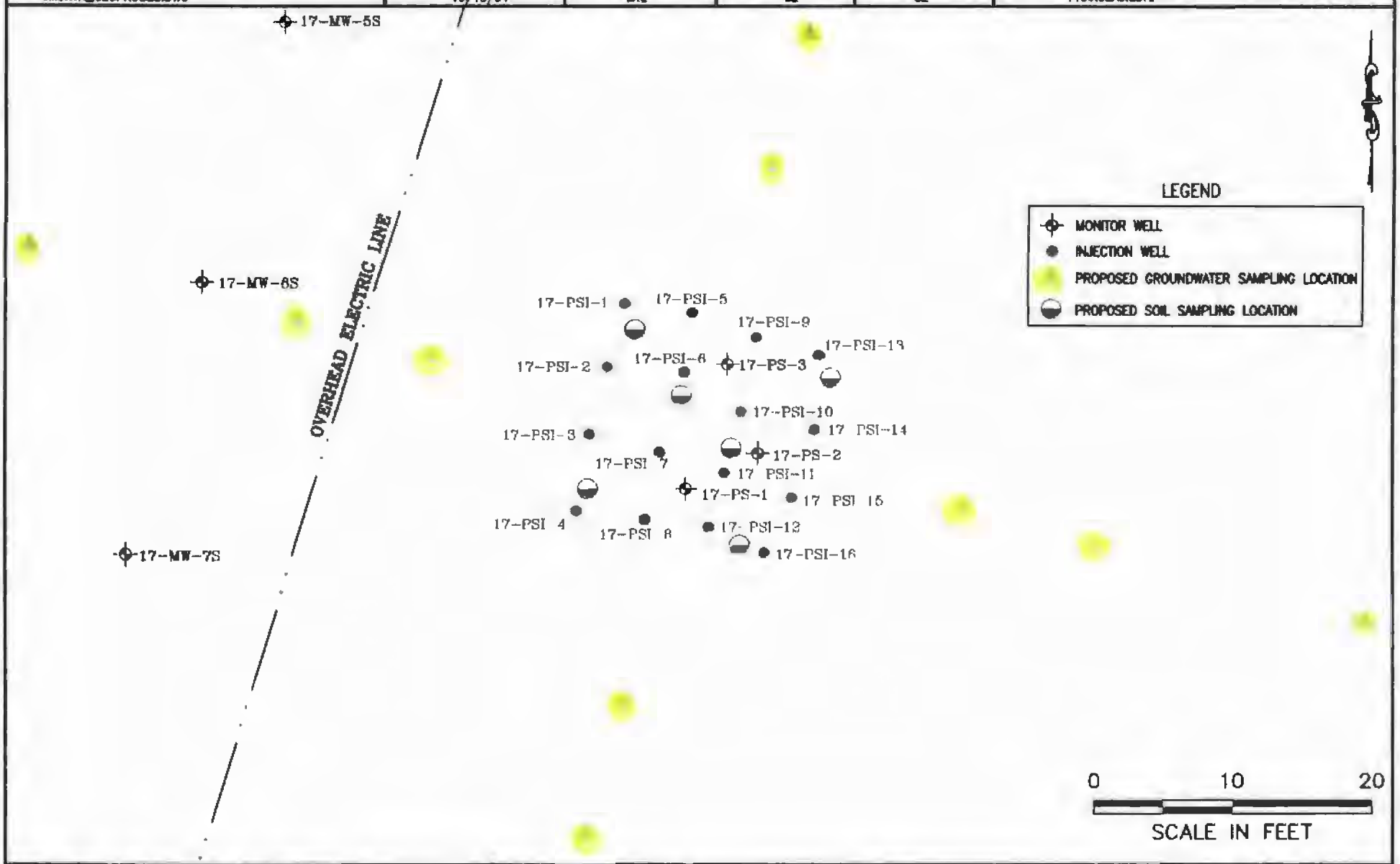
This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and R.61-71 of the South Carolina Well Standards and Regulations, dated April 26, 2002.

Date of Issuance: 10-19-2004 **Approval #: HW-04-074**

Michael W. Danielsen, Hydrogeologist
RCRA Hydrogeology I Section
Division of Hydrogeology
Bureau of Land & Waste Management

DD040683.MWD

FILE	DATE	PROJECT MANAGER	CHECKED BY	DRAFTER	PROJECT NUMBER
6MONTH_GEOPROBES.DWG	10/13/04	MTL	CZ	CZ	1130.02A3.ESTC



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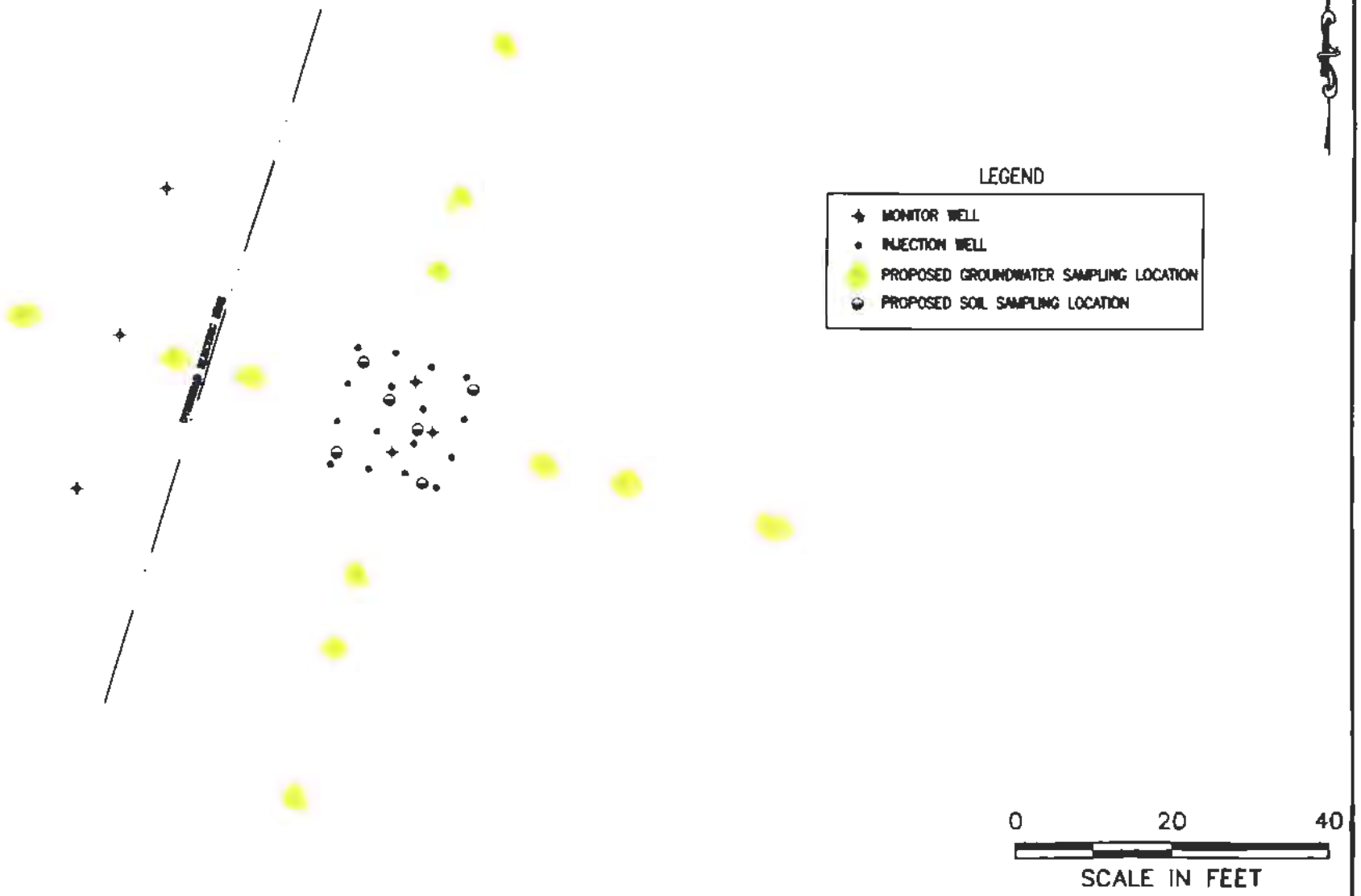
RALEIGH, NORTH CAROLINA 27609
TEL.: (919) 873-1060 FAX.: (919) 873-1074

PROPOSED GEOPROBE SAMPLING LOCATIONS
EDIBLE OIL PILOT TEST
SWMU 17
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA

FIGURE:
1A

FILE	DATE	PROJECT MANAGER	CHECKED BY	DRAFTER	PROJECT NUMBER
6MONTH_GEOPROBES_B.DWG	10/13/04	MTL	CZ	CZ	1130.02A5.ESTC



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Industrial & Environmental Services
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RALEIGH, NORTH CAROLINA 27609
TEL.: (919) 873-1080 FAX.: (919) 873-1074

PROPOSED GEOPROBE SAMPLING LOCATIONS
EDIBLE OIL PILOT TEST
SWMU 17
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA

FIGURE:
18

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

November 16, 2004

FIRST CLASS MAIL

Mr. Barry Lewis
NSC, Code 099, Building 36
2316 Red Bank Road
Goosecreek, SC 29445

RE: Naval Weapons Station Charleston (NWS)
Charleston, South Carolina
SC8 710 022 620

Monitoring Well Request (Email: Klink to Danielsen)
Dated 10-28-2004
SWMU 16 & 17

Dear Mr. Lewis:

The above referenced request has been reviewed with respect to R.61-71 of the South Carolina Well Standards and Regulations and other appropriate regulation/guidance. This request is for the installation of 26 permanent monitoring wells (16MW06S through 16MW09S, 17MW06D, 17MW08S, 17MW09S, 17MW10S, 17MW11S, 17MW12S/D, 17MW13S, 17MW14S/D, 17MW15S/D, 17MW16S/I/D, 17MW17S/I/D, 17MW18S/D, 17MW19S, and 17MW20S), 88 temporary wells/MIP points, one piezometer (16PZ01), one staff gauge (17SG05), and 10 soil borings.

All permanent wells and the piezometer will be installed in the surficial aquifer and will be installed by hollow stem auger drilling methods. The wells will be finished as stick-up wells and have guard posts installed and painted with high visibility paint. The permanent wells will be installed to allow the ten-foot screens to straddle the water table where possible. The screen lengths for nested permanent monitoring wells maybe adjusted down to 5 feet in order to prevent overlap of screened intervals. The monitoring wells are anticipated to be completed to differing depths as shown in the attached table. The shallow well screens will be placed to straddle the water table where possible. The deep well screens will be placed on top of the targeted confining unit, the first confining unit encountered or the top of the Ashley Formation ("Cooper Marl"), at the sites.

The temporary wells/MIP points will be installed by DPT technology. The temporary well screens will be no longer than five-foot in length. The temporary well screens/MIP sample depths will be placed according to the attached table.

All soil borings and temporary monitoring wells must be grouted upon termination of lithologic studies and/or sampling starting from the bottom of the boring and continuously pressure grouted to the ground surface with neat cement, bentonite-cement, or 20% high solids sodium bentonite grout through a tremie pipe.

DD040727.MWD
HW-04-076
BLWM 50551

The bentonite pellets should be placed in 6-inch lifts in order to provide for more uniform hydration.

All well installations and sampling should follow the methods described in the November 2001 EPA EISOPQAM.

The boring and/or geologist logs for each monitoring well/soil boring should be submitted to the Department within two weeks of receipt of the survey report as requested.

All well construction and sampling derived wastes, including but not limited to, drill cuttings, drilling fluids, development and purge water, must be managed properly and in accordance with all applicable state and federal requirements. If containerized, each vessel shall be clearly labeled with regard to contents, source, and date of activity.

Field equipment (including sampling probes) must be decontaminated by steam cleaning, or other approved method, before use and between sampling locations. Well screens and casing must be decontaminated before installation or must be certified clean by the manufacturer.

Note. A double cased boring/monitoring well may be required where site geology dictates the drilling of deeper temporary/permanent monitoring wells or soil borings that penetrate the local confining unit.

Attached, please find a Monitoring Well Approval Form and a copy of the proposed monitoring well locations. A copy of this monitoring well approval form should be on site during drilling operations.

The April 26, 2002 South Carolina Well Standards Regulation R.61-71 apply to the monitoring well installations for the above referenced sites.

Please be advised, additional assessment may be required at this site. Should there be any questions, please contact me at (803) 896-4194 or danielmw@dhec.sc.gov .

Respectfully,

Michael W. Danielsen, Hydrogeologist
RCRA Hydrogeology I Section
Division of Hydrogeology
Bureau of Land and Waste Management

Enclosure
MWA: HW-04-076

CC: Christine Sanford-Coker, Trident District EQC
Matt Tetrault, Hazardous Waste Permitting Section
Jeff Adams, Southern Division, Charleston
[redacted] TetraTech NUS, Inc.
NWS Bureau File #50551

DD040727.MWD
HW-04-076
BLWM 50551

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

Monitoring Well Approval

Approval is hereby granted to: Barry Lewis
Naval Weapons Station Charleston
EPA ID #SC8 710 022 620
Berkeley County

Facility: Naval Weapons Station Charleston
SWMU 16 & 17
Berkeley County

This approval is for the installation of 26 permanent monitoring wells (16MW06S through 16MW09S, 17MW06D, 17MW08S, 17MW09S, 17MW10S, 17MW11S, 17MW12S/D, 17MW13S, 17MW14S/D, 17MW15S/D, 17MW16S/I/D, 17MW17S/I/D, 17MW18S/D, 17MW19S, and 17MW20S), 88 temporary wells/MIP points, one piezometer (16PZ01), and one staff gauge (17SG05). The monitoring wells, piezometer, and the staff gauge are to be installed in the locations as illustrated on Figure 2-1, and per the proposed construction details provided in the October 28, 2004 correspondence. The monitoring wells are to be installed following all of the applicable requirements of R.61-71.

Please note that R.61-71 requires the following:

1. All wells shall be drilled, constructed, and abandoned by a South Carolina certified well driller per R.61-71.D.1.

2. All permanent wells shall be properly developed per R.61-71.H.2.d. A Water Well Record Form or other form provided or approved by the Department shall be completed and submitted within 30 days after well completion or abandonment unless another schedule has been approved by the Department. The form should contain the "as-built" construction details and all other information required by R.61-71.H.1.f

3. All analytical data and water levels obtained from each monitoring well shall be submitted to the Department within 30 days of receipt of laboratory results unless another schedule has been approved by the Department as required by R.61-71.H.1.d.

4. All permanent monitoring wells shall be labeled as required by R.61-71.H.2.c.

DD040727.MWD
HW-04-076
BLWM 50551

5. A Water Well Record Form or other form provided or approved by the Department shall be completed and submitted to the Department within 30 days after temporary well completion or abandonment unless another schedule has been approved by the Department. The form should contain the "as-built" construction details and all other information required by R.61-71.H.1.f

6. All temporary monitoring wells shall be abandoned within 5 days of borehole completion using appropriate methods as required by R.61-71.H.4.c.

7. If any of the information provided to the Department changes, Michael W. Danielsen (803.896.4194), shall be notified a minimum of twenty-four hours prior to well construction as required by R.61-71.H.1.a.

This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and R.61-71 of the South Carolina Well Standards and Regulations, dated April 26, 2002.

Date of Issuance: 11-16-2004 Approval #: HW-04-076

Michael W. Danielsen

Michael W. Danielsen, Hydrogeologist
RCRA Hydrogeology I Section
Division of Hydrogeology
Bureau of Land and Waste Management

DD040727.MWD
HW-04-076
BLWM 50551

SUMMARY OF GROUNDWATER DRILLING LOCATIONS FOR PERMIT
SWMU 16 OLD SOUTHSIDE LANDFILL
SWMU 17 OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

MIP/DPT			Permanent Monitoring Wells [b]		
MIP/DPT Location	**Estimated Depth**	**Analyses**	**MW Location**	**Estimated Depth**	**Analyses**
SWMU 16 Groundwater [a]					
16MIP01/16TW01	20' min & end contam.	VOCs only	16MW06S	14' upper surficial aquifer	Full-suite organics (90% TCL and 10% Appx 9) & TAL inorganics Shelby tubes via ASTM methods at 16MW06 and 16MW09
16MIP02/16TW02	35' first confining unit		16MW07S	14' upper surficial aquifer	
16MIP03/16TW03	20' min & end contam.		16MW08S	14' upper surficial aquifer	
16MIP04/16TW04	35' first confining unit		16MW09S	14' upper surficial aquifer	
16MIP05/16TW05	20' min & end contam.	Full-suite organics (90% TCL and 10% Appx 9) & TAL inorganics	NA	NA	NA
16MIP06/16TW06	20' min & end contam.				
16MIP07/16TW07	20' min & end contam.				
16MIP08/16TW08	20' min & end contam.				
16MIP09/16TW09	35' first confining unit				
16MIP10/16TW10	20' min & end contam.				
16MIP11/16TW11	20' min & end contam.				
16MIP12/16TW12	20' min & end contam.				
16MIP13/16TW13	20' min & end contam.				
16MIP14/16TW14	20' min & end contam.				
NA	NA	NA	16PZ01	14' upper surficial aquifer	None

SUMMARY OF GROUNDWATER DRILLING LOCATIONS FOR PERMIT
SWMU 16 OLD SOUTHSIDE LANDFILL
SWMU 17 OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

MIP/DPT [b]			Permanent Monitoring Wells [b]		
MIP/DPT Location	**Estimated Depth**	**Analyses**	**MW Location**	**Estimated Depth**	**Analyses**
SWMU 17 Groundwater [a]					
17MIP23/17TW32	30' Cooper	Full-suite organics (90% TCL and 10% Appx 9) & TAL inorganics	NA	NA	NA
17MIP24/17TW33	30' first confining unit				
17MIP25/17TW34	30' first confining unit				
17MIP26/17TW35	30' first confining unit				
17MIP27/17TW36	30' first confining unit				
17MIP28/17TW37	30' first confining unit				
17MIP29/17TW38	30' first confining unit	VOCs only	17MW12S 17MW12D	15' (upper surficial aquifer) 30' (lower surficial aquifer)	Full-suite organics (90% TCL and 10% Appx 9) & TAL inorganics
17MIP30/17TW39	30' first confining unit	Full-suite organics (90% TCL and 10% Appx 9) & TAL inorganics	NA	NA	NA
17MIP31/17TW40	30' first confining unit				
17MIP32/17TW41	30' first confining unit				
17MIP33/17TW42	30' first confining unit				
17MIP34/17TW43	30' first confining unit				
17MIP35/17TW44	30' Cooper				
17MIP36/17TW45	30' first confining unit				
17MIP37/17TW46	35' Cooper				
17MIP38/17TW47	30' Cooper	VOCs only	17MW14S 17MW14D	15' (upper surficial aquifer) 30' (lower surficial aquifer)	Full-suite organics (90% TCL and 10% Appx 9) & TAL inorganics
17MIP39/17TW48	30' first confining unit		17MW15S 17MW15D	15' (upper surficial aquifer) 30' (lower surficial aquifer)	
17MIP40/17TW49	45' Cooper		17MW16S 17MW16I 17MW16D	15' (upper surficial aquifer) 30' (intermediate aquifer) 45' (lower surficial aquifer)	
17MIP41/17TW50	30' first confining unit		17MW17S 17MW17I 17MW17D	15' (upper surficial aquifer) 30' (intermediate aquifer) 40' (lower surficial aquifer)	

SUMMARY OF GROUNDWATER DRILLING LOCATIONS FOR PERMIT
SWMU 16 OLD SOUTHSIDE LANDFILL
SWMU 17 OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

MIP/DPT [b]			Permanent Monitoring Wells [b]		
MIP/DPT Location	**Estimated Depth**	**Analyses**	**MW Location**	**Estimated Depth**	**Analyses**
17MIP42/17TW51	30' first confining unit	VOCs only	17MW18S 17MW18D	15' (upper surficial aquifer) 35' (lower surficial aquifer)	Full-suite organics (90% TCL and 10% Appx 9) & TAL inorganics
17MIP43/17TW52	30' first confining unit		17MW19S	18' (lower surficial aquifer)	
17MIP44/17TW53	30' first confining unit		17MW20S	18' (lower surficial aquifer)	
NA	NA	NA	17MW05S *	18' (lower surficial aquifer)	Full-suite organics (90% TCL and 10% Appx 9) & TAL inorganics
			17MW06S * 17MW06D	18' (lower surficial aquifer) 23' (lower surficial aquifer)	
			17MW07S *	18' (upper surficial aquifer)	None (treatability study sampling by others)
			17MW08S **	18' (lower surficial aquifer)	
			17MW09S **	18' (lower surficial aquifer)	
			17MW10S **	18' (lower surficial aquifer)	
			17MW11S	15' (upper surficial aquifer)	Full-suite organics (90% TCL and 10% Appx 9) & TAL inorganics
			17MW13S	30' (first confining unit) 15' (upper surficial aquifer)	
			17SG05	--	NA

S = Shallow (upper surficial aquifer).
I = Intermediate (between upper and lower surficial aquifer).
D = Deep (lower surficial aquifer).
MIP = Membrane Interface Probe.
TAL = Target Analyte List.
TCL = Target Compound List.
VOC = Volatile organic compound.

a. Up to 8 contingency MIP/temporary wells will be installed as necessary for SWMU 16 and 17 combined.
b. The sample number provided is the starting number for SWMU 16 and 17, continued from previous investigations.

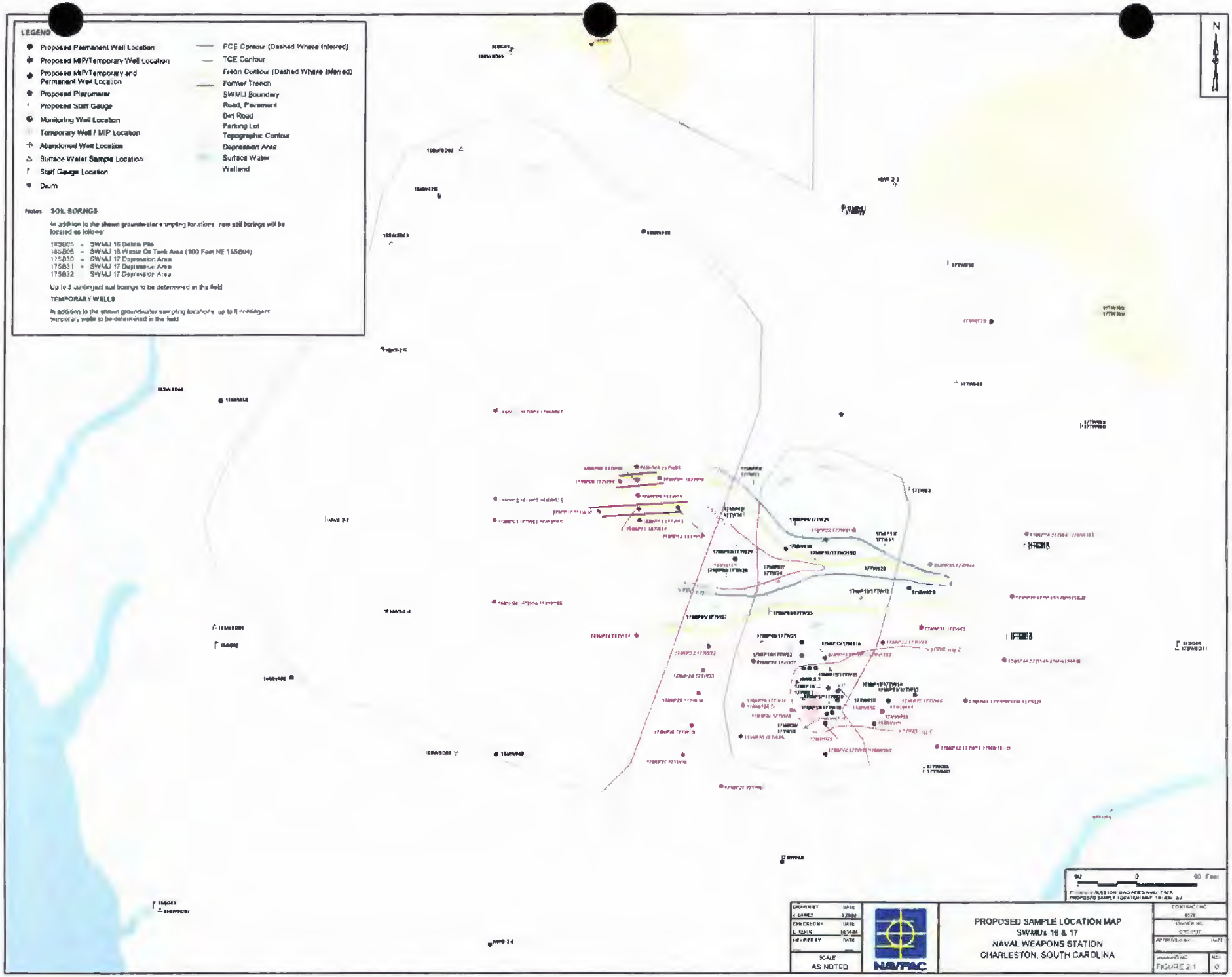
* Previously installed by TtNUS in support of emulsified oil pilot-scale treatabiltiy study by others.
** To be installed by TtNUS in the future in support of emulsified oil pilot-scale treatability study by others.

SUMMARY OF SOIL DRILLING LOCATIONS FOR PERMIT
SWMU 16 OLD SOUTHSIDE LANDFILL
SWMU 17 OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Sample Location	Anticipated Analytical Sample Depths	Rationale for Location	Analyses
SWMU 16 and 17[a] Soil			
16SB05[b]	0-1 foot bgs 1-3 foot bgs	Debris Pile: Collect additional soil data (above water table) to aid in determining remediation requirements. Confirm surface soil contamination and vertical extent.	Full-suite organics (90 % TCL and 10 % Appx 9) & TAL inorganics
16SB06	Depth of sample to be determined based on visual evidence and maximum field instrumentation reading	Waste Oil Tank Area: Collect additional soil data (above water table) within the anomaly identified during the geophysical survey to attempt location of buried waste oil tanks and determine associated contamination, if any.	
16SB07 16SB08, etc. [c]	Numbers and depths of samples will be based on MIP results and visual evidence	Soil samples will be collected based on MIP logging results, if and where there are VOC readings evident of soil contamination and/or if there is visual evidence of contamination	
17SB30[d] 17SB31 17SB32	Depth of sample to be determined based on visual evidence and maximum field instrumentation reading	Depression Area: Collect additional soil data to aid in refining area of contamination for remediation.	
17SB33 17SB34, etc. [e]	Numbers and depths of samples will be based on MIP results and visual evidence	Soil samples will be collected based on MIP logging results, if and where there are VOC readings evident of soil contamination and/or if there is visual evidence of contamination	

MIP = Membrane Interface Probe.
TCL = Target Compound List.
TAL = Target Analyte List.
VOC = Volatile organic compound.

a. Up to 10 soil borings total are anticipated for the two sites combined.
b. The sample number provided is the starting number for soil borings installed at SWMU 16, continued from previous investigations.
c. Additional soil borings at SWMU 16 are anticipated at the location of the two trenches.
d. The sample number provided is the starting number for soil borings installed at SWMU 17, continued from previous investigations.
e. Additional soil samples will be collected at SWMU 17 only as necessary.


LEGEND
Proposed Permanent Well Location
Proposed MIP/Temporary Well Location
Proposed MIP/Temporary and Permanent Well Location
Proposed Piezometer
Proposed Staff Gauge
Monitoring Well Location
Temporary Well / MIP Location
Abandoned Well Location
Surface Water Sample Location
Staff Gauge Location
Drum
PCE Contour (Dashed Where Inferred)
TCE Contour
Freon Contour (Dashed Where Inferred)
Former Trench
SWMU Boundary
Road, Pavement
Dirt Road
Parking Lot
Topographic Contour
Depression Area
Surface Water
Wetland
Notes SOIL BORINGS
In addition to the shown groundwater sampling locations new soil borings will be located as follows
175805 - SWMU 16 Debris Pile
175806 - SWMU 16 Waste Oil Tank Area (100 Feet NE 175804)
175830 - SWMU 17 Depression Area
175831 - SWMU 17 Depression Area
175832 - SWMU 17 Depression Area
Up to 5 contingent soil borings to be determined in the field
TEMPORARY WELLS
In addition to the shown groundwater sampling locations up to 8 contingent temporary wells to be determined in the field
N
90 0 90 Feet
SCALE
AS NOTED
NAVFAC
PROPOSED SAMPLE LOCATION MAP
SWMUs 16 & 17
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA
FIGURE 2-1

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

March 8, 2005

FIRST CLASS MAIL

Mr. Barry Lewis
NSC, Code 099, Building 36
2316 Red Bank Road
Goosecreek, SC 29445

RE: Naval Weapons Station Charleston (NWS)
Charleston, South Carolina
SC8 710 022 620

Monitoring Well Request (Email: Zawtocki/Liberman to Danielsen)
Dated March 4, 2005
SWMU 17

Dear Mr. Lewis:

The above referenced request has been reviewed with respect to R.61-71 of the South Carolina Well Standards and Regulations and other appropriate regulation/guidance. This request is for the installation of 8 shallow temporary monitoring wells (17PSTW-16 through 17PSTW-23) at SWMU 17 to evaluate the effectiveness of the edible oil substrate injection pilot study.

All temporary monitoring wells/soil borings will be installed in the surficial aquifer and will be installed by direct push technology (DPT) drilling methods. The temporary wells are expected to be completed to a maximum depth of 18 feet below ground surface.

All temporary monitoring wells/soil borings and must be grouted upon termination of lithologic studies and/or sampling starting from the bottom of the boring and continuously pressure grouted to the ground surface with 20% high solids sodium bentonite grout through a tremie pipe.

All sampling should follow the methods described in the November 2001 EPA EISOPQAM.

The boring and/or geologist logs for each monitoring well/soil boring should be submitted to Michael W. Danielsen, South Carolina Department of Health and Environmental Control, Bureau of Land & Waste Management, within 30 days of completion of the last bore hole.

DD050114.MWD

All well construction and sampling derived wastes, including but not limited to, drill cuttings, drilling fluids, development and purge water, must be managed properly and in accordance with all applicable state and federal requirements. If containerized, each vessel shall be clearly labeled with regard to contents, source, and date of activity.

Field equipment (including sampling probes) must be decontaminated by steam cleaning, or other approved method, before use and between sampling locations. Well screens and casing must be decontaminated before installation or must be certified clean by the manufacturer.

Attached, please find a Monitoring Well Approval Form and a copy of the proposed monitoring well locations. A copy of this monitoring well approval form should be on site during drilling operations.

The April 26, 2002 South Carolina Well Standards Regulation R.61-71 apply to the monitoring well installations for the above referenced sites.

Please be advised, additional assessment may be required at this site. Should there be any questions, please contact me at (803) 896-4194 or danielmw@dhec.sc.gov .

Respectfully,

Michael W. Danielsen, Hydrogeologist
RCRA Hydrogeology I Section
Division of Hydrogeology
Bureau of Land and Waste Management

Enclosure
MWA: HW-05-009

CC: Christine Sanford-Coker, Trident District EQC
Matthew J. Tetrault, Corrective Action Engineering
Todd Adams, Bureau of Water
Jeff Adams, Southern Division, Charleston
[redacted]etraTech Nus, Inc.
Tony Lieberman and Christie Zawtocki, P.E., Solutions-IES, 3722 Benson Drive, Raleigh, NC, 27609
NWS Bureau File #50551

DD050114.MWD

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

Temporary Monitoring Well Approval

Approval is hereby granted to: Barry Lewis
Naval Weapons Station Charleston
EPA ID #SC8 710 022 620
Berkeley County

Facility: Naval Weapons Station Charleston
SWMU 17
Berkeley County

This approval is for the installation of 8 temporary groundwater monitoring wells. The temporary monitoring wells are to be installed in the locations as illustrated on Figure 1, and per the proposed construction details provided in the March 4, 2005 correspondence. The monitoring wells are to be installed following all of the applicable requirements of R.61-71.

Please note that R.61-71 requires the following:

1. All wells shall be drilled, constructed, and abandoned by a South Carolina certified well driller per R.61-71.D.1.

2. A Water Well Record Form or other form provided or approved by the Department shall be completed and submitted to Michael W. Danielsen, South Carolina Department of Health and Environmental Control, Bureau of Land & Waste Management, within 30 days after well completion or abandonment unless another schedule has been approved by the Department. The form should contain the "as-built" construction details and all other information required by R.61-71.H.1.f

3. All analytical data and water levels obtained from each monitoring well shall be submitted to Michael W. Danielsen, South Carolina Department of Health and Environmental Control, Bureau of Land & Waste Management, within 30 days of receipt of laboratory results unless another schedule has been approved by the Department as required by R.61-71.H.1.d.

4. All temporary monitoring wells shall be abandoned within 5 days of borehole completion using appropriate methods as required by R.61-71.H.4.c.

DD050114.MWD

5. If any of the information provided to the Department changes, Michael W. Danielsen shall be notified a minimum of twenty-four hours prior to well construction as required by R.61-71.H.1.a.

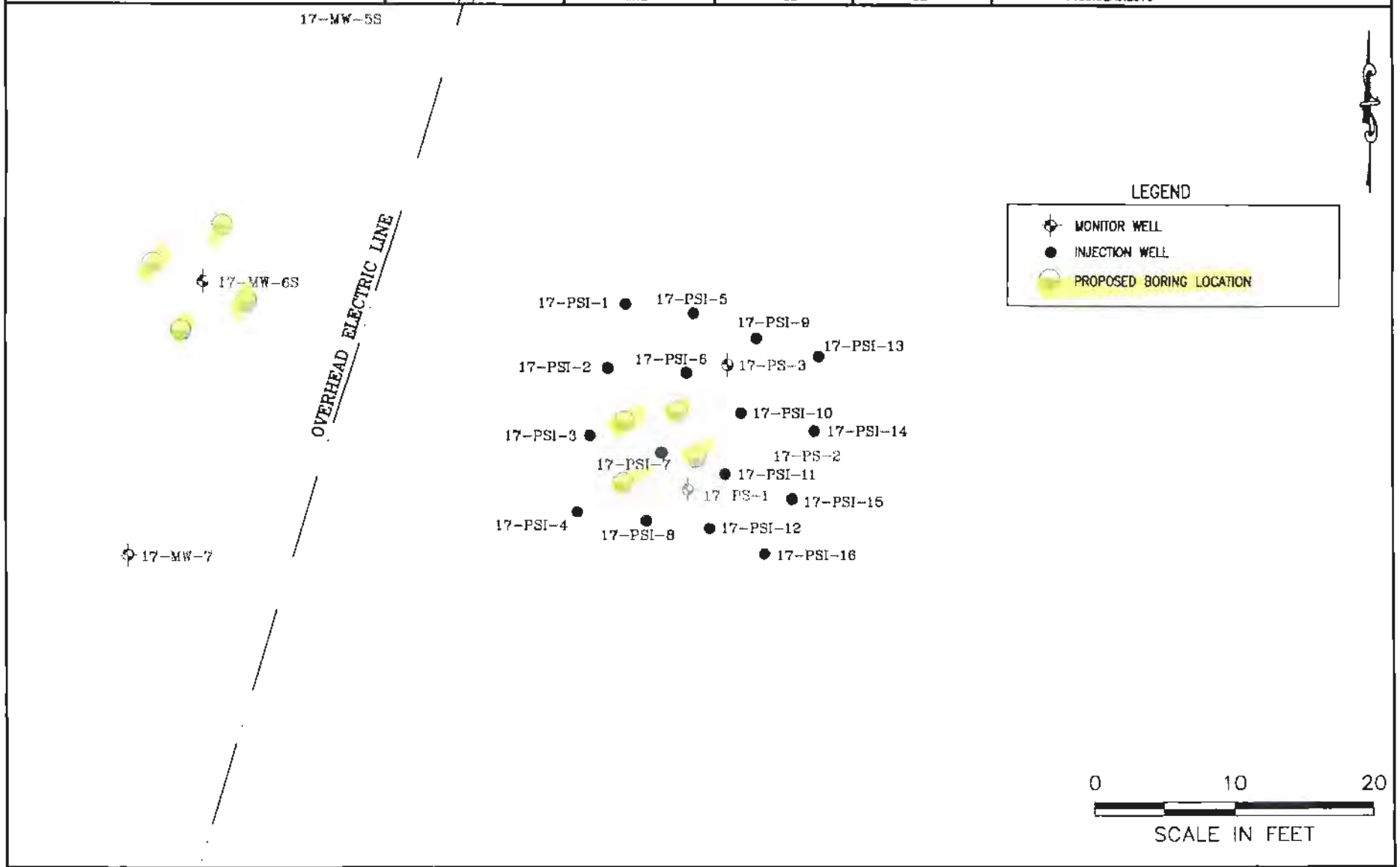
This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and R.61-71 of the South Carolina Well Standards and Regulations, dated April 26, 2002.

Date of Issuance: 3-8-2005 **Approval #: HW-05-009**

Michael W. Danielsen, Hydrogeologist
RCRA Hydrogeology I Section
Division of Hydrogeology
Bureau of Land & Waste Management

DD050114.MWD

FILE	DATE	PROJECT MANAGER	CHECKED BY	DRAFTER	PROJECT NUMBER
MICROCOSM_GEOPROBES.DWG	3/3/05	MTL	CZ	CZ	1130.02A3.ESTC



Solutions
Industrial & Environmental Services
3722 BENSON DRIVE
RALEIGH, NORTH CAROLINA 27609
TEL.: (919) 873-1060 FAX.: (919) 873-1074

PROPOSED GEOPROBE BORING LOCATIONS
EDIBLE OIL PILOT TEST
SWMU 17
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA

FIGURE: 1

APPENDIX A-2
BORING LOGS AND MIP LOGS

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK 51 TRACK RIG

BORING No.: 16SB01 / 16MW025
DATE: 6/11/01
GEOLOGIST: ~~WUDKWYCH~~ S. NEIL
DRILLER: GERALD EISTER - 1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
S-1 0920	1	~~INSIGHT OF~~	6"			BLACK	MUCK w/ ORGANIC MAT.	Pt	WET	0	0	0	0
	2	~~INSIGHT~~	24"										
S-2 0932	3		11"				PEAT	Pt		0	0	0	0
	4		24"										
S-3 0935	5							Pt		0	0	0	0
	6		24"			GRAY	CLAYEY SILT / SILTY CLAY w/ ORGANIC MATERIAL	OH	WET				
S-4 0940	7									0	0	0	0
	8		24"										
S-5 0949	9									0	0	0	0
	10		24"										
S-6 0952	11									0	0	0	0
	12		24"										
S-7 0955	13		12"						WET	0	0	0	0
							TD = 13 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: 4¼" HSA

Drilling Area Background (ppm): 0

Converted to Well: Yes X No ____ Well I.D. #: 16MW025

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BF 51 TRACK RIG

BORING No.: 16SB02
DATE: 6/11/01
GEOLOGIST: ~~WUDKWYCH~~ J. NEIL
DRILLER: EISE[redacted] 41273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
	1	2/2	18"			BRN OR	SILTY SANDY CLAY	CL		0	0	0	0
S-1 1441	2	3/4	24"				TR METAL FRAGS/CONCRETE						
	3	8/11	13"			GRY	SILTY SAND W/ WOOD	ML		0	0	0	0
S-2 1444	4	16/8	24"			↓	FRAGS						
	5	7/7	0				NO RECOVERY -		WET	0	0	0	0
S-3 1501	6	4/3	24"				WOOD IN SHOE						
	7	2/1	0				↓			0	0	0	0
S-4 1507	8	2/1	24"										
		2/1	11"			GRY	CLAY; MUCK ON TOP	CL	DRIVE SPOON				
S-5 1514		2/1	24"						TO 10'.				
							TD = 8 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: NO SAMPLE COLLECTED FOR ANALYSIS AT THE 3-5 FOOT INTERVAL

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK 51 TRACK RIG

BORING No.: 165B03
DATE: 6/11/01
GEOLOGIST: ~~WUDKWYCH~~ S. NEIL
DRILLER: GERALD FISHER - 1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
S-1 1402	1	2/2	7"			BRN/OR	SILTY SANDY CLAY	CL		0	0	0	0
	2	2/3	24"			↓	↓ TR FILL @ 2.5'		Asphalt Frags.				
S-2 1405	3	2/8	15"			GRAY	SILTY SANDY CLAY OR	CL		0	0	0	0
	4	5/3	24"			↓	MOT						
S-3 1422	5	2/2	8"			BRN	CLAYEY/SILTY SAND	SC		0	0	0	0
	6	1/1	24"			BLK	↓ TR FILL		METAL PIECES				
S-4 1424	7	1/1	12"			↓	CLAYEY PEAT TO	OH		0	0	0	0
	8	1/1	24"			↓	GRAY CLAY		NATURAL MATERIAL				
RUN	9						TD = 8 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No x Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK 51 TRUCK RIG

BORING No.: 16SB04
DATE: 6/11/01
GEOLOGIST: ~~WUDKWYCH~~ NEIL
DRILLER: EASTER #1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
S-1 1620	1	~~HAND~~	14"			BRN GRY	MULCH ON SURFACE			0	0	0	0
	2	3/6	24"			↓	CLAYEY SAND	ML					
S-2 1622	3	2/4	17"			↓	↓	↓		0	0	0	0
	4	6/7	24"			↓	↓						
S-3 1630	5	2/4	13"			↓	↓			0	0	0	0
	6	4/6	24"			GRY							
S-4 1633	7	3/3	16"			↓	↓	↓		0	0	0	0
	8	2/2	24"			↓	MULCH / CLAYEY SILT	ML					
							TD = 8 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No Y Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK 51 TRUCK RIG

BORING No.: 16MW015
DATE: 6/10/01
GEOLOGIST: ~~WUDKWYCH~~ S. NEIL
DRILLER: GERALD BISTER #1273

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
	1	3/6	9"			BRN	TOP ≈ 5" SANDY SILT	ML		0	0	0	0
S-1 1112	2	8/8	24"			GRAY	SILTY SANDY CLAY OR MOT						
	3	9/10	19"			↓	↓			0	0	0	0
S-2 1115	4	12/12	24"			↓	↓	CL					
	5	2/3	20"			↓	↓		MOIST	0	0	0	0
S-3 1124	6	5/10	24"			↓	↓	CL					
	7	9/11	24"			↓	↓			0	0	0	0
S-4 1128	8	11/10	24"			TAN	SILTY SAND OR MOT	SM					
	9	2/2	13"	28.5'		↓	↓		WET	0	0	0	0
S-5 1138	10	2/3	24"			↓	CLAYEY SAND @ 9.6"	SC					
	11	2/1	17"			↓	↓			0	0	0	0
S-6 1143	12	1/3	24"			↓	↓	SC					
	13	1/1	18"			↓	UPPER 7" CLAYEY SAND BOTTOM PORTION			0	0	0	0
S-7 1147	14	1/1	24"			↓	SILTY SAND OR MOT	SM					
	15	1/12	21"			OR	SILTY SAND			0	0	0	0
S-8 1151	16	1/12	24"			↓	↓	SM					
							TD = 16 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: 4¼" HSA

Drilling Area Background (ppm): 0

Converted to Well: Yes X No ____ Well I.D. #: 16MW01

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
* DRILLING RIG: BK 51 TRACK RIG

BORING No.: 16MW035
DATE: 6/12/01
GEOLOGIST: ~~WUDKWYCH~~ NGL
DRILLER: EISTAL # 1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
S-1 1321	1					BK	MUCK / SILTY CLAYEY	OH/Pt	WET	0	0	0	0
	2					BRN	PEAT						
S-2 1323	3												
	4												
S-3 1326	5												
	6												
S-4 1328	7					DRK GRAY	SILTY CLAY w/						
	8						PEAT						
S-5 1330	9												
	10												
S-6 1333	11												
	12												
S-7 1337	13					GRAY	SILTY CLAY	OH		0	0	0	0
							TD = 13 FEET						

* When rock coring, enter rock broken ess.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

* Remarks: BOREHOLE WAS "DRILLED" BY PUSHING 6" PVC CASING TO DEPTH, THEN PUMPING SOIL OUT OF INSIDE OF CASING - MATERIAL CLASSIFICATION WAS ANALYZED FROM MATERIAL PUMPED FROM INSIDE OF CASING. DEPTHS OF MATERIAL ARE APPROXIMATE. CASING WAS REMOVED AFTER SETTING WELL.

Converted to Well: Yes X No ____ Well I.D. #: 16MW035

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
*DRILLING RIG: BK 51 TRUCK RIG

BORING No.: 16MW04S
DATE: 6/12/01
GEOLOGIST: ~~WUDKWYCH~~ NEIL
DRILLER: EISTON HIJZ3

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
S-1 1110	1					BLK	MUCK	OH/PT	WET	0	0	0	0
	2					BLK/BRN	MUCK SILTY CLAYEY						
S-2 1114	3						PEAT						
	4												
S-3 1116	5												
	6												
S-4 1120	7					DRK GRAY	SILTY CLAY W/						
	8						PEAT						
S-5 1125	9												
	10												
S-6 1128	11												
	12												
S-7 1131	13					GRAY	SILTY CLAY/CLAYEY SILT	OH		0	0	0	0
							TD = 13 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

*Remarks: BOREHOLE WAS "DRILLED" BY PUSHING 6" PVC CASING TO DEPTH, THEN PUMPING SOIL OUT OF INSIDE OF PVC CASING - MATERIAL CLASSIFICATION WAS TAKEN FROM MATERIAL PUMPED FROM CASING. DEPTH OF MATERIAL IS APPROXIMATE. CASING REMOVED AFTER SETTING WELL.

Converted to Well: Yes x No _____ Well I.D. #: 16MW04S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK 51 TRACK RIG

BORING No.: 16MW055
DATE: 6/11/01
GEOLOGIST: ~~WUDKWYCH~~ S. NEIL
DRILLER: GERALD EISTER - 1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole*	Driller BZ**
	0												
	1		0				NO RECOVERY		WET	0	0	0	0
S-1 1256	2		24"										
	3		17"			BK/BRN	MUCK W/ ORGANIC MAT	OL	WET	0	0	0	0
S-2 1258	4		24"			↓	↓						
	5		24"							0	0	0	0
S-3 1300	6		24"			↓	CLAYEY PEAT	OH/Pt	WET				
	7		24"			↓	↓	↓		0	0	0	0
S-4 1301	8		24"			↓	↓		WET				
	9		24"			↓	↓			0	0	0	0
S-5 1303	10		24"			↓	↓		WET				
	11		20"			↓	↓	↓		0	0	0	0
S-6 1307	12		24"			↓	↓	↓	WET				
	13					GRAY	CLAY (BOTTOM 4")	OH		0	0	0	0
							TD = 13 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: 4 1/4" HSA

Drilling Area Background (ppm): 0

Converted to Well: Yes X No _____ Well I.D. #: 16MW05

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: N0578
DRILLING COMPANY: CAROLINA
DRILLING RIG: BK51 TRACK RIG

BORING No.: 17MW015
DATE: 6/10/01
GEOLOGIST: S. NEIL
DRILLER: GERALD EISTER #1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
	1	4/11	17"			BRN/OR	SANDY SILT	ML		0	0	0	0
S-1 0840	2	21/24	24"			↓	↓						
	3	13/15	14"			↓	↓ SOME CLAY			0	0	0	0
S-2 0843	4	15/16	24"			↓	BOTTOM 2 4". SILTY SANDY CLAY						
	5	13/13	15"			ORN	SILTY SANDY CLAY	CL		0	0	0	0
S-3 0856	6	12/14	24"			↓	OR MOT						
	7	7/8	15"			↓	↓		MOIST	0	0	0	0
S-4 0859	8	12/18	24"	▼ ≈8.0'		TAN	SILTY SAND (BOTTOM 3")	SM	WET				
	9	3/6	11"			BRN/GRAY	SILTY SAND w/			0	0	0	0
S-5 0915	10	4/4	24"			↓	OR MOT	SM					
	11	3/4	12"			↓	↓			0	0	0	0
S-6 0919	12	4/3	24"			↓	↓	SM					
	13	2/3	3"			↓	↓			0	0	0	0
S-7 0925	14	3/2	24"			↓	↓	SM					
	15	2/1	9"			↓	↓			0	0	0	0
S-8 0929	16	1/12	24"			↓	↓ BOTTOM 3" GRAY	SM					
							TD = 16 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: 4¼" HSA

Drilling Area Background (ppm): 0

Converted to Well: Yes X No ____ Well I.D. #: 17MW01

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO-137 / 0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK-51 ATV

BORING No.: 17MW01S-B
DATE: 6-18-01
GEOLOGIST: WUDKWYCH
DRILLER: EISTER #1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	2												
	4						0-16' SEE BORING						
	6						LOG FOR 17MW01						
	8						FOR LITHOLOGY						
	10												
	12												
	14												
	16						—						
		WOR 24				Dark	Fine gr sandy SILT	SM					
S-1	18		1.5/2			grey	T-clay		Shell MATERIAL	0	0	0	0
				-19.0-		grey	SILTY clay						
S-2	20		1/2			green	T-F sand	CL	—	0	0	0	0
S-3	22		1.5/2						Shell Fragments	0	0	0	0
S-4	24		1.5/2				SILTY clay		shell fragments	0	0	0	0
S-5	26		1/2			grey				0	0	0	0
		1/2											
S-6	28	2/2	1/2							0	0	0	0
S-7	30		1/2							0	0	0	0
		WOH 24											
S-8	32	1/2	1/2						Shell Fragment	0	0	0	0

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: 2 1/4" HSA

Drilling Area Background (ppm): 0

Converted to Well: Yes - No X Well I.D. #:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO-137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK-51 ATV

BORING No.: 177WO15-B
DATE: 6-18-01
GEOLOGIST: WUDKWYCH
DRILLER: EISTER #673

Sample No. and Type or RQD *	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Drill**
S-9	34					grey	SILTY clay T-F sand	CL	shell Frags.	0	0	0	0
		1/1		35		grey green	W/F-sand	SM					
S-10	36	2/2				grey/green	Fat clay	CH	dry				
							T-SILT		Shell Frags.	0	0	0	0
S-11	38			38									
		1/1				green							
S-12	40	2/3				OLIVE TINT							
		3/3											
S-13	42	3/4								0	0	0	0
				TD 42'									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: 2¼" HSA

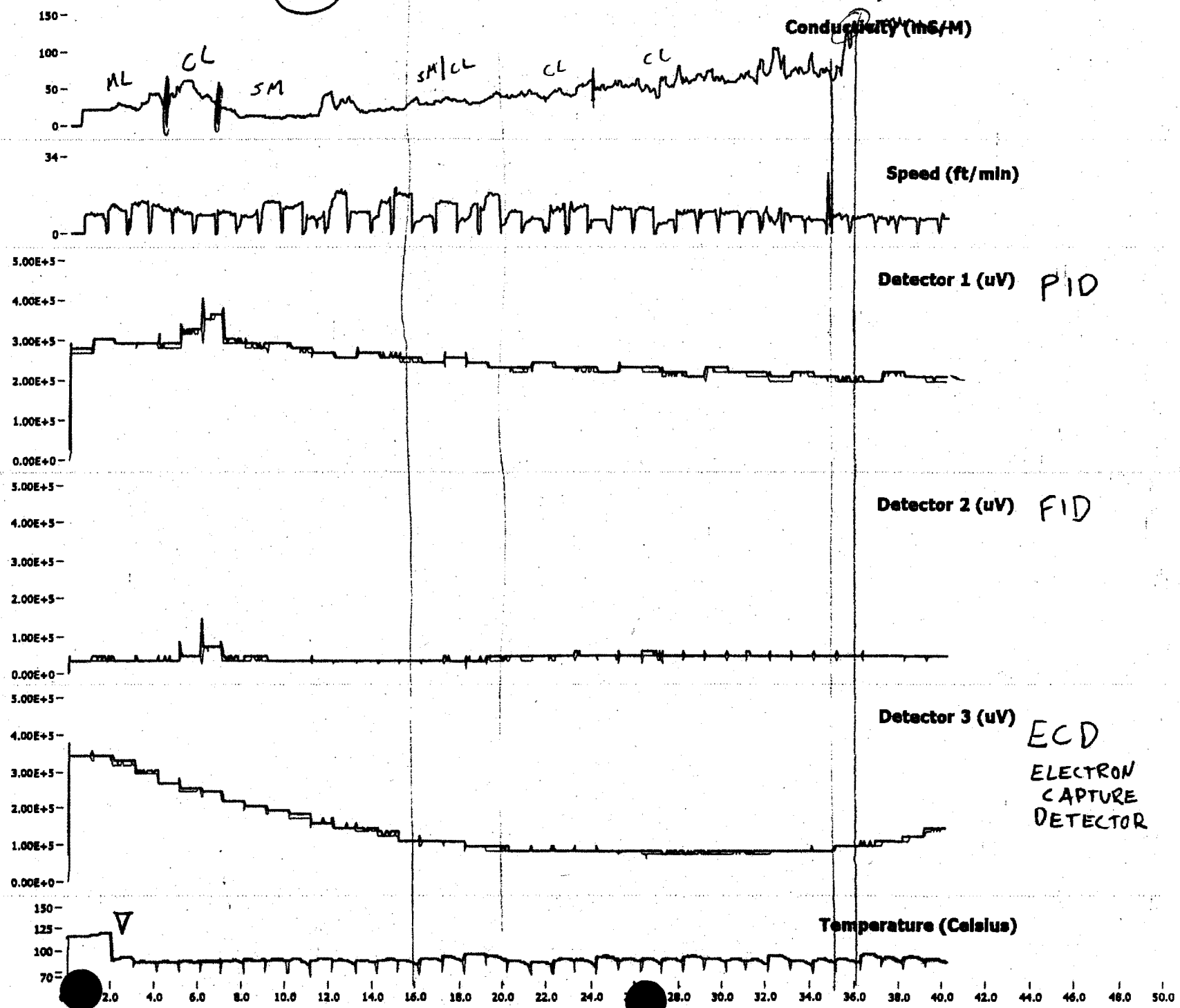
Drilling Area Background (ppm):

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Log: C:\dirim95\LOGFILES\MIP-22A.dat

BACKGROUND

35.5 ~ COOPER



17MIP22
17MW01

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BX51 TRACK RIG

BORING No.: 17MW025
DATE: 6/7/01
GEOLOGIST: ~~WUDKWYCH~~ S. NEIL
DRILLER: EISTER #1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
	1	3/4	10"			BRN	Sandy silt	MH					
S-1 1454	2	3/3	24"			↓	↓			0	0	0	0
	3	4/4	13"			BRN	TOP 3" SANDY SILT						
S-2 1500	4	3/4	24"			GRAY	SILTY SANDY CLAY OR MOT	CL		0	0	0	0
	5	7/10	19"			↓	SAME AS ABOVE						
S-3 1506	6	12/13	24"			↓	↓	CL		0	0	0	0
	7	6/5	9"			↓	SAME AS ABOVE						
S-4 1518	8	4/5	24"	SAT		↓	SANDIER AT BOTTOM 2"		MOIST-WET	0	0	0	0
	9	3/2	17"	8'±		↓	SILTY FINE SAND	SM	WET				
S-5 1526	10	2/2	24"	9'±		↓	OR MOT			0	0	0	0
	11	3/2	12"			BRN/GRAY	↓						
S-6 1530	12	3/3	24"			↓	↓			0	0	0	0
	13	2/1	22"			↓	↓						
S-7 1535	14	1/2	24"			↓	↓			0	0	0	0
	15	1/1	17"			↓	↓						
S-8 1541	16	1/1	24"			GRAY	SILTY FINE SAND (BOTTOM 8")	↓		0	0	0	0
							TD = 16 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: 4¼" HSA

Drilling Area Background (ppm): 0

Converted to Well: Yes X No _____ Well I.D. #: 17MW02

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK-51 TRACK RIG

BORING No.: 17MW035
DATE: 6/7/01
GEOLOGIST: ~~WUDKWYCH~~ S. NGIL
DRILLER: EISTER #1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
	1	4/10	4"			BRN	SANDY SILT	ML					
S-1 1055	2	11/10	24"			↓	↓			0	0	0	0
	3	10/11	0			—	NO RECOVERY IN						
S-2 1103	4	9/10	24"			—	SPLIT SPOON			0	0	0	0
	5	10/12	5			GRAY	SILTY SANDY CLAY	CL		0	0	0	0
S-3 1109	6	13/10	24"			↓	↓						
	7	3/3	16"			GRAY/BRN	SILTY FINE SAND OR	SM/SC	MOIST				
S-4 1133	8	3/3	24"	▼ 8.5		↓	MOT		WET	0	0	0	0
	9	2/1	16"			↓	↓	SM/ML					
S-5 1137	10	2/1	24"			↓	↓			0	0	0	0
	11	1/1	12"			↓	SILTY CLAYEY FINE	SC/ML					
S-6 1144	12	1/1	24"			↓	SAND OR MOT			0	0	0	0
	13	~~HAMMER~~	18"			↓	SILTY Fine Sand	SM					
S-7 1152	14	1/1	24"			↓	OR MOT			0	0	0	0
	15	2/1	21"			↓	↓	SM					
S-8 1158	16	1	24"			GRAY	BOTTOM 8" GRAY SILTY SAND		TD = 16 FEET	0	0	0	0

* When rock coring, enter rock broken.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: 4¼" HSA

Converted to Well: Yes X No _____ Well I.D. #: 17MW03

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BL 51 TRUCK 216

BORING No.: 17MW04S
DATE: 6/7/01
GEOLOGIST: ~~WUDKWYCH~~ S. NEIL
DRILLER: GERALD EISTER # 1872

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler B2	Borehole**	Driller B2**
	0												
	1	4/10	13"			BRN TAN	UPPER 6" SANDY SILT MIDDLE 7" SILT SOME SAND	ML		*	*	*	*
S-1 1645	2	11/9	24"			GRAY	BOTTOM 3" SILTY SANDY CLAY OR MOT						
	3	6/9	7"			↓	↓			*	*	*	*
S-2 1648	4	11/12	24"			↓	↓	ML					
	5	14/12	13"			↓	UPPER 3" SAME AS ABOVE			*	*	*	*
S-3 1650	6	13/13	24"			GRAY GREEN	BOTTOM 10" SILTY SANDY CLAY (GRAY/GREEN)	CL					
	7	2/2	0			–	NO RECOVERY			*	*	*	*
S-4 1703	8	3/3	24"			–	↓		MOIST - WET BASED ON DRILL CUTTINGS				
	9	2/1	0	▼		GRAY	SILTY SANDY CLAY	CL		*	*	*	*
S-5 1706	10	3/2	24"	≈9'		↓	OR MOT - BASED ON DRILLING.						
	11	2/1	14"			↓	TOP 7" SILTY SANDY CLAY OR MOT	CL		*	*	*	*
S-6 1710	12	1/2	24"			BRN	BOTTOM 7" SILTY FINE SAND OR MOT	SM					
	13	1/HAMMER	24"			↓	↓			*	*	*	*
S-7 1714	14	HAMMER/1	24"			GRAY	SILTY FINE SAND	SM					
	15	HAMMER	24"			↓	↓			*	*	*	*
S-8 1717	16	1/1	24"			BRN	CLAYEY SILT (4")	ML	COOPER MARL @				
	17	4/5					↓		≈16 FEET	*	*	*	*
S-9 1720	18		24"				↓						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): *

Remarks: * PID NOT FUNCTIONING DUE TO WEATHER - RAIN
4 1/4" HSA

Converted to Well: Yes X No ____ Well I.D. #: 17MW04

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137 / 0528
DRILLING COMPANY: GREGG
DRILLING RIG: RHINO ATV

BORING No.: 17MW055
DATE: 3-23-04
GEOLOGIST: WUDKWYCH
DRILLER: P. McKAY # 1607

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
						BROWN	FINE GRAIN SAND + SILT	SM					
	2			1.5					DRY				
						ORANGE	SILTY CLAY MOTTLED	CL					
S-1	4		4/4			GREY			DRY	0	0	0	0
	6												
									DAMP				
S-2	8		3/4	7		GREY	FINESAND + SILT	ML	MOIST	17	0	0	0
				V					WET				
	10												
							NO RECOVERY						
S-3	12												
						BROWN	SAND + SILT	SM	WET	20	0	0	0
	14									28	0	0	0
										-			
S-4	16		3/4			BROWN GREY				58	0	0	0
	18												
S-5	20		0.6/4			DARK GREY	SILT W/CLAY	ML/CL		0	0	0	0
				TD 20'			AUGER TO 19' SCREEN 8-18'						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read

Drilling Area Background (ppm): 0

Remarks: 4' MACRO CORE 4¼" HSA
Screen interval as per direction of Solutions Inc. to intercept max. concentration

Converted to Well: Yes X No ____ Well I.D. #: 17MW055

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137 / 0528
DRILLING COMPANY: GREGG
DRILLING RIG: RHINO ATV

BORING No.: 17MW06S
DATE: 3-22-04
GEOLOGIST: WUDKWYCH
DRILLER: McKAY #1607

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						BROWN	FINESAND + SILT	SM	DRY				
	2			1.5			↓	↓					
						ORG	SILTY CLAY	CL					
S-1	4		4/4			GREY	MOTTLED			0	0	0	0
									DRY				
	6												
S-2	8		3/4				SILT & SAND + CLAY	ML	DAMP	0	0	0	0
				▽		BROWN	SILT & SAND	SM	WET				
	10									21			
										28			
S-3	12		3/4							29			
	14						NO RECOVERY						
S-4	16		0/4										
	18						NO RECOVERY						
							GREY SILT ON TIP						
S-5	20		0/4										
				TD 20'			AUGER TO 19'						
							SCREEN 8-18						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: 4' MACRO CORE 4 1/4" HSA
Screen interval as per direction of Solutions Inc to intercept max. concentration

Converted to Well: Yes x No _____ Well I.D. #: 17MW06S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: MOBIL WIELD TRAC MT.

BORING No.: 17MW06D
DATE: 2-9-05
GEOLOGIST: FRED W. RAMSER
DRILLER: FRANK COOPER SC LIC # A00965

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							DK BRN SILTY SAND	SC	TOP SOIL				
					MED STIFF		MOD BRN CLAY	CH	LOG DRILL				
							+ SILT		CUTTINGS			11	25
0840	5											12	25
							YEL BRN CLAYEY	SC/SP				9	5
							SAND						
												10	6
0843	10												
					LOOSE		LT GREENISH GREY	SP	CUTTINGS				2.5
							f-g SAND		BECOME			2.5	
									SATURATED				
									@ ~13'			2.5	2.5
	15												
	16						BECOMING					9	
	17						CLAYEY DOWNWARD	SP/SC					30
	18											10	
S-1 0750	19				LOOSE	DK	GREENISH GREY	SC				25	25
	20						CLAYEY SAND (f-g)			10	25		2.5
	21						(FEWER FINES			12		25	
	22		3/4				DOWNWARD)			20	25		25
S-2 0810	23					DK	GREENISH GREY	SC	MORE SILT	16			2
	24						CLAYEY SAND		+ CLAY THAN	4			2
	25						W/SILT SHELL FRAGS @24'		ABOVE.	2			2

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 2.5

Remarks: USING 2" & 4' MACRO CORE SAMPLERS W/ PLASTIC LINERS (PLUNGER TYPE) SCREEN 18-23

Converted to Well: Yes ✓ No _____ Well I.D. #: 17MW06D

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: TRUCK MT DPT

BORING No.: 17MW06D
DATE: 2-9-05
GEOLOGIST: FRED W RAMSER
DRILLER: FRANK COOPER SC LIC #A00965

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
S-2 cont'd	26		3/4				CLAYEY SAND	SC	ABUNDANT SHELL	2			
	27								FRAGS ≤ 3/4 IN				
	28												
	29												
	30												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ✓ No _____ Well I.D. #: 17MW06D

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137 / 0528
DRILLING COMPANY: GREGG
DRILLING RIG: RHINO ATV

BORING No.: 17MW07S
DATE: 3-22-04
GEOLOGIST: WUDKWYCH
DRILLER: P. McKAY # 1607

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						BROWN	FINE SAND+SILT	SM					
	2			1.5		ORANGE	SILTY CLAY	CL	DRY				
						GREY	MOTTLED						
S-1	4		4/4						DAMP	0	0	0	0
	6												
S-2	8		4/4	7.5	▽		SAND+CLAY	SC	WET	0	0	0	0
				8		BROWN	FINESAND S-SILT	SM					
	10					GREY			WET	160			
										170			
S-3	12		3/4							0	0	0	0
							POOR RECOVERY						
	14						ORANGE FINE SAND + SILT.						
										0	0	0	0
S-4	16		0/4	16									
					V. SOFT	DARK GREY	S SAND+SILT S-CLAY	ML					
	18			18					WET				
							SILTY SANDY CLAY, S-SHELLS	CL					
S-5	20		4/4						MORE O BASE	0	0	0	0
				TD 20'									
							AUGER TO 19'						
							SCREEN 8'-18'						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: 4' MACRO CORE 4¼" HSA
Screen interval as per direction of Solutions Inc to intercept max. concentration

Converted to Well: Yes X No _____ Well I.D. #: 17MW07S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: TRUCK MOBIEWELD

BORING No.: 17MW 11S
DATE: 1-27-05
GEOLOGIST: FRED W. RAMSER
DRILLER: FRANK COOPER SC. LIC# A00965

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
						DK	BROWN SAND		(TOP SOIL)				
	2					DK	YEL BRN SAND + SILT					0	0
	4					DK	YEL ORG SANDY SILT					0	0
	6												
							YEL BRN SAND	SM				0	0
	8						w/SOME SILT						
							f-g SAND						
	10											0	0
S-1 1415					LOOSE		NO RECOVERY	SP/	SILT CONTENT				
	12						YEL BRN SAND	SM	DECREASING				
							IN SHOE		DOWNWARD				
	14		90/4				YEL BRN SAND	SP					
S-2 1425							TR SILT					0	0
	16				SOFT		DK YEL ORG	SP					
							SAND f-g						
	18		1/4						(DK GREY GREEN RESIDUE IN SHOE)				
S-3 1440							NO RECOVERY					0	0
	20						- DK GREYISH		INSTALL WELL				
							GREEN IN SHOE	SM/SP	10-20 SCREEN				
			0/4						8-20 SAND				
									6-8 BENTONITE				

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: USING 4' MACRO CORE SAMPLERS (PLUNGER TYPE)

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No _____ Well I.D. #: 17MW11S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: TRUCK MT. MOBILEWELD

BORING No.: 17MW12D
DATE: 1-28-05
GEOLOGIST: FRED W. RAMSER
DRILLER: FRANK COOPER

SC.LIC#A00965

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							DK BRN CLAY LOAM		TOP SOIL				
					MED		ORG BRN CLAY	OH				0	
					STIFF								
							YEL BRN						
	5												
					LOOSE		GREENISH GREY	SP	WET			0	
							SAND TR SILT		SATURATED				
	10												
												0	
	15												
					LOOSE		DK GREYISH GREEN SAND	SP/SM					
							W/SOME SILT						
												0	
	20												
							INCREASE SAND	SP					
							CONTENT DOWNWARD					0	
	25												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm):

Remarks: LOG CUTTINGS DOWN TO 25'
COLLECTED 4' SAMPLE 25'-29' PLUNGER TYPE
WELL 17MW12S WAS INSTALLED ~15' NEXT TO 17MW12D

Converted to Well: Yes ✓ No _____ Well I.D. #: 17MW12D/S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: TRUCK MT. MOBILE WELD

BORING No.: 17MW12D
DATE: 1-28-05
GEOLOGIST: FRED W. RAMSER
DRILLER: FRANK COOPER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
S-1	26				LOOSE		DK GREYISH GREEN SAND f-g	SP		0			0
	28							↓					
			3.5/4			DK GREYISH GREEN	SILT + CLAY	OH	PLASTIC (CU)	0			0
	30								THIS IS NOT THE "COOPER" FM.				
							SCREEN 18-28						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: 17MW12S - SCREEN 5-15
17MW12D - SCREEN 18-28

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No _____ Well I.D. #: 17MW12D/S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: MOBILE WILD TRAC-MT

BORING No.: 17MW13
DATE: 2-8-05
GEOLOGIST: FRED KRAMER
DRILLER: FRANK COOPER SC LIC#A00865

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						DK BRN	SILTY SAND		TOP SOIL		0	0	0
									"FILL" NEXT				
					LOOSE	BRN	SAND + CLAY	SC	TO ROAD.				
					TO								
	5				MED STIFF						0	0	0
							CHANGES						
							TO YEL BRN	SC/SP					
							SAND						
					LOOSE		GREENISH GREY	SP					
	10						SAND				0	0	0
	15			TD							0	0	0
				14'									
							WELL						
							SCREEN:						
							4'-14'						
							SAND						
							3'-14'						
							BENTONITE						
							2'-3'						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: LOG CUTTINGS, NO SAMPLES TAKEN

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No _____ Well I.D. #: 17MW13

10-20 40-40

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: TRACK MT. (D11)

BORING No.: 17MW14
DATE: 1-25-05
GEOLOGIST: FRED W. RAMSER
DRILLER: FRANK COOPER

SC LIC#A00965

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						DK BRN	CLAYEY LOAM		TOP SOIL				
	2					YEL	SANDY CLAY	CL/CH					
						BRN	MOTTLED GREY		H_2O @ ~3'				
	4												
					DENSE		GREENISH GREY	SC	DAMP	0.1			0
S-1 1410	6						CLAYEY SAND TR		M-g SAND				
							SILT - f-g SAND -		STRINGERS WET. -5'			0	
	8								-8'				
	9		0.5/4										
S-2 1425	10				MED	GREENISH GREY	m-g	SP	SATURATED	0.0			0
	11				DENSE		SAND TR SILT + CLAY		-COARSING DOWNWARD				
	12						- CLAYEY LAYER @ ~11.5'						
	13		2.5/4									0	
S-3 1440	14												
				?			NO RECOVERY						
	16							?					
			0.0/4										
S-4 1515	18				LOOSE SOFT	DK	GREYISH GREEN	SM				0	
							CLAYEY + SILTEY f-g SAND		ABUNDANT				
	20						BECOMING SANDIER		SHELL FRAG. 17-19'				
			3.0/4				DOWNWARD		SATURATED ABUNDANT				
S-5 1536	22					DK	GREYISH GREEN		SHELL @ 21'	0			0
							f-g SAND W/SOME		TR. SHELL	0		0	
	24						SILT + CLAY 75% 15%		FRAG.	0			0
			3.0/4							0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: USE PLUNGER TYPE SOLID CORE SAMPLER W/ PLASTIC LINER (4-FOOT INTERVALS

Converted to Well: Yes ✓ No _____ Well I.D. #: 17MW140 + 145

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG:

BORING No.: 17MW14
DATE: 1-25-05
GEOLOGIST: FRED W RAMSEL
DRILLER: FRANK COOPER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
S-6 1555	26				LOOSE	LT	GREENISH GREY	SP	SATURATED	0.0			0
							SAND Mod						
	28											0	
	29		3.5/4										
S-7 1605	30						AS ABOVE			0			0
	31												
	32				MED DENSE								
	33		4/4									0	
S-8 1630	34						AS ABOVE	SP					
	35												
	36												
	37		4/4										
S-9 1640	38						NO SAMPLE						
							TAKEN						
	40												
	41		/4						SCREEN				
									15-25				

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: 17MW14S INSTALLED 4-14
17MW14D INSTALLED 15-25

Converted to Well: Yes ✓ No _____ Well I.D. #: 17MW14D + 14S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: MOBILE WELD 74' TRACK MT

BORING No.: 17MW15
DATE: 1-30-05
GEOLOGIST: FRED W RAMSER
DRILLER: FRANK COOPER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
						DK BRN	CLAYEY LOAM		TOP SOIL				
						YEL	SANDY CLAY	CL/OH					
						BRN	MOTTLED GREY						
												0	0
	5				DENSE		LT GREENISH GREY	SC					
							CLAYEY SAND TR						
							SILT		WET			0	0
	10				MED DENSE		GREENISH GREY	SP	WET			0	0
							SAND TR SILT+CLAY						
												0	0
	15											0	0
												0	0
					LOOSE		DK GREENISH GREY	SM	SHELL FRAGS			0	0
	20						CLAYEY+SILTY F-g SAND						
S-1 1130					VERY SOFT		DK GREENISH	SM	ABUNDANT SHELL FRAGS	0		0	
							GREY F-g SAND		AMOUNT DEC DOWNWARD	0			
					VERY		SOME SILT + CLAY SAND CONTENT		≤ 3/4"	0		0	
			4/4		LOOSE		INC. DOWNWARD	SP/SM		0		0	
S-2 1205	25												

* When rock coring; enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: USE 4' MACRO-CORE PLUNGER TYPE, PLASTIC LINER SAMPLE.

17MW15S = 10-20' 17MW15D = 29-39

Converted to Well: Yes ✓ No _____ Well I.D. #: 17MW15 S/D

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: MOBILE WIELD 74' TRACMT
BORING No.: 17MW15
DATE: 1-30-05
GEOLOGIST: FRED W RAMSER
DRILLER: FRANK COOPER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
S-2 1205	26				LOOSE		AS ABOVE	SP		0			0
							TR SILT		SOME SHELL	0		0	
	28						+CLAY		FRAG. ≤ 0.15in	0			0
			4/4				f-g SAND	SP		0			
S-3 1400	30				LOOSE		SAND (f-g TO m-g)	SP	LT GREENISH	0			0
							TR SILT		GREY	0		0	
	32								TRACE	0			0
			3.5/4						SHELL FRAGS ≤ 0.1"	0			0
S-4 1500	34				MED DENSE		AS ABOVE	SP					
									TRACE SHELL				
	36								FRAGS ≤ 0.02"			0	
			4.0/4.0							0			0
	38												
S-5 1600					MED DENSE		AS ABOVE	SP				0	
	40												
							1" CLAYEY SAND LAYER @ 40'						
	42		4.0/4.0							0			0
S-6 1715					MED DENSE		AS ABOVE f-g	SP/SM					
	44						SILT CONT.		2" CLAYEY SAND LAY			0	
							INCREASING	SM	ABUNDANT	0			0
	46		4.0/4.0				DOWNWARD		SHELL FRAGS ≤ 2" @ 45'				
									-MOD OLIVE BRN SILT CLASTS				
									≤ 0.25" RARE				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: 15S = 10'-20' 15D = 29-39

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No _____ Well I.D. #: 17MW15S10

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: D11 TRAC MT

BORING No.: 17MW16D
DATE: 2-1-05
GEOLOGIST: FRED W RAMSEN
DRILLER: FRANK COOPER

SC. LIC# A00965

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
							DK BRN CLAYEY LOAM		TOP SOIL				
							CLAY + SILT	OH					0
							MOTTLED BRN						
							GREY						
	5												0
							LT GREENISH GREY	SP					0
							SAND						
	10												0
S-1 1050					VERY LOOSE		NO RECOVERY	SP	LOOSE MATL.	0			
	12						- SOME MATL. IN		IN PLASTIC				
							SHOE GREENISH GREY		LINER SATURATED				
	14		0.1 / 4.0				SAND TR SILT		LT GREENISH GREY SAND				
S-2 1120	15						NO RECOVERY		IN CUTTINGS				
	16												
	18		0 / 4.0										
S-3 1140					VERY LOOSE		DK GREENISH GREY SAND W/SOME	SM	ABUNDANT	0			
	20						SILT		SHELL FRAGS	0			
							(f-g)		≤1.25"	0			
	22		3.8 / 4.0					SP/SM		0			
S-4 1200	23												
	24												
	25				LOOSE		DK GREENISH GREY	SP/SM					

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: USING 4' MACRO CORE DPT SAMPLERS PLUNGER TYPE

5-15 15-25 32-42

Converted to Well: Yes ✓ No _____ Well I.D. #: 17MW16 S.I.D

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: D11 MOBILE WIELD (TRAC)

BORING No.: 17MW16D
DATE: 2-1-05
GEOLOGIST: FRED W. RAMSER
DRILLER: FRANK COOPER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	26		1.0/4		LOOSE		SAND TR SILT	SP		0			
S-5 1220	27				MED DENSE		GREENISH GREY	SP	TR SHELL				
	28						SAND (f.g)		FRAGS ≤0.02"				
	29									0			
	30		4.0/4										
S-6 1300					MED DENSE		AS ABOVE	SP		0			
	32									0			
										0			
	34		3.5/4							0			
S-7 1330					MED DENSE		AS ABOVE	SP		0			
	36									0			
							SILTY SAND			0			
	38		3.5/4				LAYER 1" @ 37'			0			
S-8 1400					MED		AS ABOVE	SP		0			
	40				DENSE					0			
										0			
	42		3.5/4							0			
S-9 1430					MED		MOD. OLIVE	OL	THIS IS AN	0			
	44				STIFF		BRN CLAY		AQUITARD	0			
							AND SILT		(COOPER)	0			
	46		4/4							0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): [ ]

Remarks: S=5-15, D=32-42, I=15-25

Converted to Well: Yes ✓ No ____ Well I.D. #: 17MW16S, I, D

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: TRAC MT MOBIL WIELD

BORING No.: 17MW17S/I/D
DATE: 2-12-05
GEOLOGIST: FRED WRAMSER
DRILLER: FRANK COOPER SCLIC#00965

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							CLAYEY SILT + SAND		TOP SOIL				
					STIFF	BRN	CLAY + SILT	OH					
							MOTTLED GREY					0	
							+ YEL BRN						
	5												0
												0	
					LOOSE		LT GREENISH GREY	SP					
							SAND						0
	10						FINING					0	
					LOOSE		DOWNWARD						
												0	
	15												0
					VERY LOOSE		DK GREEN GREY	SM					
							SAND w/SOME SILT					0	
							TR CLAY						
	20												
S-1 1150					VERY LOOSE		DK GREENISH GREY	SM	ABUNDANT	0			
							SAND w/SOME SILT		SHELL FRAGS	0		0	
							f.g, SILT CONTENT		@ 22-24'	0			
	24		3.5 / 4				INC. DOWNWARD		≤ 1/2" TR CLAY	0		0	
S-2 1215	25				MED DENSE		DK GREENISH GREY	SP					

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: USING 4' MACRO CORE SAMPLER w/PLASTIC LINERS

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No ___ Well I.D. #: 17MW17 S/I/D

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: TRAC MT MOBIL RIGFLD

BORING No.: 17MW17S/I/D
DATE: 2-12-05
GEOLOGIST: FRED W. RAMSER
DRILLER: FRANK COOPER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	25												
S-2 CONT					MED DENSE		SAND f-g	SP		0			
										0		0	
			3.5/4.0							0			
S-3 1245							AS ABOVE		TRACE	0			
	30						DKGREENISH GREY		SHELL	0		0	
							f-g SAND		FRAG.	0			
			3.5/4.0				TR SILT @ 32'			0			
S-4 1310							AS ABOVE	SP					
							(f-g SAND						
	35												
			3.5/4.0										
	37												
S-5 1355					MED STIFF		MOD. OLIVE	OL	SAID TO				
							BRN CLAY		BE PART OF				
	40						AND SILT		THE "COOPER"				
			4/4						FM.				
	45												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: D = 27-37
I 13-23

Converted to Well: Yes ✓ No _____ Well I.D. #: 17MW17S/I/D

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: TRAC RIG

BORING No.: 17MW18S/D
DATE: 2-13-05
GEOLOGIST: FRED W RAMSER
DRILLER: FRANK COOPER SC. LIC#A009965

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						DK BRN	CLAY + SILTY LOAM		TOPSOIL				
							CLAY + SILT	OH				0	
							MOTTLED GRY						
							ORG + BRN						0
	5											0	
					LOOSE		GREENISH GREY	SP					
							SAND					0	
													0
	10											0	
				12								0	
				14									0
	15			15			DK GREENISH GREY	SM				0	
							SAND SILT + SHELLS						
S-1 1545					VERY LOOSE		DK GREENISH GREY	SM	ABUNDANT	0			0
							F-g SAND W/SOME		SHELL FRAGS.	0			0
							SILT TR CLAY		≤ 3/4"	0			0
	20		4/4							0			0
S-2 1600					VERY LOOSE		AS ABOVE	SM	ABUNDANT	0			0
									SHELL FRAG	0			0
23				22					BLACK GRAVELS ≤ 3/4"	0			0
			4/4				DK GREENISH GREY	SP		0			0
S-3 1630	25				MED DENSE		SAND						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: USING 4' MACRO CORE SAMPLER W/PLASTIC LINER (PLUNGER TYPE)

Converted to Well: Yes ✓ No _____ Well I.D. #: 17MW18S/D

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: TRAC RIG

BORING No.: 17MW 18 S/D
DATE: 2-13-05
GEOLOGIST: FRED W RAMSER
DRILLER: FRANK COOPER SC LIC#A00965

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
					MED		DK GREENISH GREY	SP		0			
	27				DENSE		SAND			0			
	28		3.5/4							0			0
SCY 1 Tod										0			
	30						GRADES TO DK			0			
							GREENISH GREY		SAND W/SHELL				
			3.5/4		MED STIFF		MOD OLIVE	CL	W/SOME SILT				
							BRN CLAY		@ 30' ON				
							+ SILT		TOP OF THE				
	35								BRN CLAY &				
									SILT. SAID				
									TO BE PART				
									OF THE "COOPER				
									FORMATION"				
	40												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: INSTALLED WELLS 2-14-05
18D = 15'-22' 18S = 4-14

Converted to Well: Yes ✓ No _____ Well I.D. #: 17MW18S/D

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: MIDDLEWIELD TRAC MT

BORING No.: 17MW195
DATE: 2-8-05
GEOLOGIST: FRED W RAMSER
DRILLER: FRANK COOPER SCLIC#A00965

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						DK BRN	SAND+SILT LOAM		TOP SOIL			0	0
							DK-BRN						
						YEL BRN	CLAY+SILT	OH					
												0	0
	5												
S-1 1035	6				MED STIFF	YEL BRN	VARIEGATED	OL	LOOKS LIKE "FILL"	0.3		0	0
	7						SILT + CLAY		ROOT MATL.	0.4			
	8				LOOSE		GREENISH GREY	SP/SC	COARSENING	0.4			
	9		3.5/4				SAND TR SILT	SP	DOWNWARD	0.4		0	0
S-2 1100	10												
				?						0		0	0
	12				VERY		YEL BRN SAND	SP					
			1/4		LOOSE					0		0	0
S-3 1105	14						NO RECOVERY						
	15						- SAND IN SHOE						
	16												
	17		0/4										
									SET WELL				
									8-18				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: USING 4' MACRO CORE SAMPLERS w/ PLASTIC LINER + PLUNGER

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No _____ Well I.D. #: 17MW195

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: MOBILE WIELD "TRAC"

BORING No.: 17MW20S
DATE: 2-9-05
GEOLOGIST: FRED W. RAMSER
DRILLER: FRANK COOPER SC.LIC#A00965

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						DK	BRN CLAY SAND		TOP SOIL				
					MED STIFF		MOD ORG BRN	OH				0.3	0.3
							CLAY + SILT						
												0.3	0.3
	5												
					LOOSE		GREENISH GREY	SC					
							CLAYEY SAND					0.3	0.3
							BECOMING						
							SANDIER						
	10						DOWNWARD	SC/SP				0.3	0.3
S-1 1100					VERY LOOSE		NO RECOVERY	SP					
							LT GREENISH GREY						
							SAND IN SHOE						
			0 / 4										
1130	15												
							INSTALL WELL						
							4'-14'						
	20												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: SPL @ 10-14, LOG CUTTINGS

Drilling Area Background (ppm): 0.3

Converted to Well: Yes ✓ No _____ Well I.D.#: 17MW20S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: TRUCK MT MOBILE WELD

BORING No.: 17MW21S
DATE: 1-28-05
GEOLOGIST: FRED RAMSER
DRILLER: FRANK COOPER

SC.LIC#A00965

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						DK	BRN SILTY SAND	SM					
							CLAYEY SAND	SC	(POSSIBLE				
									FILL NEXT TO ROAD)				
						LT	BRN SAND	SM				0	0
	5						w/ SOME SILT						
							YEL BRN SAND	SM					
							f-g					0	0
							SOME SILT						
	10												
							BECOMING	SP					
							SANDIER DOWNWARD					0	0
	15												
Core							ORG BRN SAND	SP					
							VERY POOR REC			0			
							SOME GREY RESIDUE		ON THE SHOE			0	0
			1.5/4			DK	GREYISH GREEN	SM/SC		0			
	20						SAND & SILT						
							TR CLAY						
									INSTALLED				
									8-18				
	25												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): [ ]

Remarks: USING 4' MACRO CORE PLUNGER TYPE SCREEN 8-18, SAND 6-18

Converted to Well: Yes ✓ No ____ Well I.D. #: 17MW21

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: TRUCK "MOBILE WELD"

BORING No.: 17MW22S
DATE: 1-27-05
GEOLOGIST: FRED W RAMSEUR
DRILLER: FRANK COOPER

SC LIC # A00965

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
						DK	BRN SAND						
						DK	YEL BRN SAND	SM					
							SILT						
	5					DK	YEL ORG SAND	SM					
							+ SILT						0
									SATURATED				
					LOOSE		YEL BRN SAND	SM					
	10						W/SOME SILT						0
	15												0
					LOOSE		DK YEL BRN	SP					
							SAND f-g						
					LOOSE/ SOFT		DK GREYISH	SM					
	20						GREEN CLAYEY						0
				TD			SILTY SAND f-g						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: LOG DRILL CUTTINGS DUE TO VERY POOR RECOVERY

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No _____ Well I.D. #: 17MW22

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: TRUCK MT.

BORING No.: 17MW23S
DATE: 1-27-05
GEOLOGIST: FRED W. RAMSER
DRILLER: FRANK COOPER

SC LIC#A 00965

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
						BRN	SAND						
	2					YEL BRN	SAND W/ SILT +	SC/	MOTTLED				
							CLAY (TR)	SP	GREY				
	4						CLAYEY	SC					
							@ 3'-4'-5'						
	6							SP					
							GREENISH GREY	SP	SATURATED				
	8						SAND + SILT						
	10												
S-1 1021							NO RECOVERY	SP					
	12						SAND IN						
						YEL-BRN	SHOE						
	14		0.1/4				SAND						
S-2 1031	15				LOOSE	YEL	SAND TR SILT	SP		0			
	16					BRN				0			
	17									0			
	18		2.0/4							0			
S-3 1050	19				LOOSE/ SOFT	DK	NO RECOVERY	SC	OFF SET 1 FOOT TO NORTH				
	20					GREY	DK GREYISH GREEN		TO COLLECT ANOTHER SPL				
	21						CLAYEY SAND IN		18'-22'				
	22		0.0/4				SHOE, THIS IS NOT		STILL NO REC.				
							A C.U.		DECIDED TO INSTALL TO				
							SILTY + CLAYEY		20' BGS WILL LOG AUGER				
							SAND ON BTM 2' OF AUGER STRING		CUTTINGS				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): ____

Remarks: USING 4' MACRO CORE PLUNGER TYPE SAMPLERS PLACED SCREEN @ 10'-20'

Converted to Well: Yes ✓ No ____ Well I.D. #: 17MW23S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK 51 TRACK RIG

BORING No.: 175B01
DATE: 6/7/01
GEOLOGIST: ~~WUDKWYCH~~ S. NEIL
DRILLER: GERALD EISTER #1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
S-1 0957	1		12"			BRN	SANDY SILT	ML	HAND AUGER	0	0	0	0
	2	4/5	19"			LGD/ OR	SILTY SANDY CLAY	CL					
S-2 1005	3	5/7	24"				SANDY SILT	ML		0	0	62	0
	4	6/5	15"			BRN	SILTY SAND OR	SM					
S-3 1012	5	5/7	24"			↓	MOT			0	0	16	0
	6	4/4				GRN	SILTY SANDY CLAY	CL					
S-4 1021	7	5/8	24"			↓	OR MOT		MOIST	0	0	19.6	0
							TD = 7 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK51 TRACK RIG

BORING No.: 175602
DATE: 6/7/01
GEOLOGIST: ~~WUDKWYCH~~ S. NEIL
DRILLER: GERALD EISTER - 1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
S-1 0920	1		12"			BRN	SANDY SILT	ML	HAND AUGER	0	0	0	0
	2	8 / 7	17"			DK BRN /	SANDY SILTY ~~CLAY~~ SILT	ML					
S-2 0933	3	9 / 9	24"			GRAY	↓			0	0	0	0
	4	8 / 10	15"			BRN	Fine sand some	SM					
S-3 0943	5	9 / 8	24"			↓	silt		MOIST	0	0	0	0
	6	8 / 7	24"			GRAY	SILTY SANDY CLAY	CL					
S-4 0950	7	8 / 11	24"			↓	w/ OR NOT			0	0	0	0
							TD = 7 FEET		MOIST				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK 51 TRACK RIG

BORING No.: 17SB03
DATE: 6/6/01
GEOLOGIST: ~~WUDKWYCH~~ S. NEIL
DRILLER: ELSNER #1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole*	Driller BZ**
	0												
S-1 1420	1		12"			BRN	SANDY SILT / RED CLAY	ML CL	HAND AUGER	0	0	0	0
	2	6 / 7	15"			RED	SILTY SANDY CLAY	CL					
S-2 1441	3	8 / 8	24"			↓	↓			0	0	0	0
	4	9 / 15	15"			OR		CL					
S-3 1505	5	15 / 13	24"			↓	↓			0	0	0	0
	6	12 / 5				OR / GRAY		CL					
S-4 1520	7	7 / 10	24"			↓	↓			0	0	0	0
							TD = 7 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK 51 TRAIL RIG

BORING No.: 17SB04
DATE: 6/6/01
GEOLOGIST: ~~WUDIKWYCH~~ S. NEIL
DRILLER: EISTER #1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
S1 @ 1300	1		12"			BRN	SANDY SILT	ML	HAND AUGER	0	0	0	0
	2	4/6	16"			RED	SANDY/SILTY CLAY	CL					
S2 @ 1317	3	7/6	24"			↓	↓			0	0	0	0
	4	5/7	20"			RED	↓	CL					
S3 @ 1330	5	8/8	24"			ORANGE	↓			0	0	0	0
	6	5/7	22"			GRAY	SANDY SILTY CLAY w/	CL					
S4 @ 1345	7	7/8	24"			↓	OR MOT			0	0	0	0
	8	5/9	24"				UPPER 6" SILTY SANDY CLAY OR MOT	CL	MOIST				
	9	10/11	24"			↓	SILTY SAND OR MOT	SM	↓				
										5.8	0	25.3	0
							TD = 9 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No x Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK 51 TRACK RIG

BORING No.: 175805
DATE: 6/6/01
GEOLOGIST: ~~WUDKWYCH~~ S. NEIL
DRILLER: EISTER # 1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
SB-1 1110	1		12"			Brn	SANDY SILT	ML	HAND AUGER	0	0	0	0
	2	5/6	12"			Gray	SILTY SANDY CLAY w/	CL					
SB-2 1120	3	7/9	24"			↓	OR MOT			0	0	0	0
	4	6/7	15"			↓	↓	CL					
SB-3 1132	5	12/11	24"			↓	↓			0	0	0	0
	6	11/10	24"			↓	↓	CL					
SB-4 1145	7	9/10	24"			↓	↓			0	0	4.9	0
							TD = 7 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No x Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK 51 TRACK MG

BORING No.: 175B06
DATE: 6/6/01
GEOLOGIST: ~~WUDKWYCH~~ S. NIL
DRILLER: EISTER # 1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
S-1 @ 1015	1		18"			BRN	SANDY SILT	ML	HAND AUGER	0	0	0	0
	2	4 / 5	11"			GRY	SANDY/SILTY CLAY OR MAT	CL					
S-2 @ 1020	3	5 / 7	24"			↓	↓			4.1	0	0.9	0
RUN S-3	4	5 / 6	17"			↓	↓	CL					
S-3 @ 1040	5	10 / 12	24"			↓	↓			0	0	0	0
	6	10 / 11	24"			↓	↓	CL					
S-4 @ 1050	7	8 / 13	24"			↓	↓		MOIST AT BOTTOM	0	0	0	0
							TD = 7 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK 51 TRACK RIG

BORING No.: 175B07
DATE: 6/6/01
GEOLOGIST: ~~WUDKWYCH~~ S. NEIL
DRILLER: EISTER #1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
S-1 @ 1540	1		12"			BRN RED	SANDY SILT (2") SILTY /SANDY CLAY	ML CL		0	0	0	0
	2	5/7	18"			OLIV BRN	SILTY SAND/ SILTY SANDY CLAY	CL					
S-2 @ 1554	3	8/6	24"			↓	↓			0	0	0	0
	4	6/7	19"			OLIV BRN	SILTY SANDY CLAY SILTY SAND @ 6"	CL					
S-3 @ 1603	5	10/9	24"			↓	SILTY SANDY CLAY			0	0	0	0
	6	7/8	24"			GRAY	SILTY SANDY CLAY	CL					
S-4 @ 1615	7	10/11	24"			↓	W/ OR MOT			0	0	0	0
							TD - 7 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK51 TRACK RIG

BORING No.: 175B08
DATE: 6/6/01
GEOLOGIST: ~~WUDKWYCH~~ S. NEIL
DRILLER: EISTER #1272

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
S-1 0930	1		12"			BRN	SANDY SILT	ML	HAND AUGER	0	0	10.1	0
	2	11/12	18"			GRAY	SANDY / SILTY CLAY w/	CL					
S-2 0940	3	9/8	24"			↓	OR MOT			0	0	14.8	0
	4	8/10	15"			↓	↓	CL					
S-3 0948	5	10/14	24"			↓	↓			3.1	0	18	0
	6	12/9	21"			↓	↓	CL					
S-4 1000	7	10/13	24"			↓	↓				0	21.8	0
							TD 7'						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK-51 TRACK RIG

BORING No.: 175B09
DATE: 6/6/01
GEOLOGIST: ~~WUDKWYCH~~ S. NGIL
DRILLER: EISTEL #1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
S-1 0830	1		12"			BRN	SILTY SAND	ML	Hand Auger	0	0	76	0
	2	5/5	15"			BRN	SAME AS ABOVE (UPPER 6")	ML					
S-2 0851	3	7/8	24"			GRAY	SILTY SANDY CLAY OR MOIST	CL		*	*	*	*
	4	7/9	14"			↓	↓	CL					
S-3 0905	5	9/12	24"			↓	↓			*	*	*	*
	6	16/11	24"			↓	SAME AS ABOVE -	CL					
S-4 0915	7	12/10	24"			↓	MORE SAND			*	*	*	*

* When rock coring, enter rock brokeness.

** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0/*

Remarks: * PID BACKGROUND = 10.1; HUMIDITY/DAMPNESS MAYBE AFFECTING PID

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK51 TRACK RIG

BORING No.: 17SB10
DATE: 6/5/01
GEOLOGIST: ~~WUDKWYCH~~ S. NEIL
DRILLER: EISTER # 1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
S-1 @ 1900	1		12"			BRN	SILTY/SANDY	ML	HAND AUGER	5.1	0	4.6	0
	2	4/5	13"			LTBRN	SANDY SILT	ML					
S-2 @ 1912	3	5/7	24"			GRAY	SILTY SANDY CLAY OR MOT	CL		0	0	1.8	0
	4	5/7	11"			GRAY	SILTY SANDY CLAY W/	CL					
S-3 @ 1923	5	8/11	24"			↓	OR MOT			1.3	0	5.2	0
	6	4/5	15"			GRAY	SAME AS ABOVE	CL					
S-4 @ 1935	7	5/7	24"			↓	↓		MOIST @ BOTTOM	3.2	0	9.7	0
							TD = 7 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No Y Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK 51 TRUCK RIG

BORING No.: 175B11
DATE: 6/6/01
GEOLOGIST: ~~WUDKWYCH~~ S. NEIL
DRILLER: EISTER #1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
S-1 @ 1635	1		12"			OR BRN	SANDY SILTY CLAY / SANDY SILT TR CLAY	CL	HAND AUGER	0	0	0	0
	2		24"			OR/ BRN	SILTY SANDY CLAY	CL	HAND AUGER				
S-2 @ 1650	3		24"			↓	↓		↓	0	0	0	0
	4	5 / 6	21"			GRAY	SILTY SANDY CLAY OR	CL					
S-3 @ 1705	5	8 / 8	24"			↓	MOT			0	0	0	0
	6	7 / 7	20"			↓	↓	CL					
S-4 @ 1721	7	8 / 11	24"			↓	↓		MOIST	0	0	0	0
							TD = 7 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BR SI TRUCK RIG

BORING No.: 175B12
DATE: 6/7/01
GEOLOGIST: ~~WUDKWYCH~~ S. NEIL
DRILLER: GERALD GISTER - 1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
S-1 0850	1		12"			BRN	3" SANDY SILT / GRAY CLAY	ML CL	HAND AUGER	*	*	*	*
	2	4 / 5	17"			GRAY	SILTY SANDY CLAY	CL					
S-2 0800	3	7 / 8	24"			↓	OR MOT			*	*	*	*
	4	5 / 8	15"				↓	CL					
S-3 0810	5	10 / 13	24"			↓	↓			25.1	0	8.4	0
	6	11 / 7	22"				SAME AS ABOVE	CL					
S-4 0823	7	7 / 8	24"			↓	MORE SANDY AT BOTTOM		MOIST	4.2	0	8.6	0
							TD = 7 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: * Tentative PID readings

Drilling Area Background (ppm): */0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CT0137 / 0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK 51 TRACK RIG

BORING No.: 17SB13
DATE: 6/5/01
GEOLOGIST: S. NEIL
DRILLER: GERALD EISTER #1573

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
S-1 @ 1605	1		12"			BRN	SILT SOME F. GR. SAND	ML	HAND AUGER	0	0	0	0
	2	3 / 4	17"			GRAY	SILTY/SANDY CLAY W/	CL					
S-2 @ 1615	3	5 / 6	24"			↓	OR MOT.			0	0	0	0
	4	5 / 7	18"				SAME AS ABOVE	CL					
S-3 @ 1624	5	7 / 9	24"			↓	↓			65	0	0	0
	6	10 / 13	24"					CL					
S-4 @ 1637	7	11 / 10	24"			↓	↓			0	0	0	0
							TD = 7 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0.0

Remarks:

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK 51 TRACK MG

BORING No.: D5B14
DATE: 6/5/01
GEOLOGIST: WUDKWYCH / NEIL
DRILLER: EISTER #1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
S-1 @ 0940	1		12"			BRN	SILT SOME FINE SAND	ML	HAND AUGER	0	0	0	0
	2	7/6	5"			BRN	SAME AS ABOVE W/	ML					
S-2 @ 0953	3	5/3	24"			↓	OR MOT.			0	0	0	0
	4	2/3	14"			BRN	UPPER 3" SAME AS ABOVE	CL	WHITE CHALKY MATERIAL MIDDLE				
S-3 @ 1007	5	3/8	24"			GRAY	SILTY/SANDY CLAY			0	0	0	0
	6	5/7	19"			WH	WHITE CHALKY MATERIAL						
S-4 @ 1020	7	8/11	24"			GRAY	SANDY CLAY - OR MOT.	CL		0	0	0	0
							TD = 7 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK-51 TRACK M6

BORING No.: 17SB15
DATE: 6/5/01
GEOLOGIST: WUDKWYCH / NGIL
DRILLER: EISTER #1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
S-1 @ 1350	1		12"			BRN	SANDY SILT	ML	HAND AUGER	0	0	0	0
	2	3/3	5"			BRN	SAME AS ABOVE W/	CL					
S-2 @ 1310	3	5/5	24"			GRAY	OR MOT - GRAY CLAY			0	0	0	0
	4	3/5	14"			BRN	TOP 6" - SANDY SILT						
S-3 @ 1340	5	7/9	24"			GRAY	SILTY CLAY OR MOT	CL	MOIST	0	0	0	0
	6	10/12	24"			GRAY	UPPER 21" SILTY CLAY	CL					
S-4 @ 1337	7	12/16	24"			↓	OR MOT - THIN SILTY SAND OR MOT		WET	0	0	0	0
							TD = 7 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BL51 TRACK H6

BORING No.: 175B16
DATE: 6/5/01
GEOLOGIST: WUDKWYCH / NEIL
DRILLER: ELSTER #1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
Se1 1400	1	/	12"			BRN	FINE SANDY SILT	MH	HAND AUGER	0	0	0	0
	2	3/5	15"			LTBRN	FINE SANDY SILT	MH					
Se2 1433	3	5/3	24"			↓	↓			0	0	0	0
	4	3/5	11"			BRN	FINE SANDY SILT	MH	STAINING				
Se3 1445	5	5/7	24"			GRAY	SILTY SANDY CLAY w/ OR MOT (BOTTOM 7")	CL		20.1	0	0.1	0
	6	2/4	24"			GRAY	SILTY SANDY CLAY	CL					
Se4 1500	7	5/4	24"			↓	OR MOT		MOIST @ 7'	0	0	159	0
		/					TD = 7'						

* When rock coring, enter rock brokeness.

** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK 51 TRACK RIG

BORING No.: 17SB17
DATE: 6/5/01
GEOLOGIST: WUDKWYCH / NEIL
DRILLER: EISER #1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
S-1 0845	1		12"			GRAY BRN	OR MOT SILTY CLAY, SOME SILT	ML CL	HAND AUGER	0	0	0	0
	2	3/4	18"			↓	SAME AS ABOVE	CL					
S-2 0857	3	7/9	24"				↓			0	0	0	0
	4	5/7	18"			GRAY	SILTY CLAY TR.	CL					
S-3 0915	5	9/9	24"				OR MOT.		MOIST	0	0	0	0
	6	7/5	21"			GRAY	SILTY SAND OR MOT SAME AS ABOVE (SA)	SM	WET				
S-4 0921	7	4/4	24"				↓		↓	0	0	0	0
							TD = 7 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK 51 THACK MG

BORING No.: 175B18
DATE: 6/5/01
GEOLOGIST: ~~WUDKWYCH~~ S. NEIL
DRILLER: EISSA + ZIZZ

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
S-1 @ 1050	1		12"			BRN	SILTY/SANDY	MH	HAND AUGER	0	0	0	0
	2	3 / 4	11"			BLK BRN	SILTY SANDY CLAY	CL					
S-2 @ 1100	3	5 / 6	24"				OR MOT			0	0	0	0
	4	5 / 8	19"			GRAY	SILTY SANDY CLAY	CL					
S-3 @ 1112	5	10 / 14	24"			↓	↓			0	0	0	0
	6	7 / 8	16"			↓	↓	CL					
S-4 @ 1124	7	8 / 11	24"			↓	↓			0	0	0	0
							TD = 7 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: CAROLINA DRILLING
DRILLING RIG: BK 51 TRACK RIG

BORING No.: 17SB09
DATE: 6/5/01
GEOLOGIST: WUDKWYCH / NEIL
DRILLER: G. EISTER #1273

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
S-1@ 0750	1		12"			BRN	ROOTS SILT SOME FINE SAND	ML	HAND AUGER	0	0	0	0
	2	4/9	15"			OR/BRN	SILTY CLAY TR F.G. SAND	CL		0	0	0	0
S-2 @ 0865	3	11/13	24"			↓	↓			0	0	0	0
	4	9/13	16"			OR/GRAY	SILTY/SANDY CLAY	CL		0	0	0	0
S-3 @ 0914	5	14/19	24"			↓	↓			0	0	0	0
	6	13/13	21"			GRAY	OR MOT CLAY (SILTY)	CL		0	0	0	0
S-4 @ 0923	7	14/17	24"			↓	↓			0	0	0	0
							TD = 7 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG:

BORING No.: 17SB20
DATE: 4-28-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						BROWN	SILT & SAND	ML					
	2			1.5			S-CLAY		WET				
						ORG/BRY	SILTY CLAY	CL	DRY				
S-1	4						MOTTLED		DAMP	0	0	0	0
	6						S-SAND		DAMP				
				▽		GRY							
S-2	8		3/4				SILT+SAND	SM	WET	0	0	0	0
				TD 8									

* When rock coring, enter rock brokeness.

** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 17SB21
DATE: 4-29-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						BRN	SILT+CLAY	CL	WET				
	2					GRY							
						GREEN	CLAY S-SILT		DRY				
S-1	4		3/4							0	0	0	0
	6												
				▽		GREY	MOTTLED						
S-2	8		2/4	8		ORG			WET	0	0	0	0
							FINE SAND+SILT	SM					
	10								SATURATED				
S-3	12		3/4							0	0	0	
				TP									
				12'									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG:

BORING No.: 175B22
DATE: 4-28-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						BROWN	SILT + SAND						
	2			2		OR		SM	WET	0	0	0	0
						ORG	SILTY CLAY	CL					
S-1	4		3.5/4			GRY	MOTTLED		DAMP				
	6								DAMP				
						GREY	W/SAND						
S-2	8		4/4						WET	0	0	0	0
				TD 8									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 175823
DATE: 4-28-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
							BROWN SILT	ML	WET ROOT				
	2			1.5		ORG GRY	SILTY CLAY	CL					
							MOTTLED						
S-1	4		3.5/4						DAMP	0	0	0	0
	6					GREY	CLAY		DAMP				
S-2	8		4/4	7.5		GREY	SILTY SAND	SM	WET	0	0	0	0
				TD 8'									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 175B24
DATE: 4-28-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						BRN OR	SILT	ML	ROOTS WET				
	2					BRN	SILT	↓					
				2		OR RED	SILT+CLAY MOTTLED	CL					
S-1	4		4/4			GRY			DAMP	0	0	0	0
	6			▽			S-SAND						
						GRY			MOIST				
				7									
S-2	8		3.5/4			BRN	SAND+SILT	SM		0	0	0	0
									WET	0			
				TD 8'									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 175B25
DATE: 4-28-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						BROWN	SILT	ML	ROOTS WET				
	2					ORG	SILTY CLAY	CL					
						RED GRY	MOTTLED						
S-1	4		4/4						DRY	8	0	0	0
	6					GRY	S-SAND		MOIST				
				▽						12	0	0	0
S-2	8		3/4	7			SILT+SAND	SM	WET				
						BROWN	FINE SAND + SILT						
	10												
									WET				
S-3	12		3/4							14	0	0	0
				TD 12'									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 175B26
DATE: 4-28-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
				1		BROWN	SAND w/s-SILT	SW	WET ROOTS				
	2					↓	SILT T-CLAY	ML					
				3		↓	↓	↓					
S-1	4		3/4			BRN ORG	CLAY MOTTLED	CL	DAMP	0	0	0	0
						↓	↓	↓					
	6			V		GRAY	↓	↓					
							SANDY CLAY	SC	MOIST				
S2	8		3/4			↓	SANDY SILT	ML	WET	0	0	0	0
				TD 8'									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 175B27
DATE: 4-28-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	2					ORG	SILT - ROOTS		WET				
						GRY	SILTY CLAY	CL	MOIST				
S-1	4		2/4										
							CLAY						
	6					GREY			MOIST				
S-2	8		4/4				SANDY CLAY	SC	WET				
				TD 8'									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 175B28
DATE: 4-28-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						BRN	SILT S-SAND	ML	ROOTS				
	2			2		↓	↓	↓	WET				
						ORG RED	SILTY CLAY MOTTLED	CL					
S-1	4		4/4						DRY	0	0	0	0
	6					↓	↓						
				▽		GRY							
S-2	8		4/4			1	CLAY	↓	MOIST	0	0	0	0
				TD 8'									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 17SB29
DATE: 4-28-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	2					BROWN	SILT POROUS	ML	WET				
				3		OR-F	↓	↓					
S-1	4		2/4			ORANGE	SILTY CLAY MOTTLED	CL	WET	0	0	0	0
	6			▽					WET				
S-2	8		3.5/4							0	0	0	0
				TD 8'									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: GREGG DRILLING
DRILLING RIG: RHINO DPT

BORING No.: 17TW015
DATE: 3-7-02
GEOLOGIST: WVDKWYCH
DRILLER: A. MARTIN #1419

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	0
	5												
				▽					WATER WAS				
	10						SCREEN		RISING IN WELL				
							6'-11'						
				TD									
				11'									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: DPT

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: GREGG DRILLING
DRILLING RIG: RHINO DPT

BORING No.: 17TW02
DATE: 3-7-02
GEOLOGIST: WUOKWYCH
DRILLER: A. MARTIN #1419

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	0
	5												
				▽			WATER RISING						
							IN WELL						
	10						SCREEN 6'-11'						
				TD									
				11'									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: GREGG DRILLING
DRILLING RIG: RHINO DPT

BORING No.: 17TW03
DATE: 3-7-02
GEOLOGIST: WUDKWYCH
DRILLER: A. MARTIN #1419

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	0
	5												
				▽			WATER RISING IN WELL						
	10												
							SCREEN 6'-11'						
				TD 11'									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: GREGG DRILLING
DRILLING RIG: RHINO DPT

BORING No.: 17TW04
DATE: 3-7-03
GEOLOGIST: WWOKWICH
DRILLER: A. MARTIN #1419

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	0
	5			▽									
							SCREEN 6'-11'						
							WATER RISING						
	10						IN WELL						
				TD 11'									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No Y Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: GREGG DRILLING
DRILLING RIG: RHINO

BORING No.: 17TW05
DATE: 3-8-02
GEOLOGIST: WVDKW YCH
DRILLER: A. MARTIN #1419

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	0
				▽									
							SCREEN 6'-11'						
	10												
				TD 11'									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: GREGG DRILLING
DRILLING RIG: RHINO DPT

BORING No.: 17TW065ID
DATE: 3-8-02
GEOLOGIST: WVOKWYCH
DRILLER: A. MARTIN #1419

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
				▽									
	10												
	20												
						DRK GRY	FINE SAND W/SHELLS	SW	WET	0	0	0	0
S-1	24												
	30												
						OLVE GRN	SILTY CLAY	CL	COOPER	0	0	0	0
S-2	34												
				TD 34			SET DEEP SCREEN 25'-30'						
							SHALLOW SCREEN 6'-11'						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: GREGG DRILLING
DRILLING RIG: RHINO DPT

BORING No.: 17TW07S1D
DATE: 3-7-02 / 3-8-02
GEOLOGIST: WUDKWYCH
DRILLER: A. MARTIN #1419

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	5												
							SHALLOW WELL	SCREEN					
							6'-11'						
	10												
	15												
5-1	19						NO RECOVERY						
							SOFT						
	22					DRK GREY	FINE SAND W/SHELLS	SW					

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: GREGG DRILLING
DRILLING RIG: RHINO DPT

BORING No.: 17TW075ID
DATE: 3-7-02 / 3-8-02
GEOLOGIST: WVDKWYCH
DRILLER: A. MARTIN #1419

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
S-2	26		3/4			DRK GREY	FINE SAND W/SHELLS	SW	T-CLAY LENSES THROUGH OUT				
S-3	29		3/4										
							SAME AS ABOVE						
S-4	34		4/4										
S-5	38		2/4				AS ABOVE MORE CLAYEY						
S-6	42		2/4				AS ABOVE W/SHELLS		CLAY NODULES				
						OLIVE GR	SILTY CLAY	CL	COOPER				
S-7	46		4/4										
				TD 46			SET DEEP SCREEN 42'-38'						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: GREGG DRILLING
DRILLING RIG: RHINO DPT

BORING No.: 17TW08S1D
DATE: 3-8-02
GEOLOGIST: WUDKWYCH
DRILLER: A. MARTIN. #1419

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	10						SHALLOW SCREEN 6'-11'						
	20								DRILLING WAS SOFT.				
S-1	24					DRY FRY ↓	SILT + CLAY W/SHELLS	ML/CL	MOIST				
							SANDY - MOSTLY SILT		MATERIAL WET	0	0	0	0
				TD 24			DEEP SCREEN 20' @ 15'-20'						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: GREGG DRILLING
DRILLING RIG: RHINO

BORING No.: MTW09510
DATE: 3-8-02
GEOLOGIST: WUDKWYCH
DRILLER: A. MARTIN #1419

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
				▽									
	10												
							SHALLOW SCREEN						
							6'-11'						
	20												
					DENSE		SILTY W/CLAY	ML	MOIST				
5-1	24												
				TD			DEEP SCREEN						
				24			15'-20'						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: GREGG DRILLING
DRILLING RIG: RHINO DPT

BORING No.: 17TW105/0
DATE: 3-8-02
GEOLOGIST: WUDKWYCH
DRILLER: A. MARTIN #1419

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							SHALLOW SCREEN 6'-11'						
				▽									
	10												
	14												
	20					DRK GRY	SILTY CLAY T-Fine sand	CL	W/SHELLS				
S-1	24		4/4				DEEP SCREEN 15'-20'						
				TD 24'									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 17TW11 / 17MIP11
DATE: 4-26-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND # 1485

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	0
							SEE MIP 11						
							PERCHED H_2O						
							SCREEN 3'-7'						
				TD 7'									

* When rock coring, enter rock brokeness.

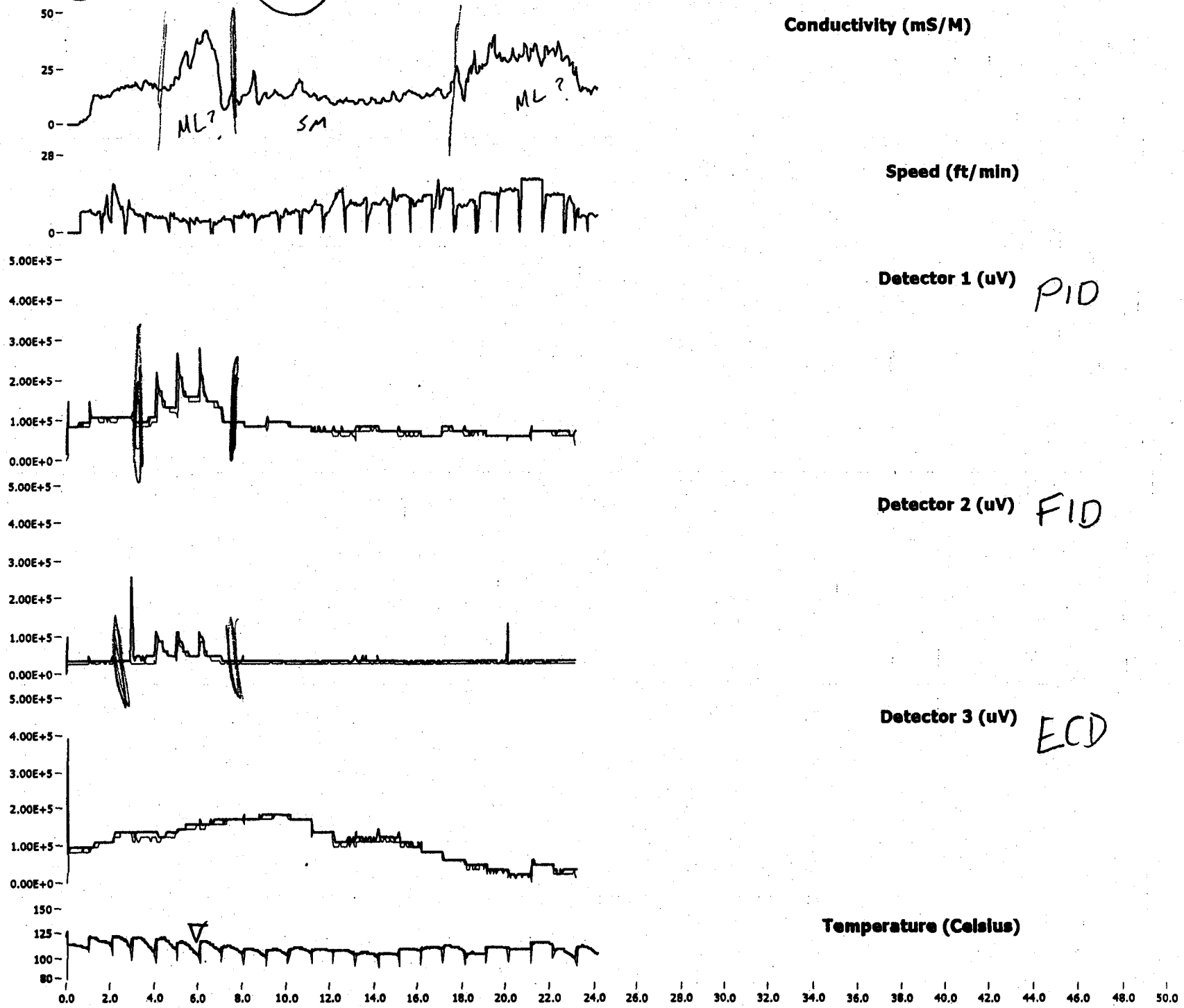
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Log: C:\[redacted]m95\LOGFILES\MIP_11.dat



Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 17TW12 / 17MIP12
DATE: 4-26-08
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	0
							SEE MIP 12						
	5			▽									
							SCREEN 5'-9'						
	10			TD 9'									

* When rock coring, enter rock brokeness.

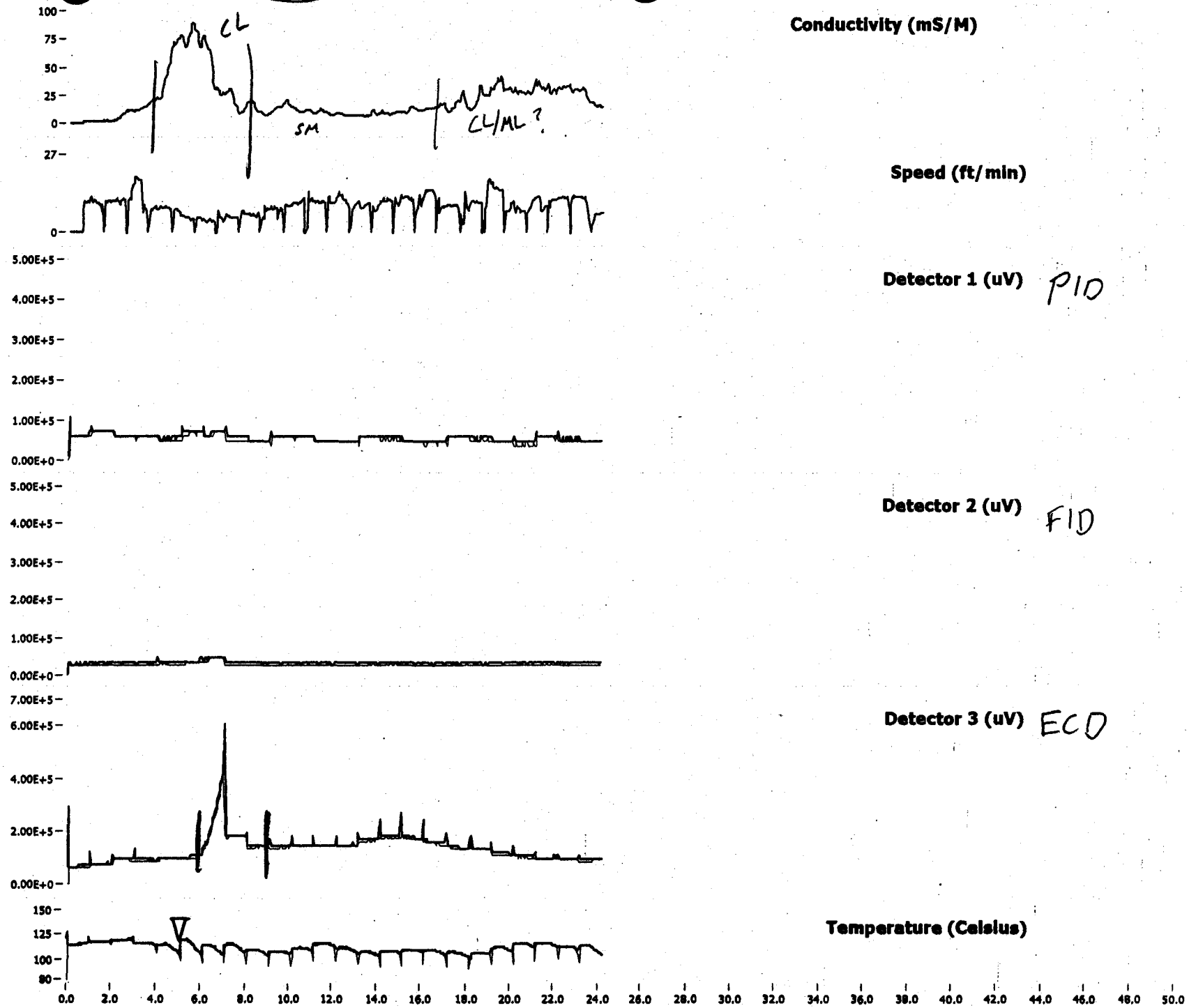
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Log: C:\[illegible]im95\LOGFILES\MIP_12.dat



17MIP12/
17TW12

MINOR CONTAMINAT
@ 6'-8' bgs

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 17MIP21 ATW13
DATE: 4-26-05
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	0
							SEE MIP21						
	5			▽									
							SCREEN						
							5'-9'						
	10			TD									
				9'									

* When rock coring, enter rock brokeness.

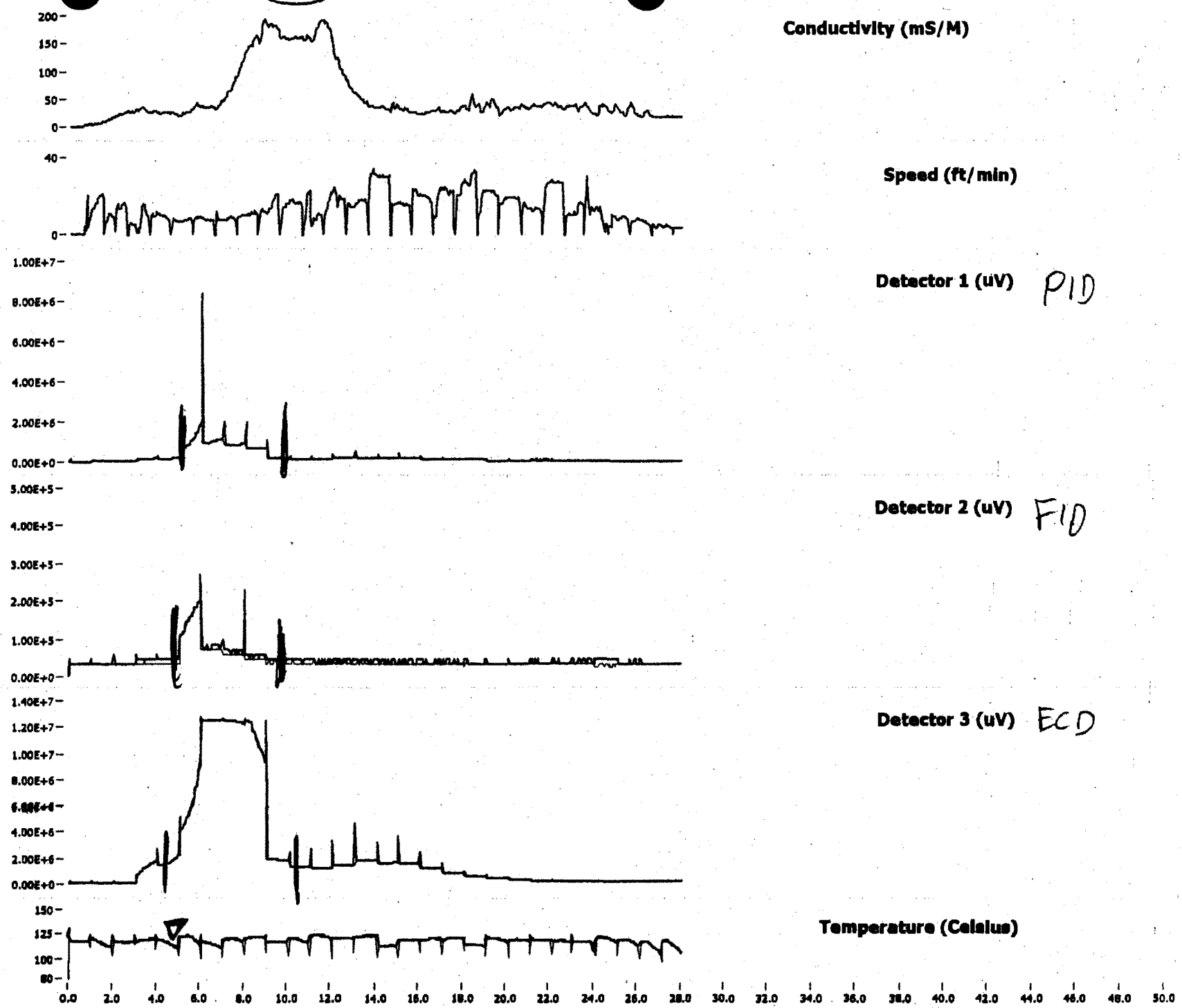
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Log: C:[redacted]m95\LOGFILES\MIP_21.dat



ROUGHLY 8'-14' bgs
SHALLOW V. DENSE CLAY
CONTAMINATION IS SITTING ON CLAY

WATER TABLE @ ~ 4' bgs

17MIP21
17TW13

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: MIP16 ATW 14
DATE: 4-26-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	0
							SEE						
							MIP16						
	5												
							SCREEN						
							5.5'-9.5'						
	10												
				TD 9.5									

* When rock coring, enter rock brokeness.

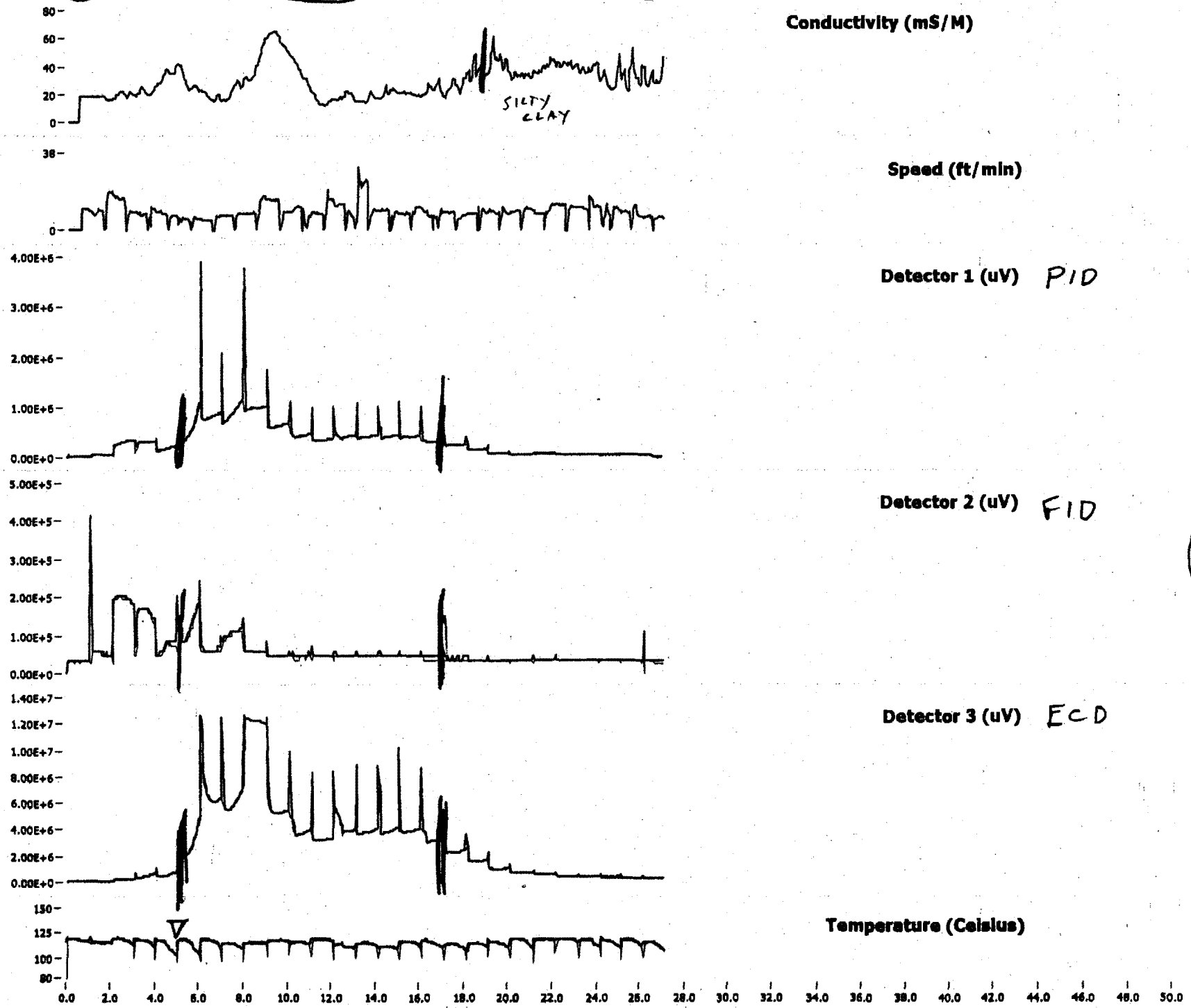
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Log: C:\[redacted]m95\LOGFILES\MIP_16A.dat



Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: MIP15 / TW15
DATE: 4-26-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							SEE			0	0	0	0
							MIP 15						
	5												
							SCREEN						
							6.5-10.5						
	10												
				TD 10.5									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

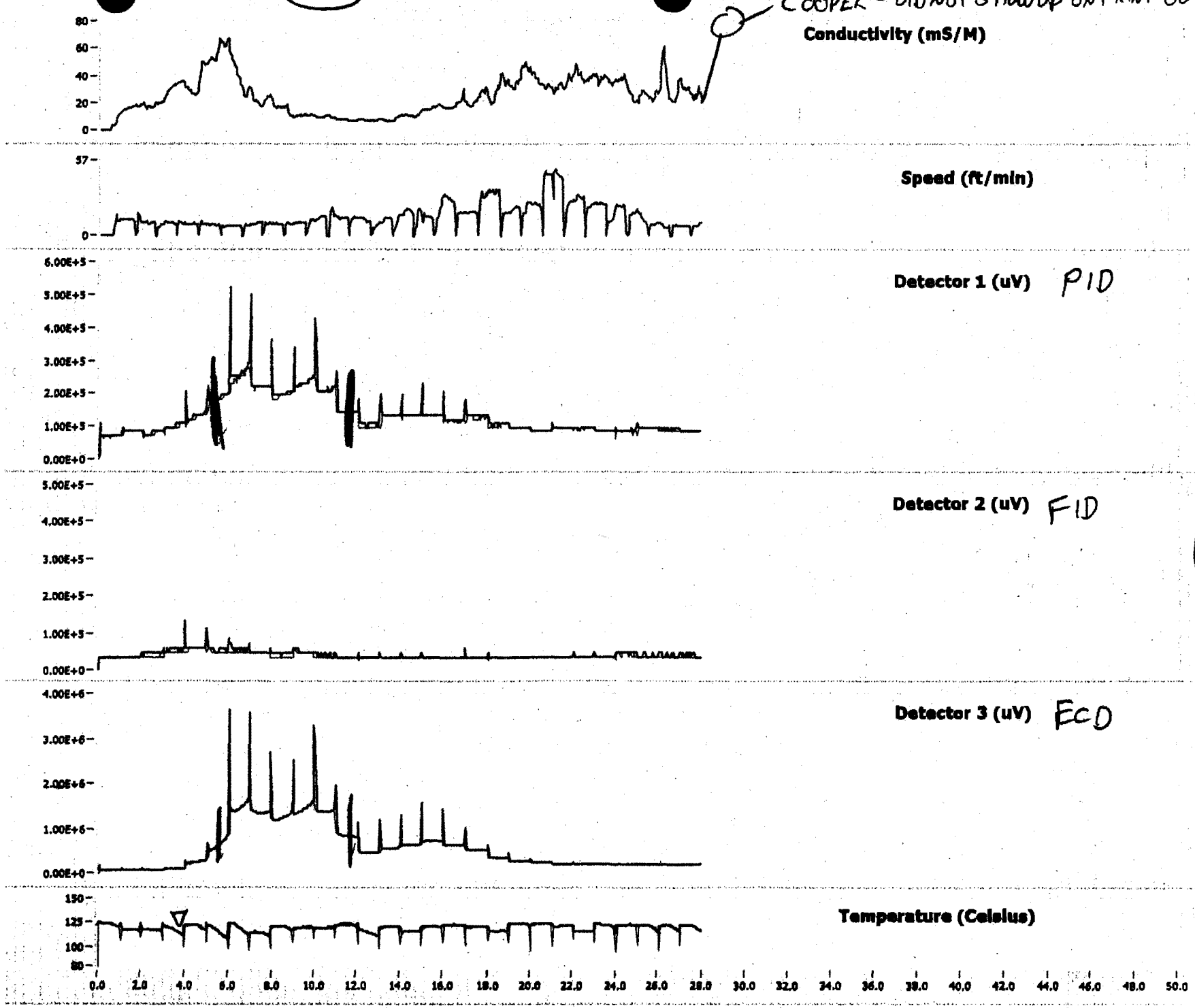
Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Log: C:\[redacted]m95\LOGFILES\MIP_15.dat

COOPER - DID NOT SHOW UP ON PRINT OUT



17MIP15/
17TW15

PRETTY CLEAN

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 17MIP13 / 17TW16
DATE: 4-26-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	0
							SEE MIP13						
	5												
							SCREEN						
							5'-9'						
	10			TD									
				9'									

* When rock coring, enter rock brokeness.

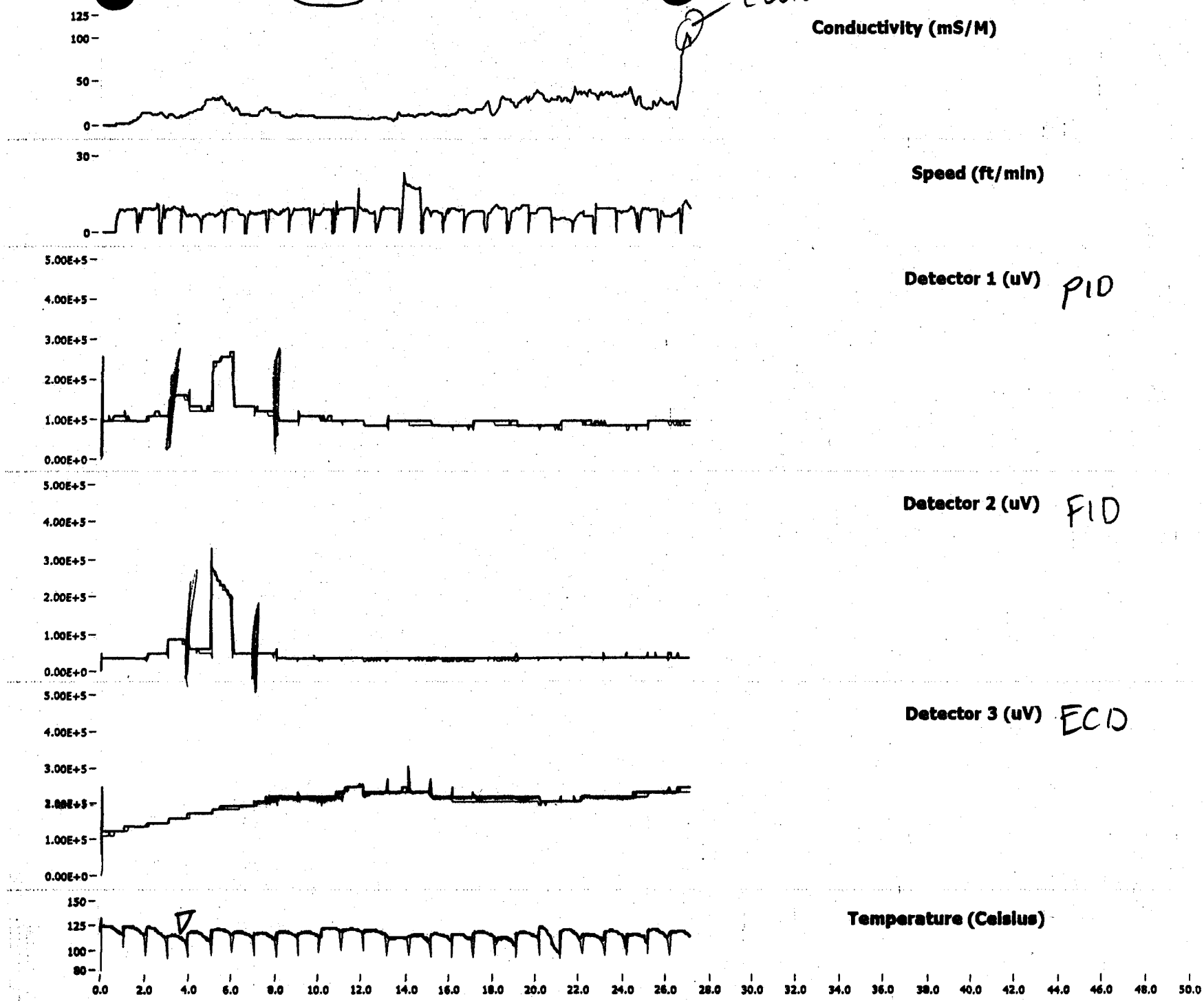
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Log: C:\[illegible]m95\LOGFILES\MIP_13.dat



17MIP13/
17TW16

VERY LITTLE
CONTAMINATION

WATER TABLE
~4' bgs

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: MIP 18 / TW17
DATE: 4-28-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	0
							SEE						
							MIP 18						
	5												
							SCREEN						
							4.5'-8.5						
	10			TD									
				8.5'									

* When rock coring, enter rock brokeness.

** Include monitor reading in 8 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

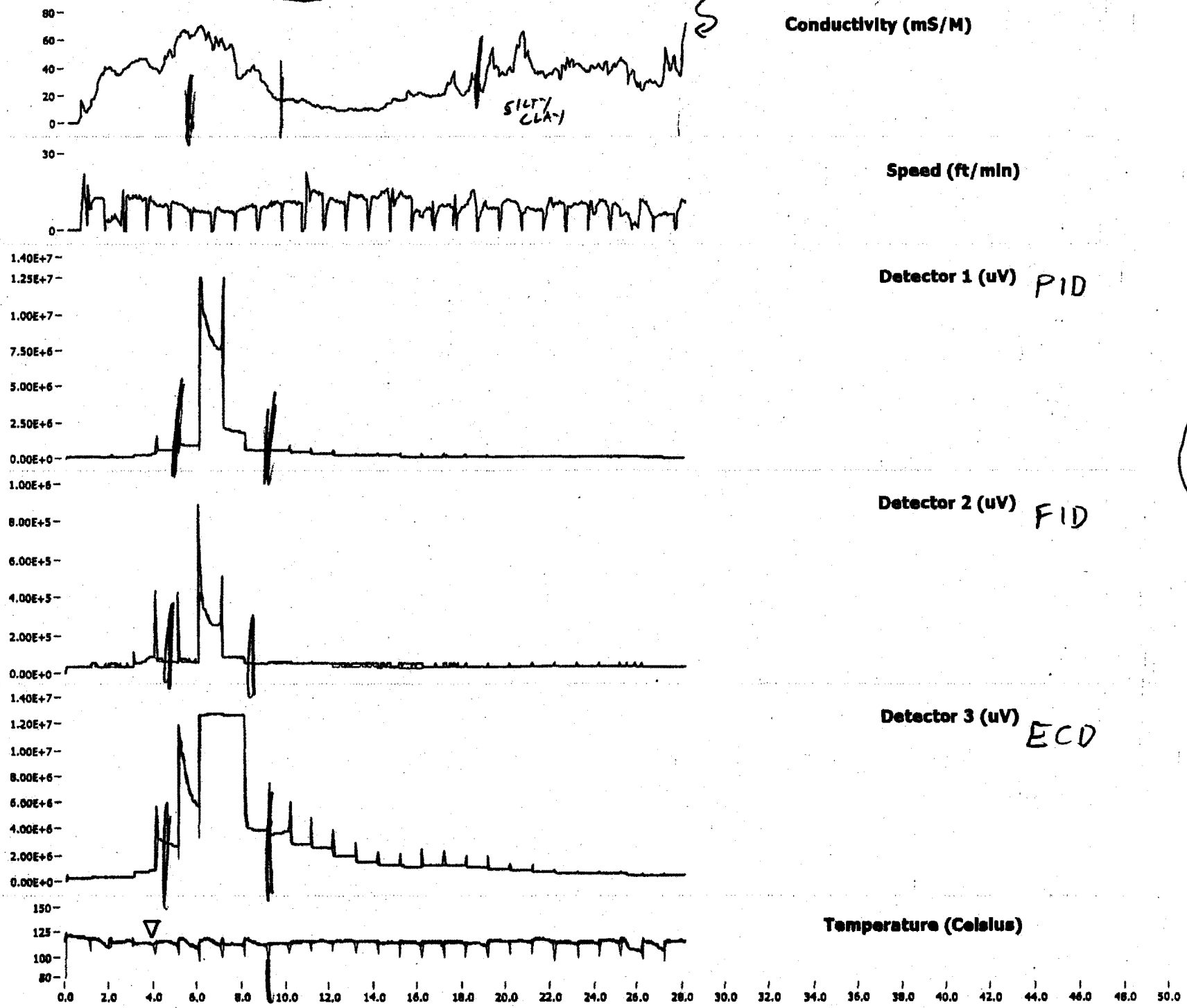
Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Log: C:\[redacted]n95\LOGFILES\MIP_18.dat

COOPER



17MIP18/
17TW17

CONTAMINATI
@ WATER
TABLE
~4' bgs

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 17MIP19 / 17TW18
DATE: 4-26-03
GEOLOGIST: WUDKWYCH
DRILLER: BRANO

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	•
							SEE						
							MIP 19						
	5												
							SCREEN						
							6'-10'						
	10												
				TD									
				10'									

* When rock coring, enter rock brokeness.

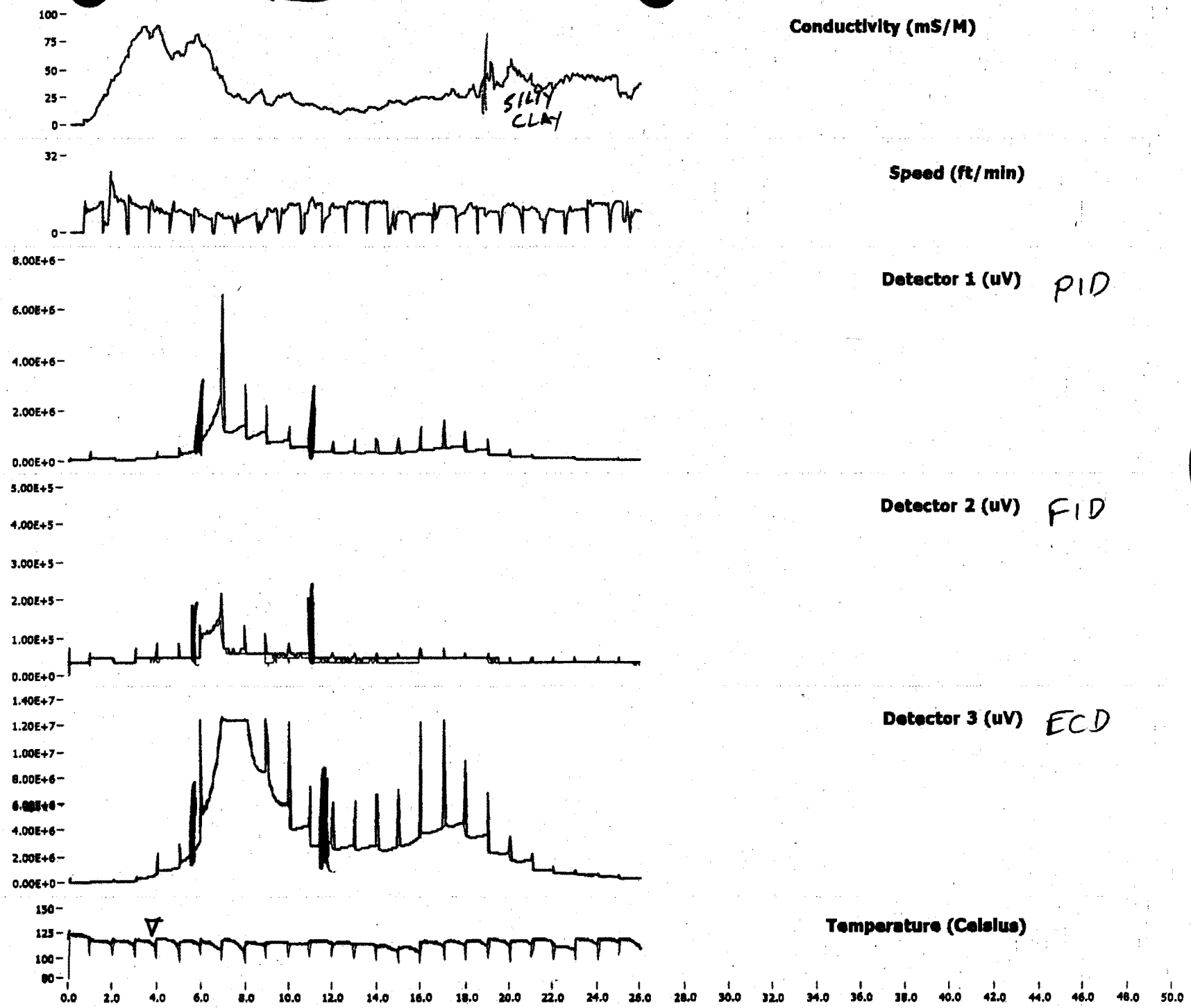
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Log: C:\[redacted]m95\LOGFILES\MIP_19.dat



17MIP19/
17TW18

WATER TABLE
@ ~4' bgs

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 17MIP20 / TW19
DATE: 4-27-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	0
							SEE MIP20						
	5												
							SCREEN 9'-13'						
	10												
	13												
				TD 13'									

* When rock coring, enter rock brokeness.

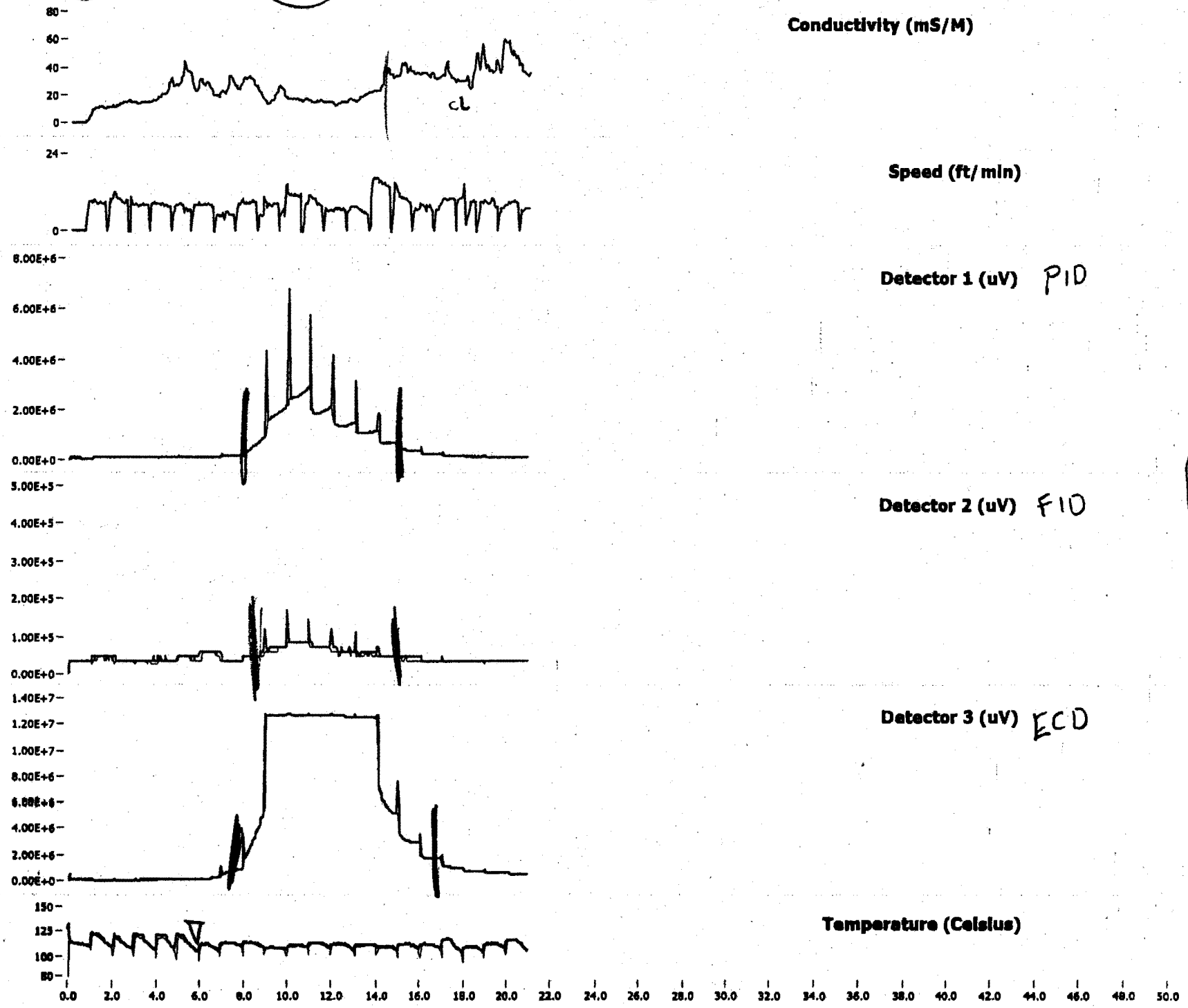
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Log: C:\[redacted]m95\LOGFILES\MIP_20.dat



17MIP 20/
17TW19

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 17MIP17 / 17TW20
DATE: 4-27-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							SEE						
							MIP 17						
	5												
							SCREEN						
							9'-13'						
	10												
				TD									
				13'									

* When rock coring, enter rock brokeness.

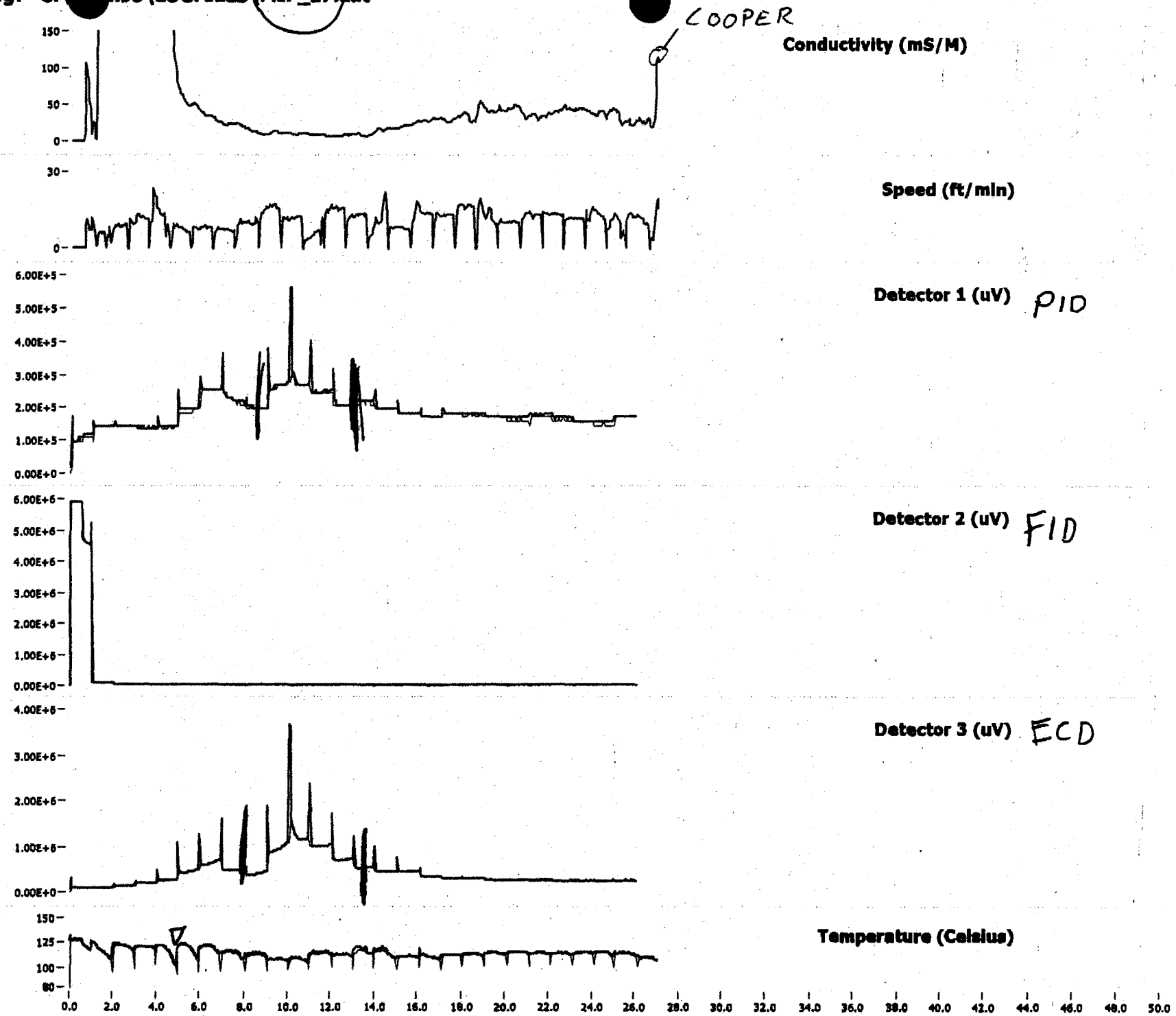
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Log: C:\[redacted]n95\LOGFILES\MIP_17.dat



VERY LITTLE CONTAMINATION

17MIP17/
17TW20

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: MIP09 / TW21
DATE: 4-27-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							SEE MIP09						
	4			▽									
							SCREEN 4'-8'						
	8												
				TD 8'									

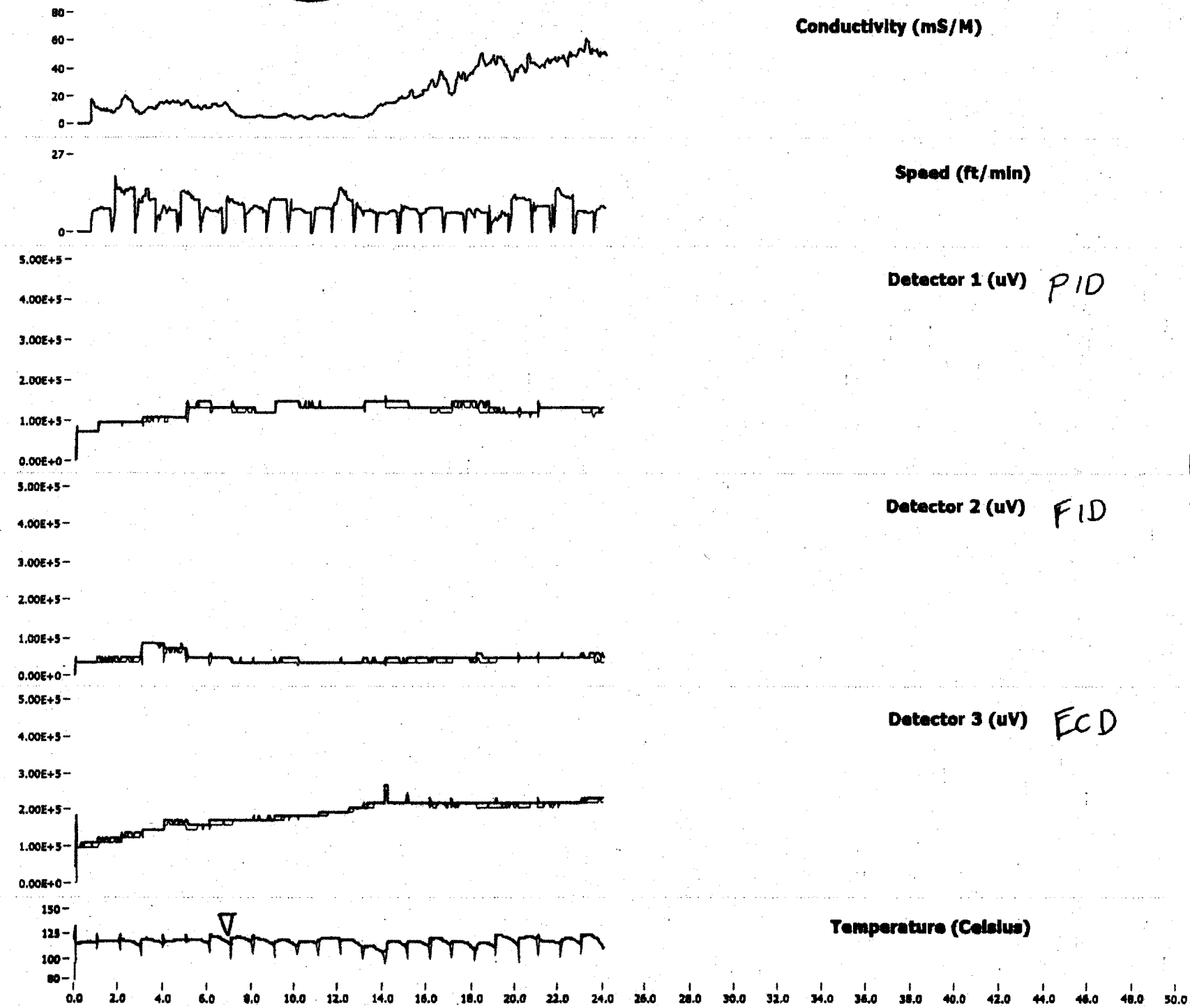
* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Log: C:\[redacted]m95\LOGFILES\MIP_09.dat



Pretty Clean

17MIP09/
17TW21

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 17MIP 14 / 17 TW 22
DATE: 4-27-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	0
							SEE MIP 14						
	4												
							SCREEN 4'-8'						
	8												
				TD 8'									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

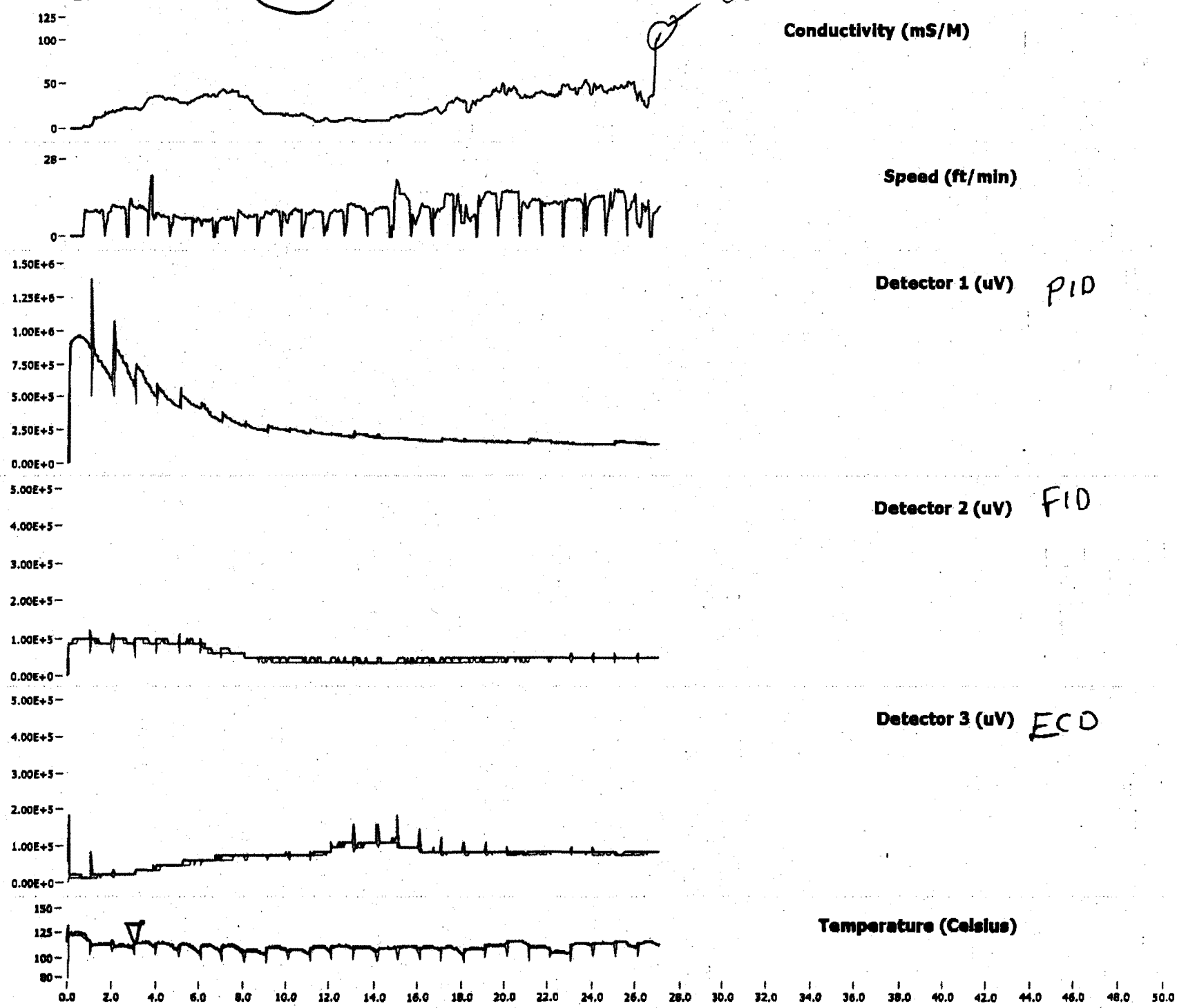
Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Log: C:[redacted]m95\LOGFILES\MIP_14.dat

COOPER



LOCATION IS CLEAN

17MIP14/
17TW22

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: MIP08 / TW23
DATE: 4-27-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	0
							SEE MIP 8						
	5												
	10												
							SCREEN						
	15						13'-17'						
				TD 17'									

* When rock coring, enter rock brokeness.

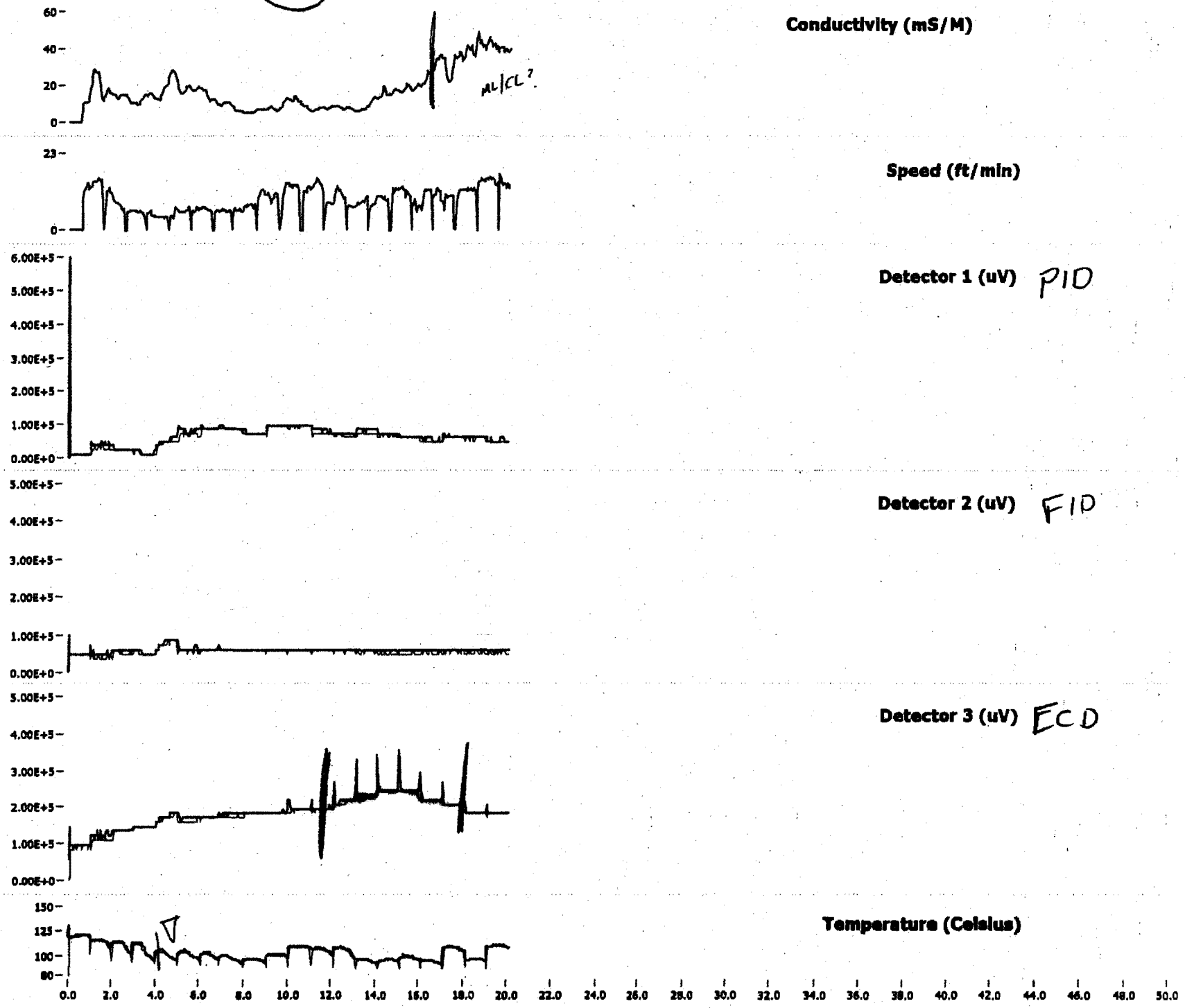
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Log: C:\[redacted]n95\LOGFILES\MIP_08.dat



17MIP08/
17TW23

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 17MIP07 / 17TW24
DATE: 4-27-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	0
							SEE MIP07						
	5			V									
	10												
							SCREEN 15.5'-19.5'						
	15												
	20			TD 19.5									

* When rock coring, enter rock brokeness.

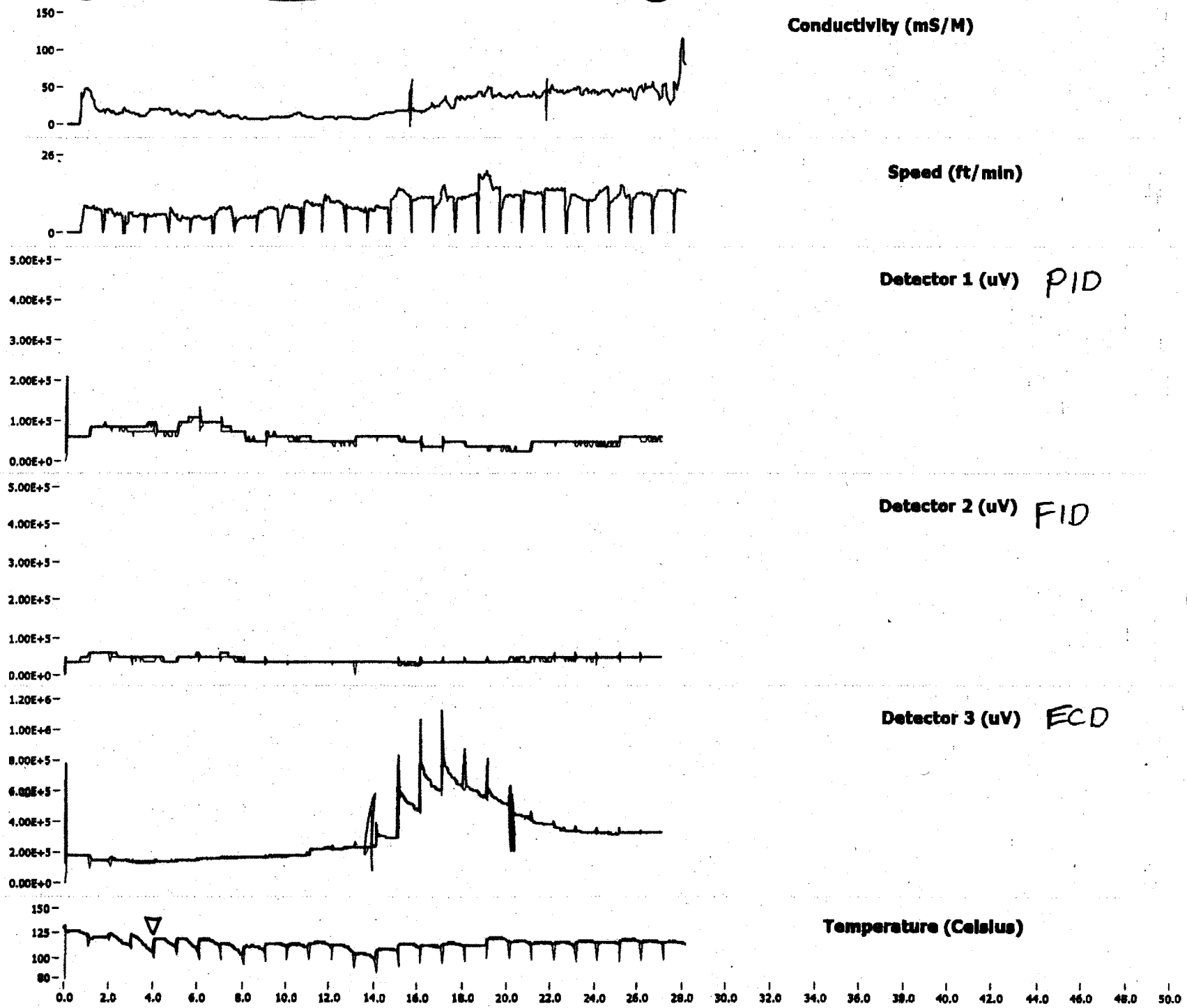
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Log: C:\[redacted]n95\LOGFILES\MIP_07.dat



VERY LITTLE IF ANY CONTAMINATION

17MIP07/ 17TW24

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 17MIP10 / TW255+0
DATE: 4-27-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	0
							SEE MIP10						
	5												
							SCREEN						
							4'- 8'						
	10												
	15												
							SCREEN						
							15'- 19'						
	20			TD 19'									

* When rock coring, enter rock brokeness.

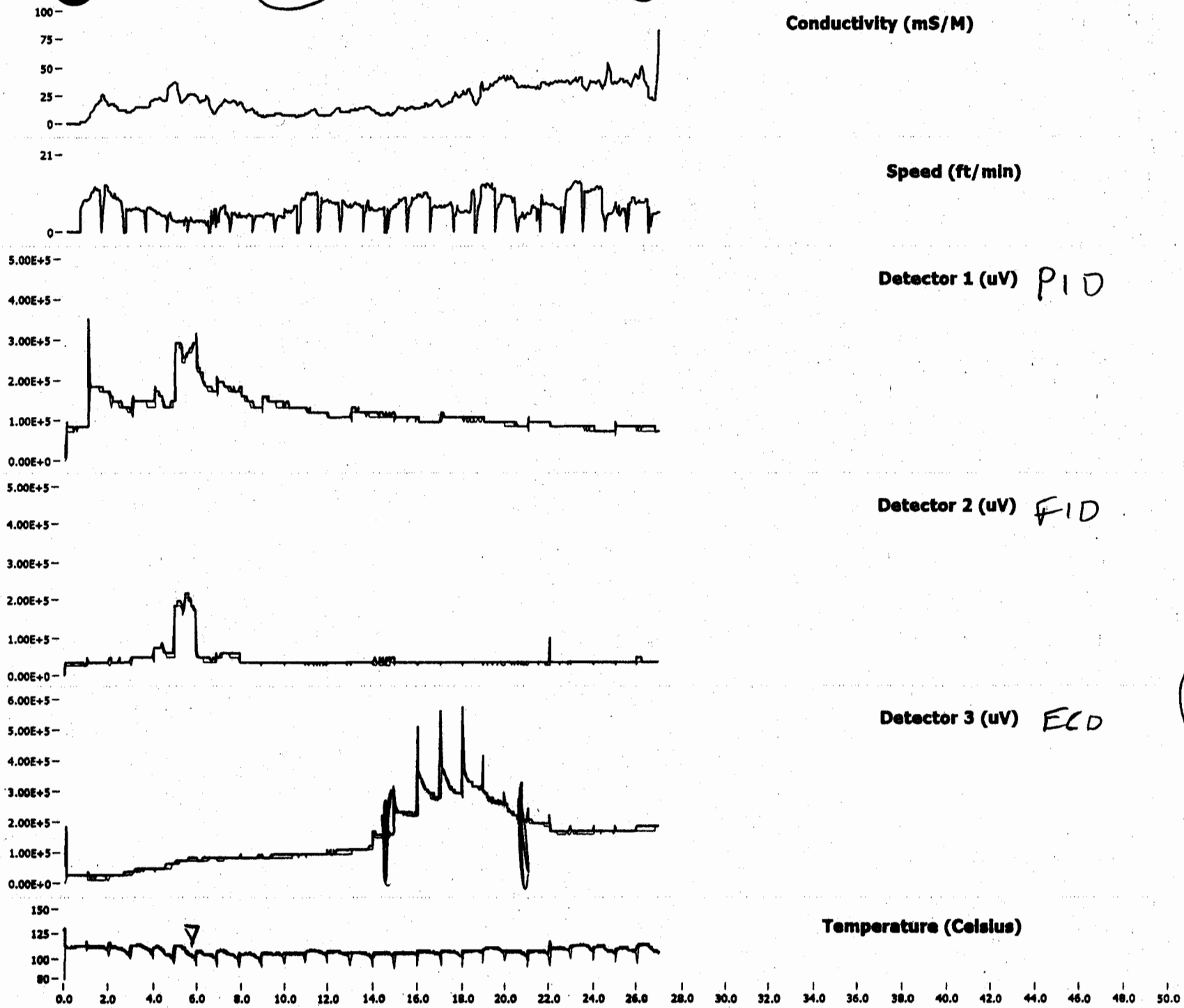
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Log: C:\[illegible]im95\LOGFILES\MIP_10.dat



VERY LITTLE CONTAMINATION ON CLAY

17MIP10/
17TW25S/D

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 17MIP06 / TW26
DATE: 4-27-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							SEE			0	0	0	0
							MIP06						
	5												
	10												
							SCREEN						
	15						15.5' - 19.5'						
	20			TD 19.5'									

* When rock coring, enter rock brokeness.

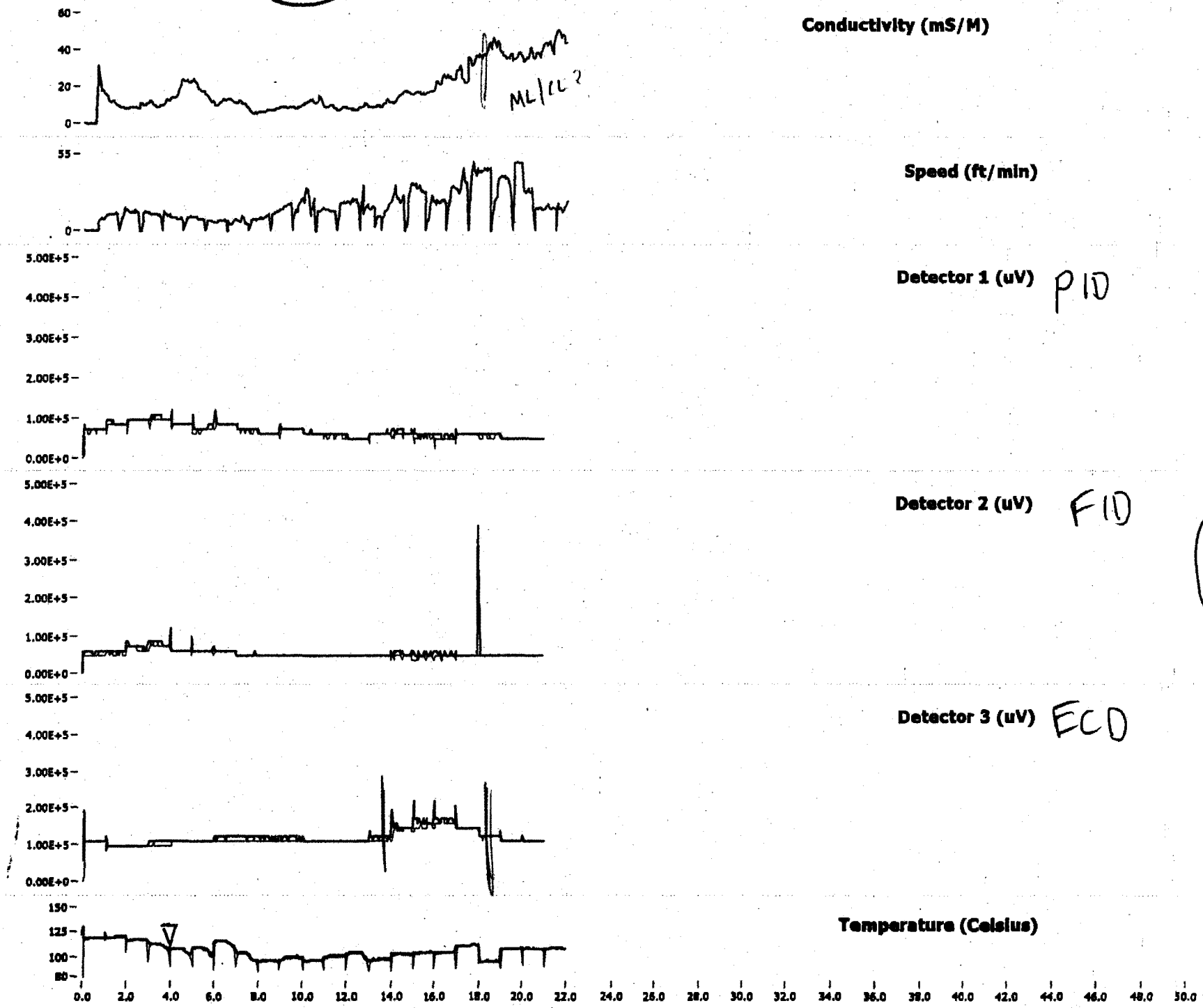
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No x Well I.D. #: ____

Log: C:\[redacted]n95\LOGFILES\MIP_06.dat



17MIP06/
17TW26

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 17MIP05 / 17W27
DATE: 4-27-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	0
							SEE MIP05						
	5												
	10												
	15						SCREEN 15'-19'						
	20			19' TD									

* When rock coring, enter rock brokeness.

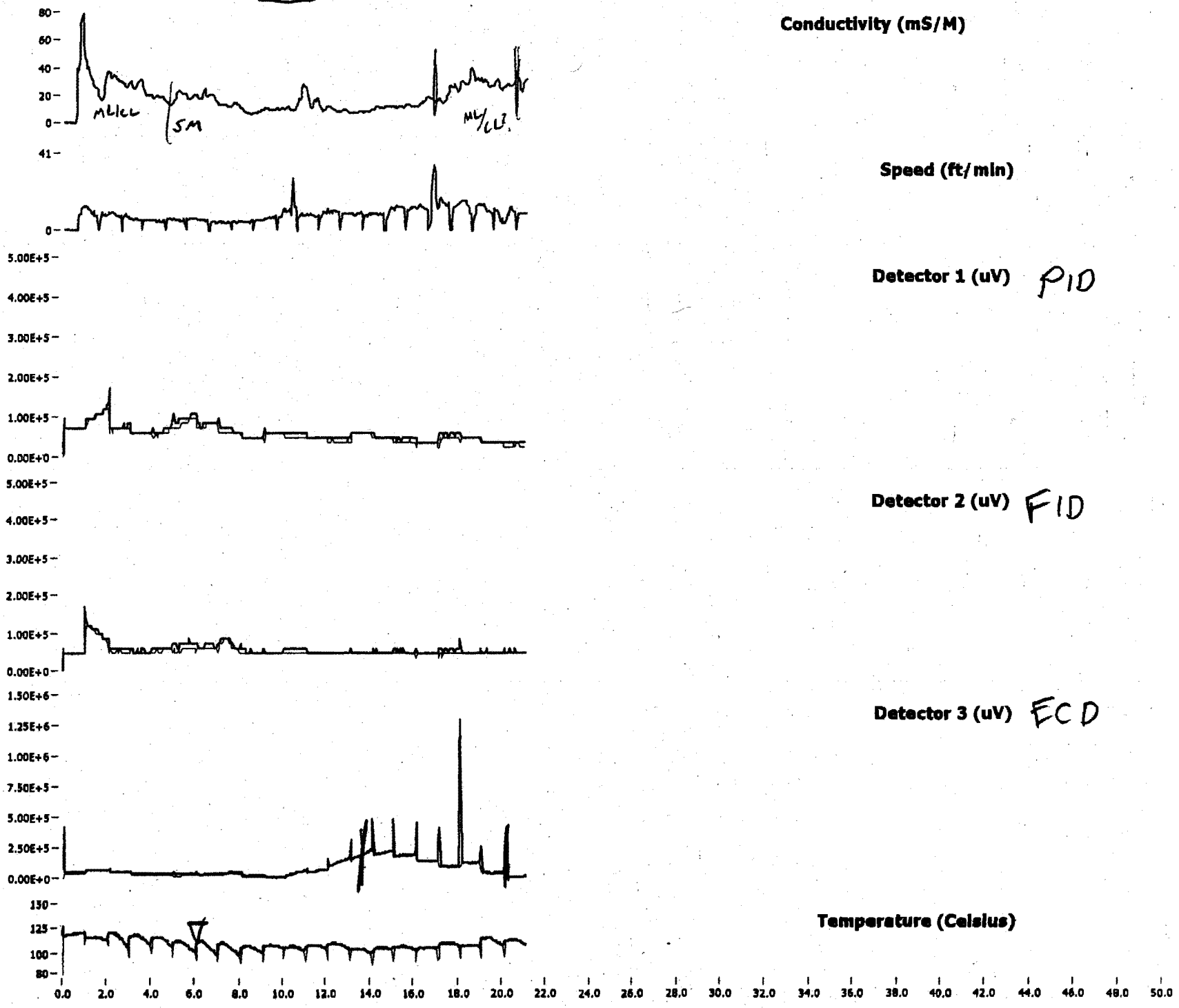
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Log: C:\[redacted]n95\LOGFILES\MIP_05.dat



17MIP05/
17TW27

CONTAMINATION DOWN ON SILT/CLAY UNIT

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 17MIP04 / TW28
DATE: 4-27-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	0
							SEE						
							MIP04						
	5												
	10												
							SCREEN 14'-18'						
	15												
				TD 18'									

* When rock coring, enter rock brokeness.

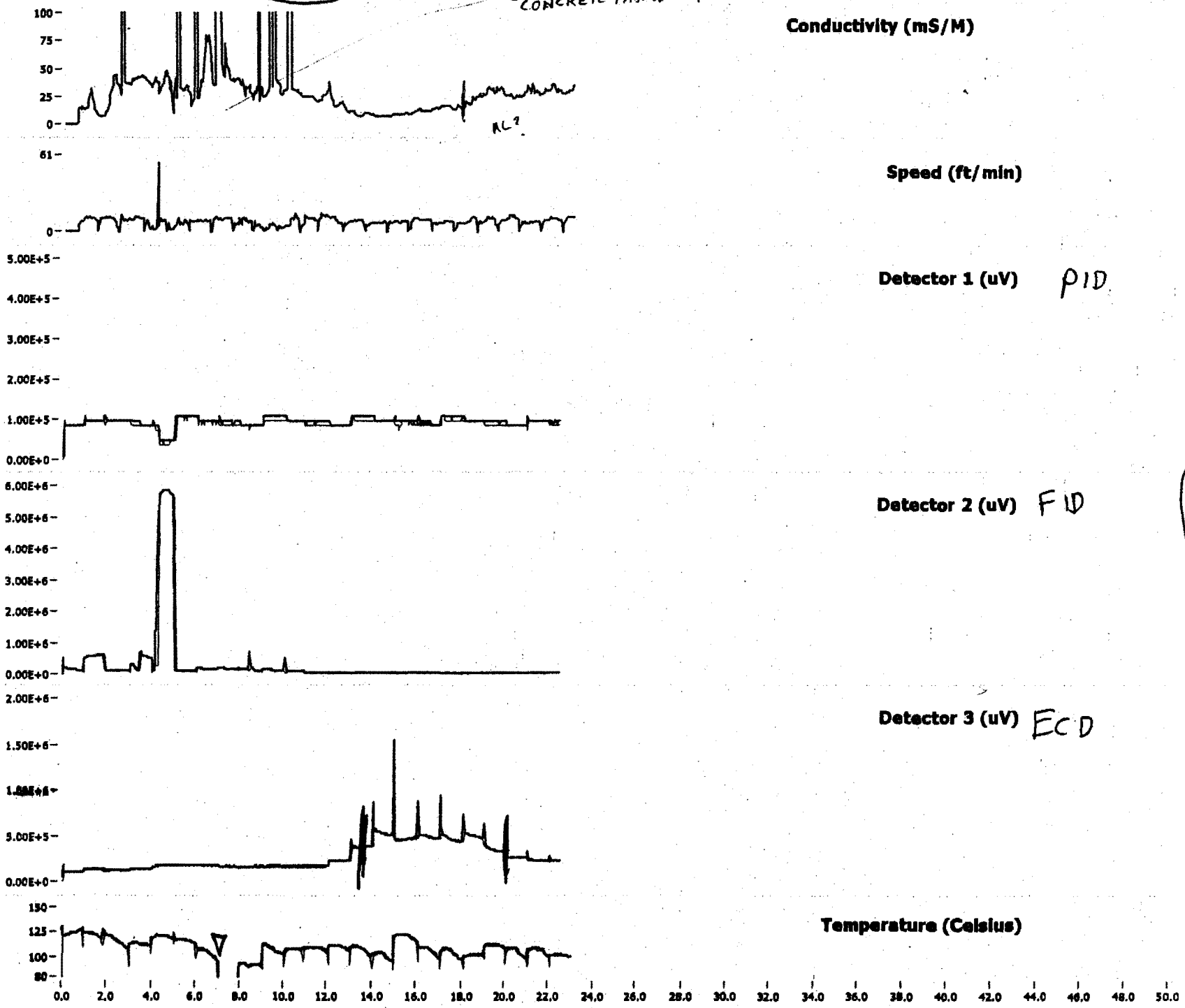
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Log: C:\[redacted]m95\LOGFILES\MIP_04C.dat



Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 17MIP03 / TW29
DATE: 4-27-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	0
							SEE						
							MIP03						
	5												
	10												
							SCREEN						
	15						14'-18'						
				TD									
	20			18'									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

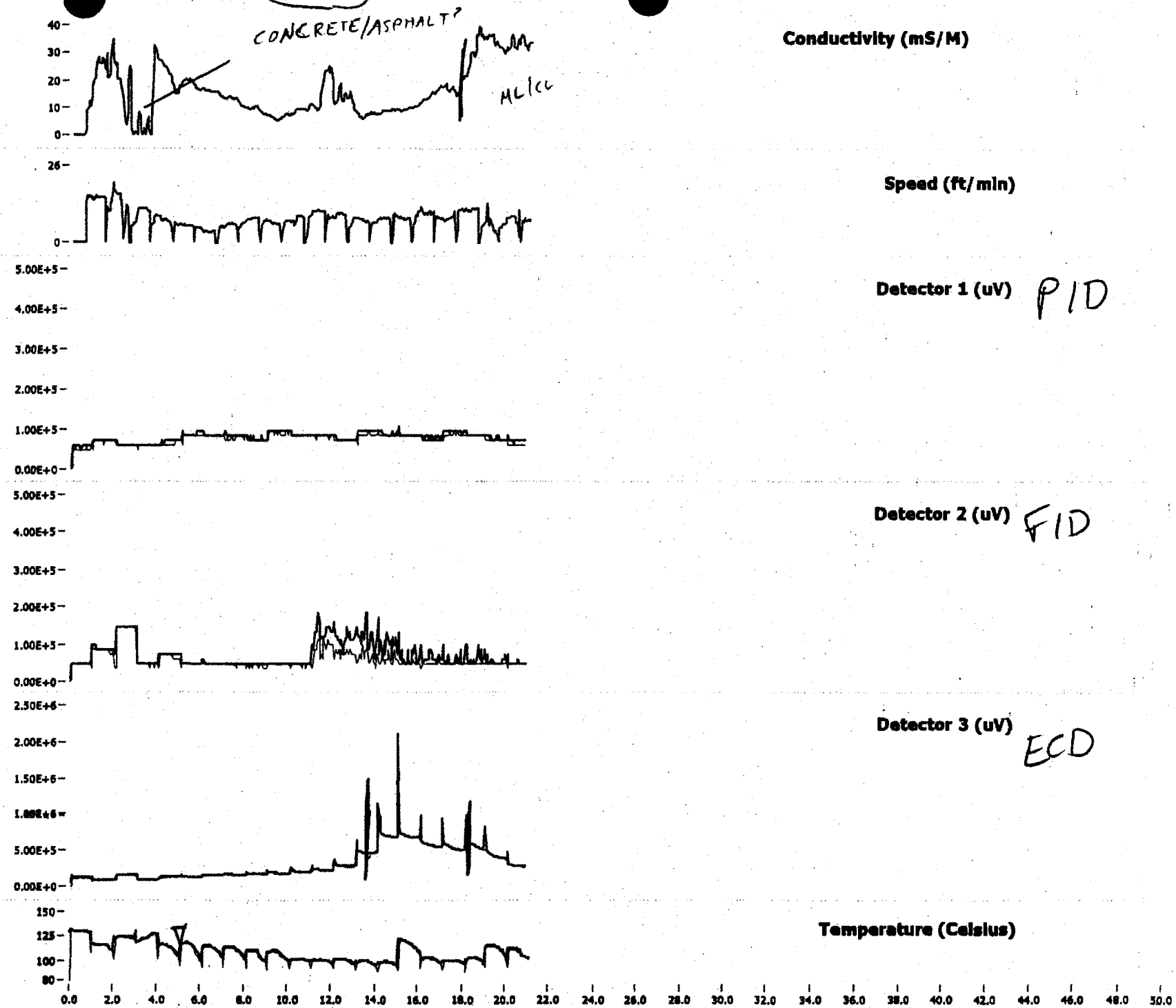
Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

REFUSAL @ 12' LOCATION

Log: C:\[redacted]m95\LOGFILES\MIP_03A.dat



17MIP03
17TW29

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 17MIP~~02~~17/TW30
DATE: 4-27-03
GEOLOGIST: WUDKWYCH
DRILLER: BRAND #1485

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	0
							SEE						
							17MIP02						
	5												
	10												
	15												
							SCREEN						
							14'-18'						
				TD									
	20			18'									

* When rock coring, enter rock brokeness.

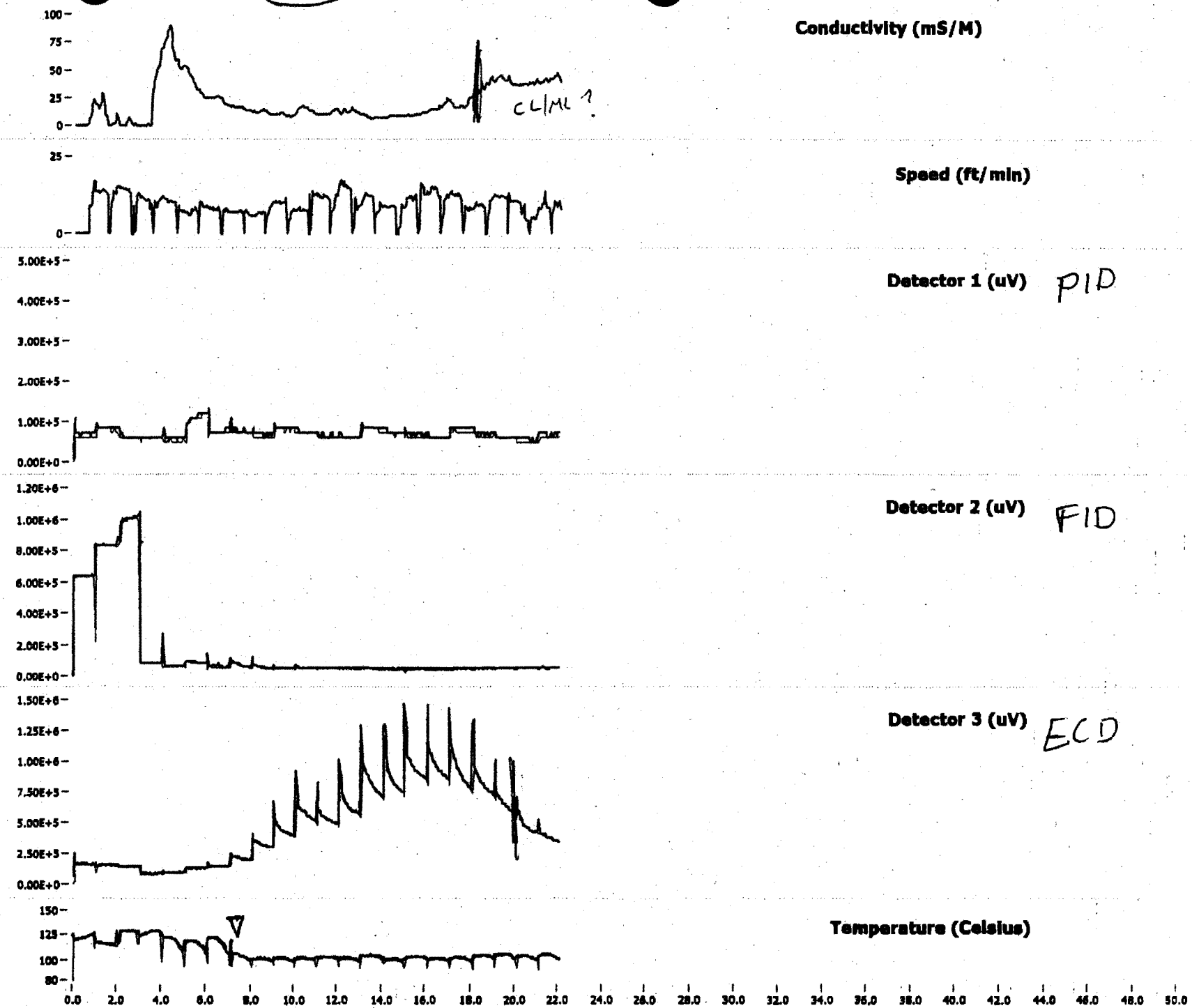
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Log: C:\[redacted]n95\LOGFILES\MIP_02.dat



17MIP02/
17TW30

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
DRILLING COMPANY: COLUMBIA TECH
DRILLING RIG: ATV DPT

BORING No.: 17MIP01 / TW31
DATE: 4-27-03
GEOLOGIST: WUDKWYCH
DRILLER: B RAND #1485

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										0	0	0	0
	5						SEE MIP01						
	10												
	15												
							SCREEN 14'-18'						
				TD 18'									
	20												

* When rock coring, enter rock brokeness.

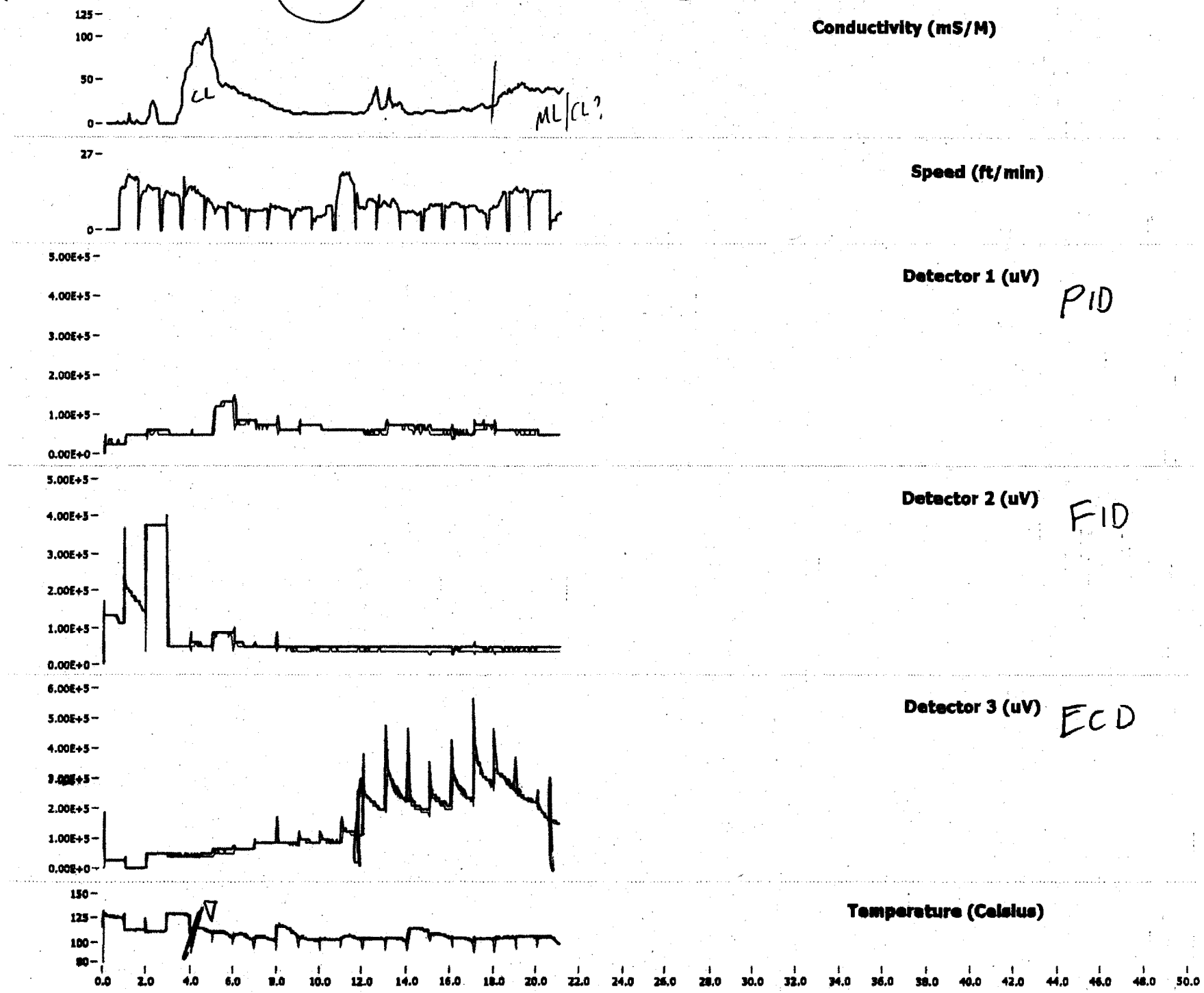
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Log: C:\[redacted]n95\LOGFILES\MIP_01.dat



17MIP01
17TW31

WELL NO.: 17TW32

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL* SHEET STICK-UP

BORING LOG

PROJECT SWMU 16/17 SUPP. RFI
PROJECT NO. 0528
DATE BEGUN 1-13-05
FIELD GEOLOGIST FRED W. RAMSER
GROUND ELEVATION _____

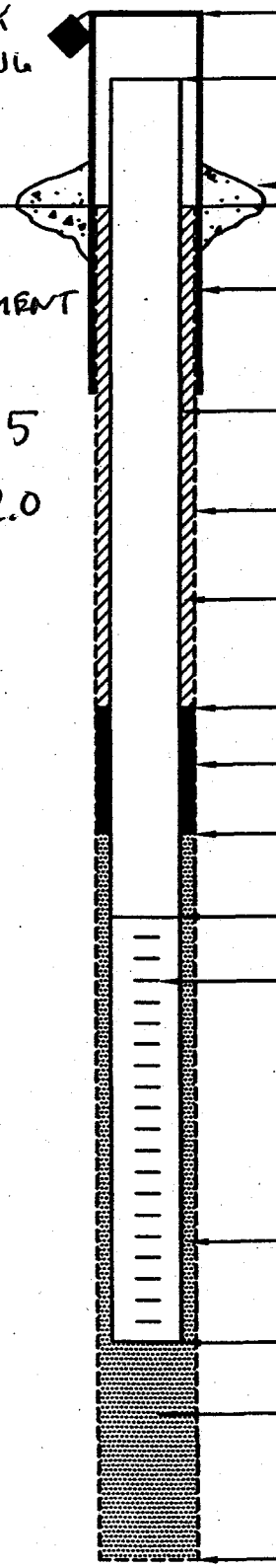
LOCATION NUS CHARLESTON
BORING 17TW32
DATE COMPLETED 1-13-05
DATUM _____

DRILLER RANDY BRAND SC LIC# B01485
DRILLING METHOD DPT
DEVELOPMENT METHOD PUMP

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-15-05

SWL = 2.0



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA
TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC
TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: /0'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~3'

ELEVATION/DEPTH TOP OF SCREEN: /6'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: /11'

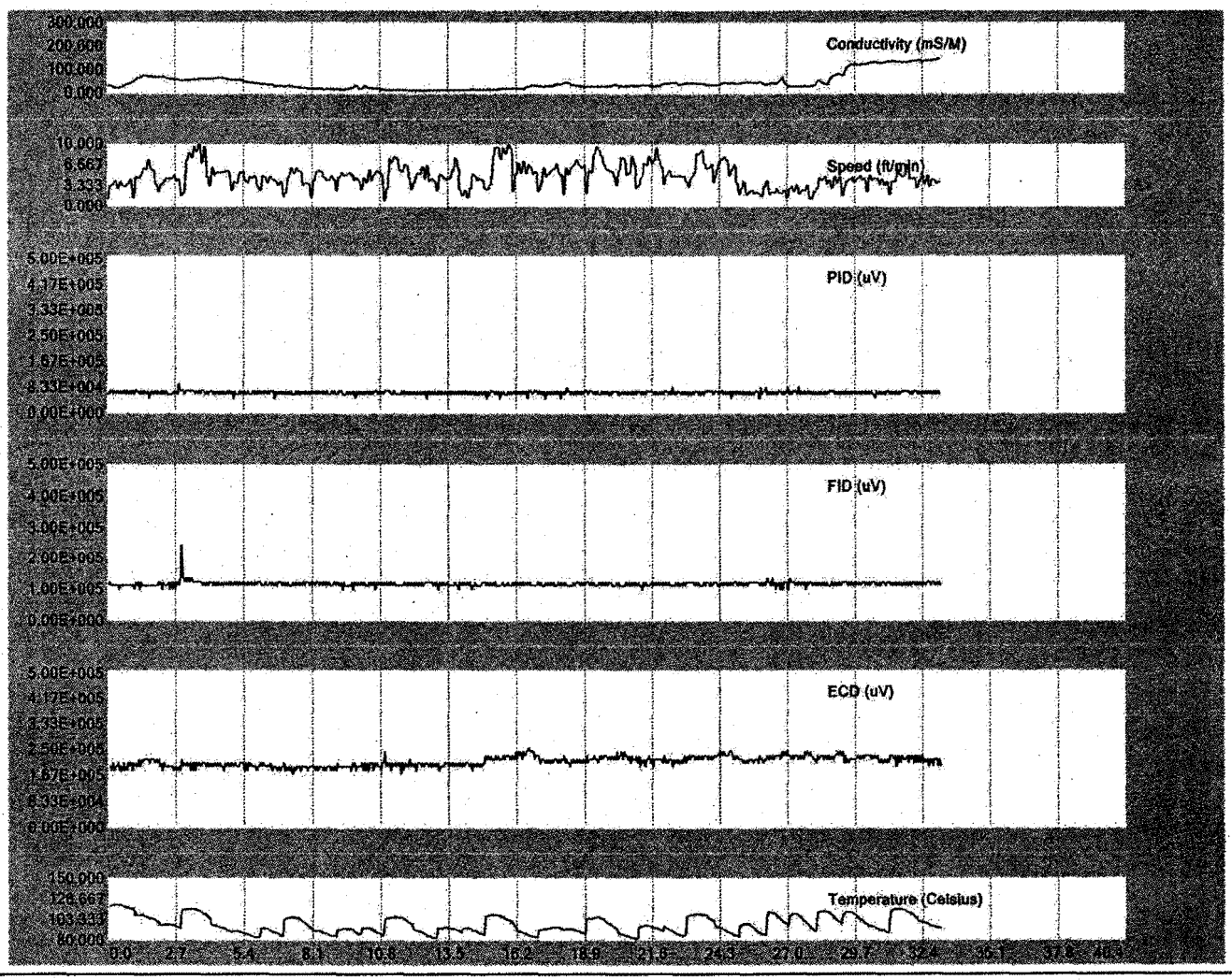
ELEVATION/DEPTH BOTTOM OF SAND PACK: /1

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: /11'

ACAD:FORM_MWSU.dwg 07/28/99 INL

17MIP23



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12/13/04

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COLUMBIA TECHNOLOGIES

17MIP23/
17TW32

WELL NO.: 17TW33

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL* SHEET STICK-UP

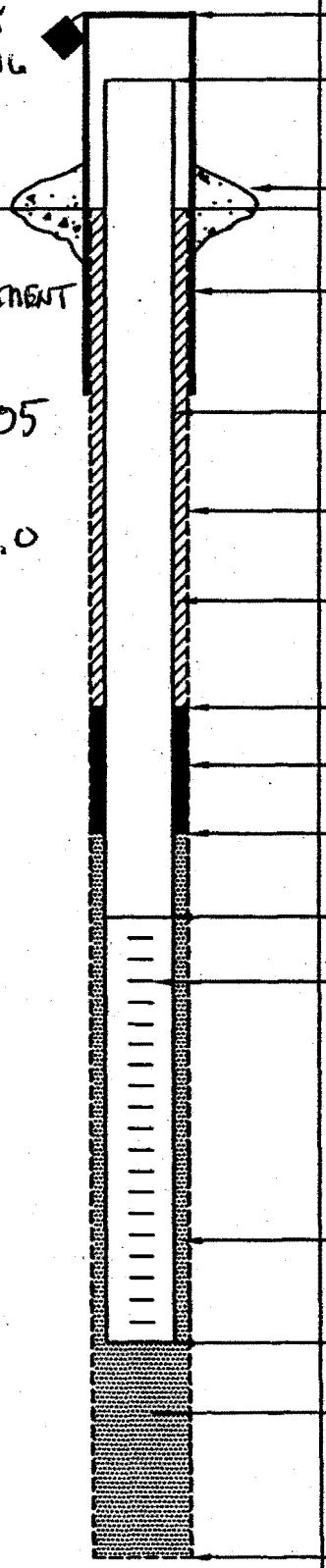
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NWS CHARLESTON	DRILLER RANDY BRAND
PROJECT NO. 0528	BORING 17TW33	DRILLING METHOD SC LIC# B01485 DPT
DATE BEGUN 1-13-05	DATE COMPLETED 1-13-05	
FIELD GEOLOGIST FRED W. RAMSER		DEVELOPMENT METHOD PUMP
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

SWL ~ 2.0 BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: /0'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~4'

ELEVATION/DEPTH TOP OF SCREEN: /6'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: /11'

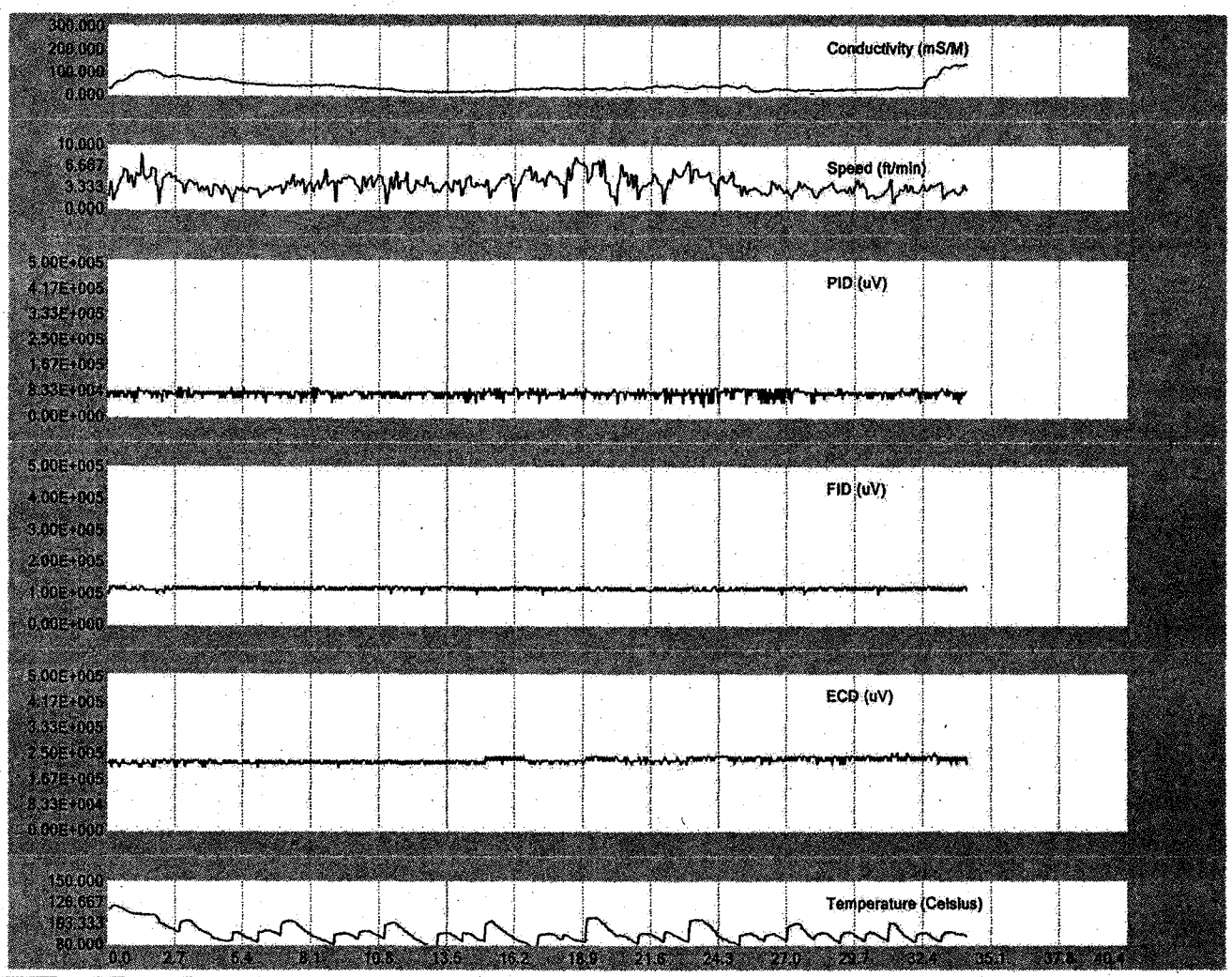
ELEVATION/DEPTH BOTTOM OF SAND PACK: /1

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: /11'

ACAD:FORM_MWSU.dwg 07/28/99 INL

17MIP24



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12/13/04

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COLUMBIA TECHNOLOGIES

17MIP24/
17TW33

WELL NO.: 17TW34

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL* SHEET STICK-UP

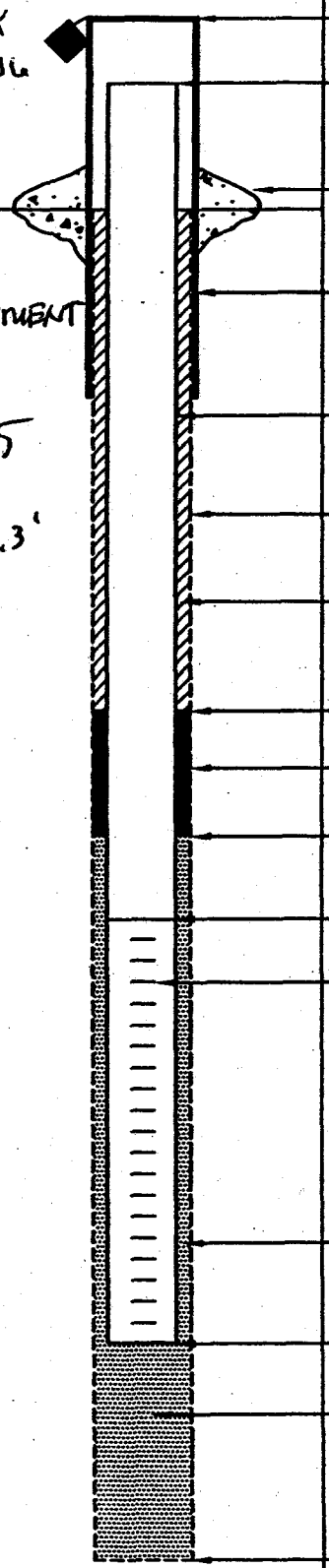
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NWS CHARLESTON	DRILLER RANDY BRAND
PROJECT NO. 0528	BORING 17TW34	DRILLING METHOD SC LIC#B01485 DPT
DATE BEGUN 1-13-05	DATE COMPLETED 1-13-05	
FIELD GEOLOGIST FRED W. RAMSER		DEVELOPMENT METHOD PUMP
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-15-05

SWL ≈ 2.3' BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: /0'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~4'

ELEVATION/DEPTH TOP OF SCREEN: /6'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: /11'

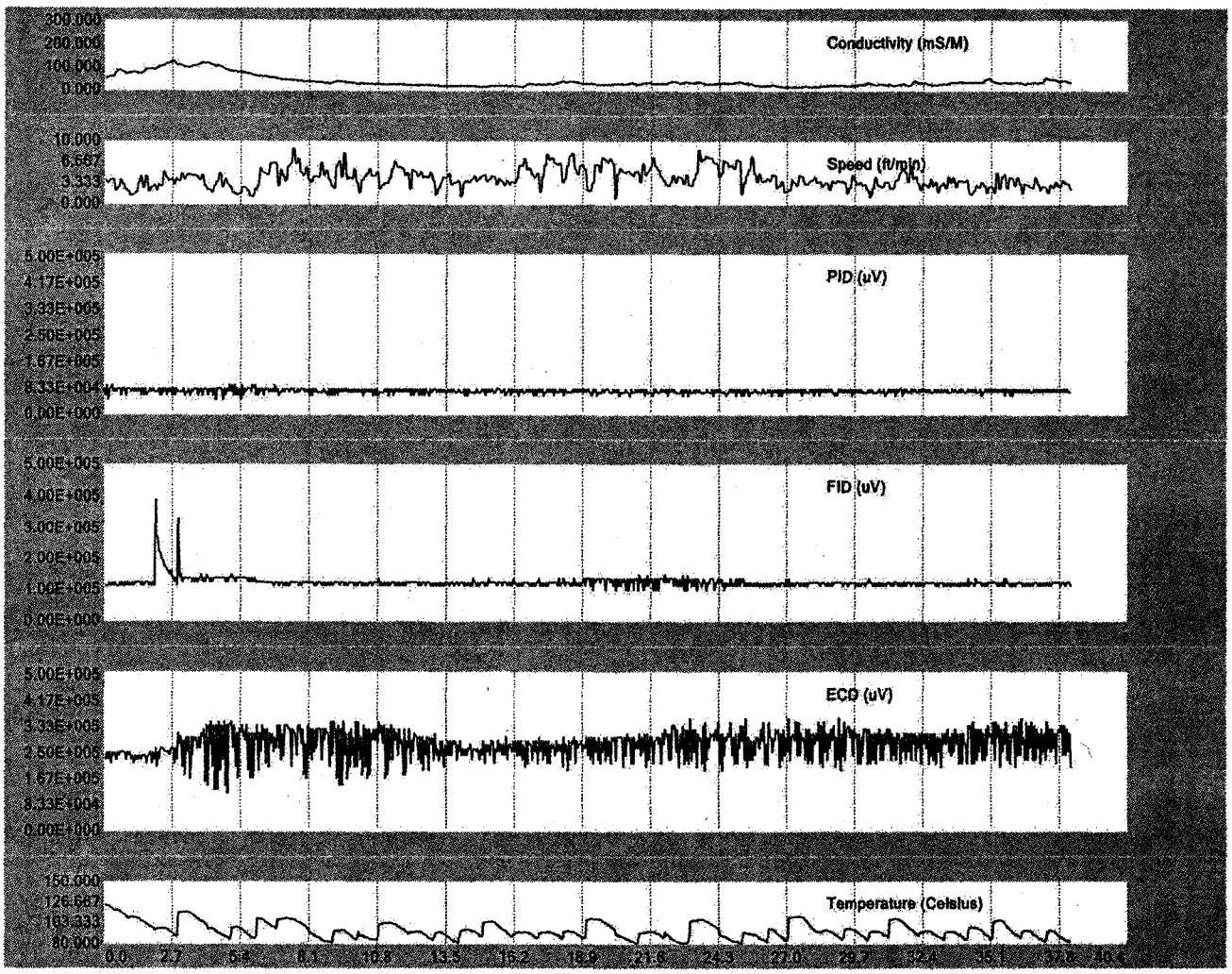
ELEVATION/DEPTH BOTTOM OF SAND PACK: /1

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: /11'

ACAD:FORM_MWSU.dwg 07/28/99 INL

17MIP25



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COLUMBIA TECHNOLOGIES

17MIP25/
17TW34

WELL NO.: 17TW35

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL* SHEET STICK-UP

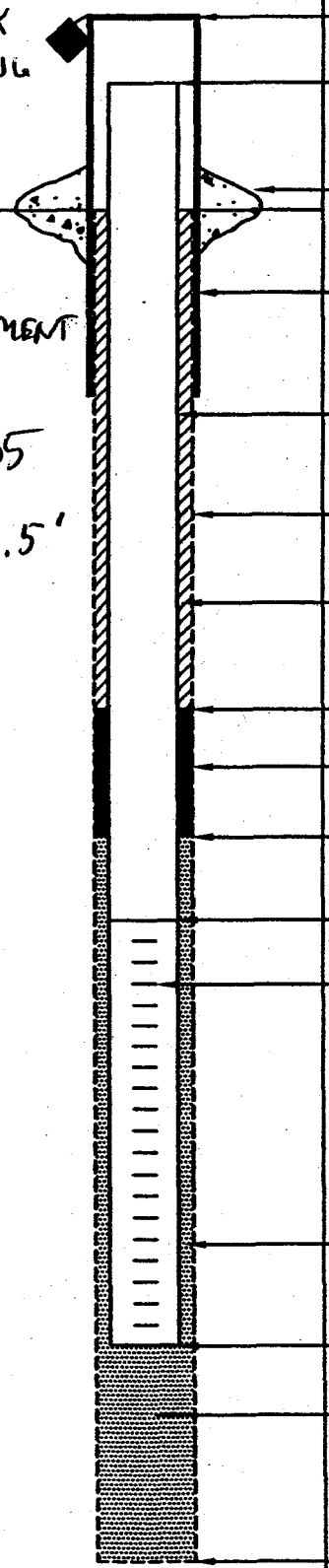
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NUS CHARLESTON	DRILLER RANDY BRAND
PROJECT NO. 0528	BORING 17TW35	DRILLING METHOD SC LIC # B01485 DPT
DATE BEGUN 1-13-05	DATE COMPLETED 1-13-05	
FIELD GEOLOGIST FRED W. RAMSER		DEVELOPMENT METHOD PUMP
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

SWL≈2.5' (BGS)



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 1

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~4'

ELEVATION/DEPTH TOP OF SCREEN: 16'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 11'

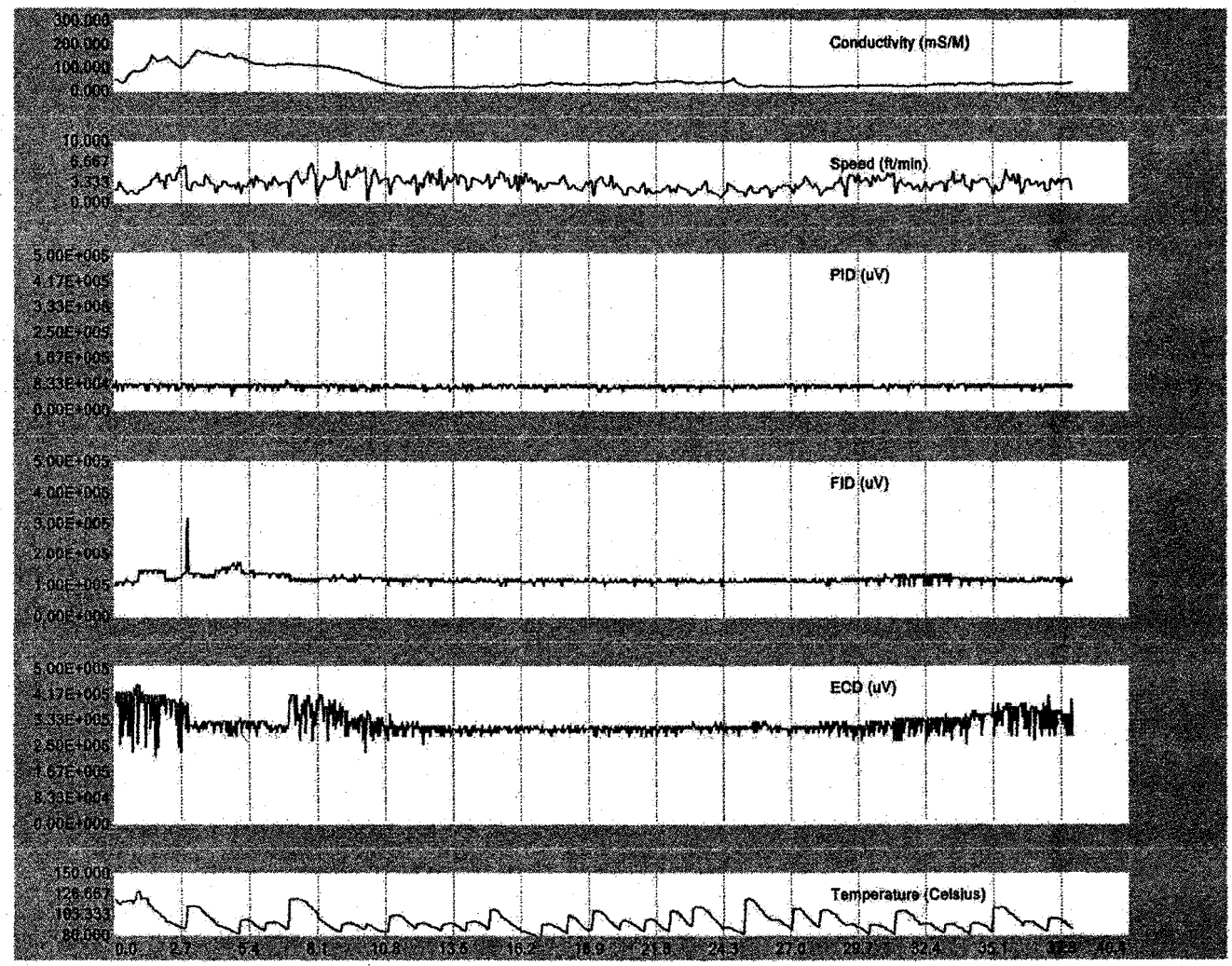
ELEVATION/DEPTH BOTTOM OF SAND PACK: 11

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 11'

ACAD:FORM_MWSU.dwg 07/28/99 INL

17MIP26



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12/13/04

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COLUMBIA TECHNOLOGIES

17MIP26/
17TW35

WELL NO.: 17TW36

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL* SHEET STICK-UP

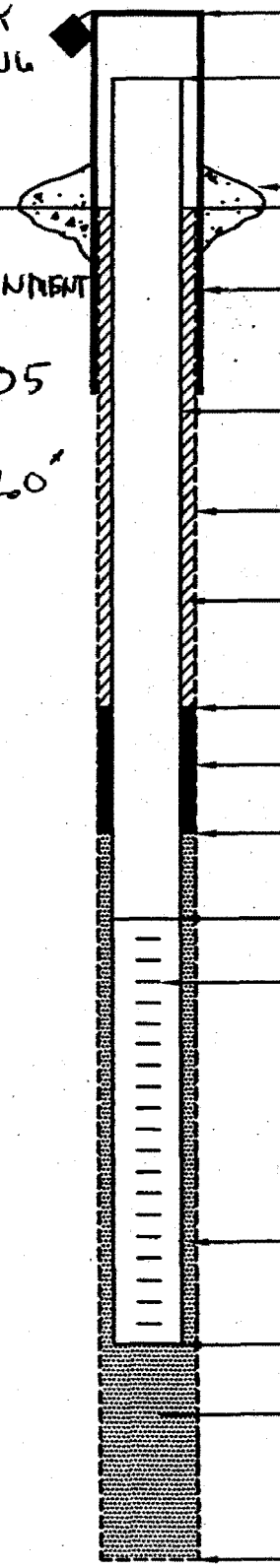
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NUS CHARLESTON	DRILLER RANDY BRAND LIC SC#B01485
PROJECT NO. 0528	BORING 17TW36	DRILLING METHOD DPT
DATE BEGUN 1-13-05	DATE COMPLETED 1-13-05	
FIELD GEOLOGIST FRED W. RAMSER		DEVELOPMENT METHOD PUMP
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

SWL = 20' BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~3'

ELEVATION/DEPTH TOP OF SCREEN: 15'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 10'

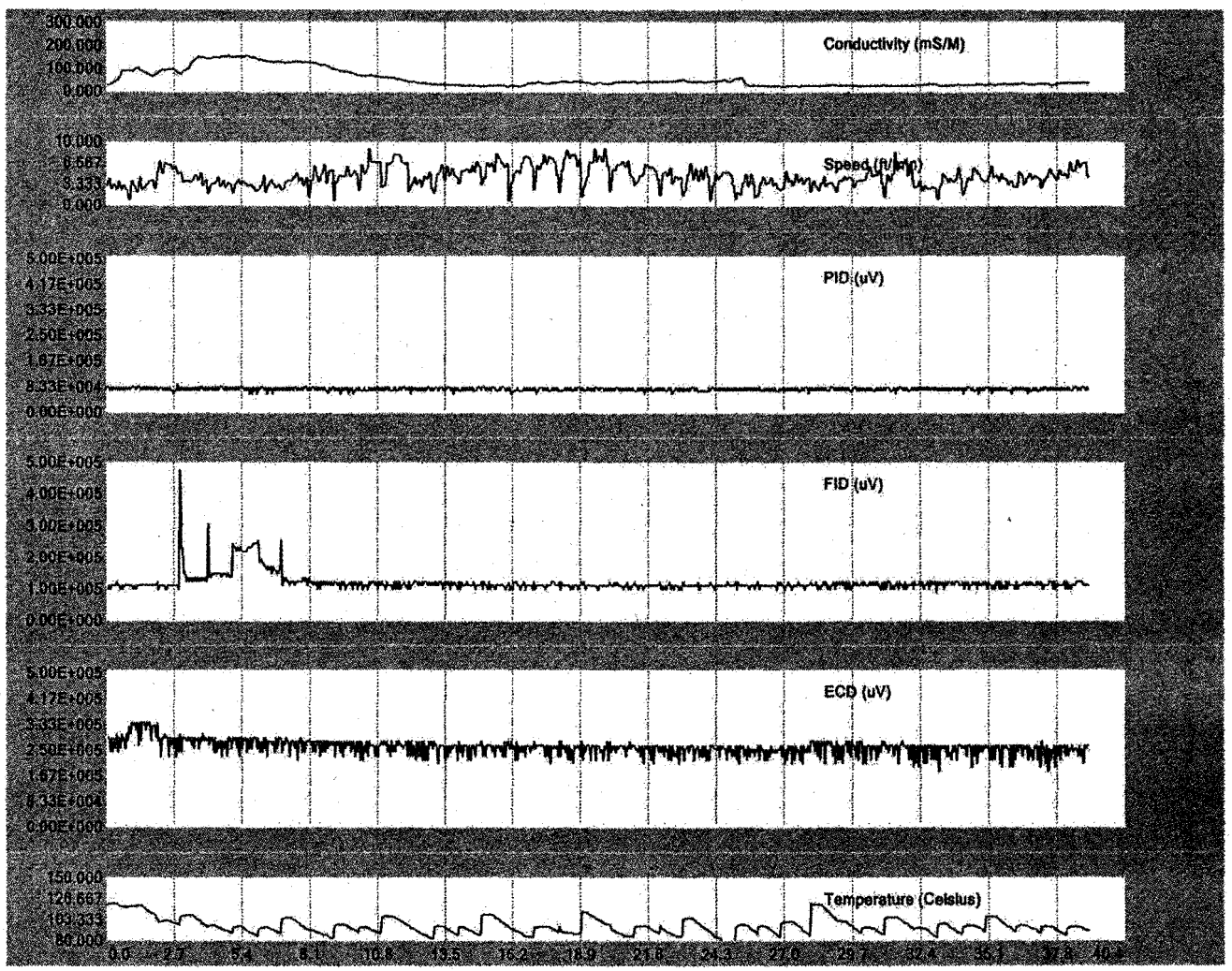
ELEVATION/DEPTH BOTTOM OF SAND PACK: 1[illegible]

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 10'

ACAD: FORM_MWSU.dwg 07/28/99 INL

17MIP27



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12/13/04

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COLUMBIA TECHNOLOGIES

17MIP27/
17TW36

WELL NO.: 17TW37

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL* SHEET STICK-UP

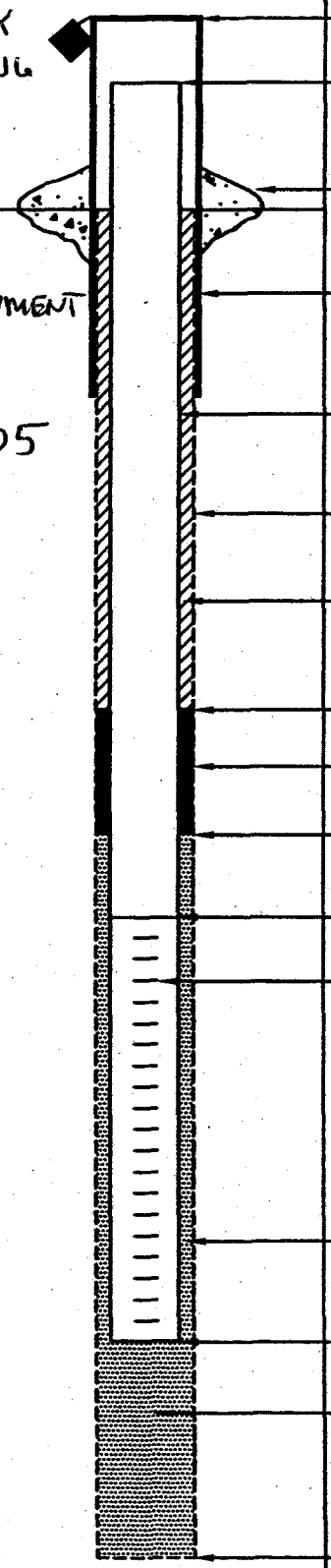
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NUS CHARLESTON	DRILLER RANDY BRAND SC. LIC. #B01485
PROJECT NO. 0528	BORING 17TW37	DRILLING METHOD DPT
DATE BEGUN 1-13-05	DATE COMPLETED 1-13-05	
FIELD GEOLOGIST FRED W. RAMSER		DEVELOPMENT METHOD PUMP
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

Sul=1.5' BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 1

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~9'

ELEVATION/DEPTH TOP OF SCREEN: 11'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 16'

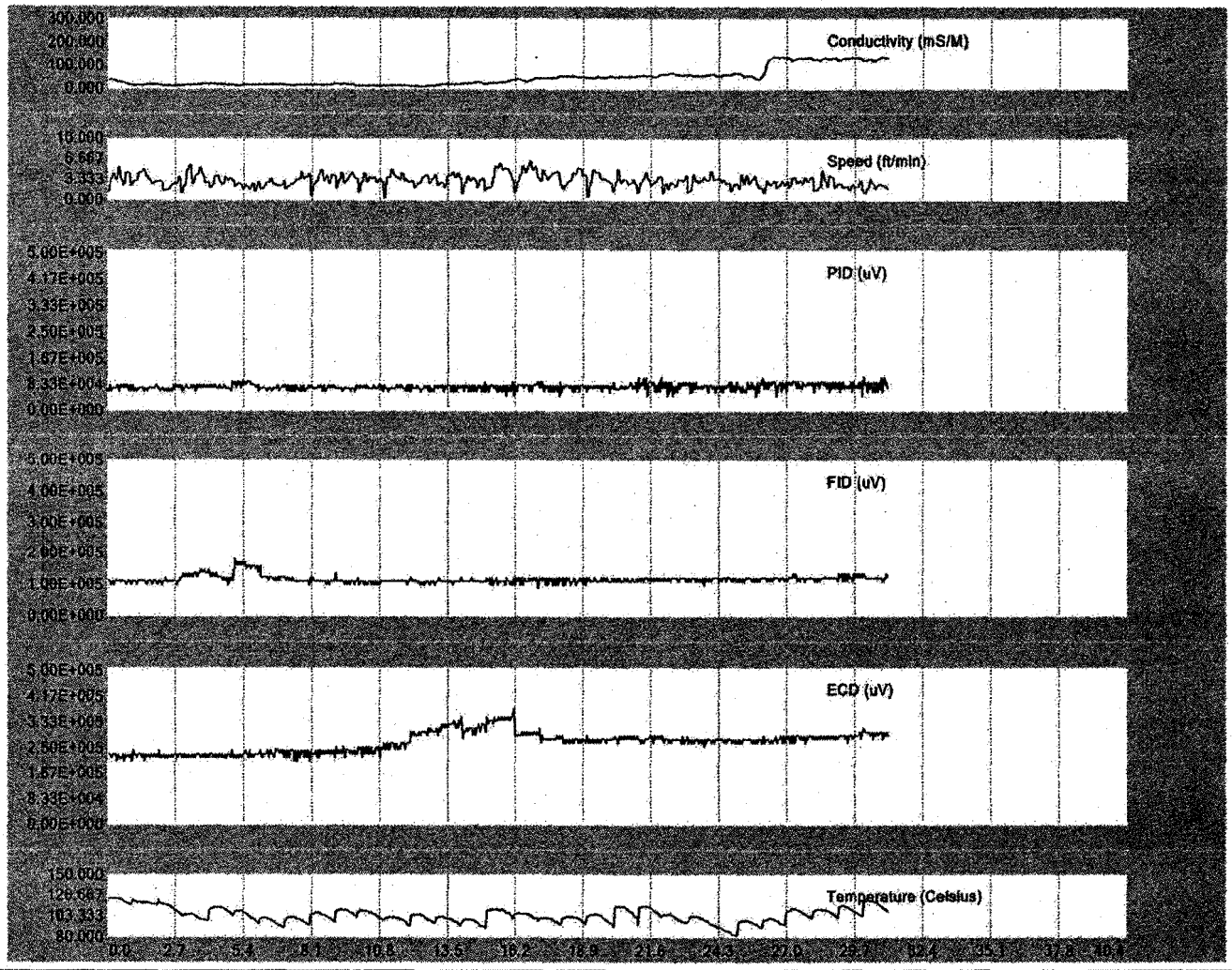
ELEVATION/DEPTH BOTTOM OF SAND PACK: 16

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 16'

ACAD:FORM_MWSU.dwg 07/28/99 INL

17MIP28



Tetra Tech
SWMU 17 Revisit
12/07/04

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COLUMBIA TECHNOLOGIES

17MIP28/
17TW37

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: DP6 "MOBILWELD"

BORING No.: 17TW37-B ~~17MW12~~ FWR
DATE: 1-26-05
GEOLOGIST: FRED WRAMSER
DRILLER: FRANK COOPER #0965

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	SC.LIC#A00965 Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							REDDISH SAND		HA TO 5.5'				
							YEL BRN		(FILL)				
							CLAY + SAND		NEXT TO				
							H_2O @ ~5.5'		WILKINSON RD				
	5												
S-1 0935	6			▽	MED DENSE	GREENISH GREY	(POOR RECOVERY)	SP	SATURATED	0			
	7						SAND TR SILT		IRON STAINING	0			
	8						+ CLAY MOTTLED						
	9		0.5/4.0										
S-2 0955	10				MED DENSE	YEL BRN	SAND MOTTLED	SP		0			0
						TO LT GREENISH GREY				0			0
	12						SAND TR SILT			0			0
			3.0/4.0				+ CLAY			0			0
S-3 1005	14				?		LT GREENISH GREY	SP					
							SAND IN SHOE						
	16												
			0.2/4.0										
S-4 1010	18				LOOSE		DK GREYISH GREEN	SM	SOME TO TR.	0			
					(SOFT)		SILTY f-g SAND COARSENING DOWN		SHELL FRAG.	0			
	20						WARD (SANDIER)			0			
			4.0/4.0							0			
S-5 1020	22				LOOSE	DK GREY	f-g SAND TR SILT	SM/SP	TR SHELL	0			0
						ISH GRN		S	FRAG	0			0
	24									0			0
	25		4.0/4.0							0			0

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): [ ]

Remarks: USING 4' MACRO CORE SAMPLERS W/ PLASTIC LINERS (DPT)

Converted to Well: Yes ✓ No _____ Well I.D. #: ~~17MW12D~~ FWR 17TW37-B

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS Charleston CTO 137
PROJECT NUMBER: 0528, SWMU 16/17 RFI
DRILLING COMPANY: GREGG
DRILLING RIG: DP 6 "MOBILE WELD"

BORING No.: ~~17MW12~~ FUR 17TW37-B
DATE: 1-26-05
GEOLOGIST: FRED WRAMBER
DRILLER: FRANK COOPER #0965

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
S-6 1050	26						AS ABOVE			0			
	27						f.g SAND w/ some SILT + TR SHELL FRAG			0			
	28									0			
	29		4.0/4.0		MED STIFF		DK GREYISH GREEN CLAY w/ SOME SILT	OH	TR SHELL FRAG	0			
	30						(PLASTIC)		THIS IS THE				
									CONFINING UNIT!				
									PLACE SCREEN				
									JUST AT				
									18-28				
									SAND 16-28				
							SHALLOW WELL		BENTONITE				
							17MW12S WAS		14'-16'				
							ALSO ABANDONED		HYDRATED				
							CLUSTERED w/17MW12D		w/ POTABLE				
									H_2O @				
							THIS WELL						
							WAS ABANDONED						
							1-28-05 AND						
							IDENTIFIED						
							AS 17TW37-B						
							THIS BORING WAS						
							DONE AT 17MIP28						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): [ ]

Remarks: (DEEP WELL SCREEN 18-28) SHALLOW WELL SCREEN 4-14

Converted to Well: Yes ✓ No _____ Well I.D. #: ~~17MW12~~ FUR 17TW37-B

WELL NO.: 17TW38

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL* SHEET STICK-UP

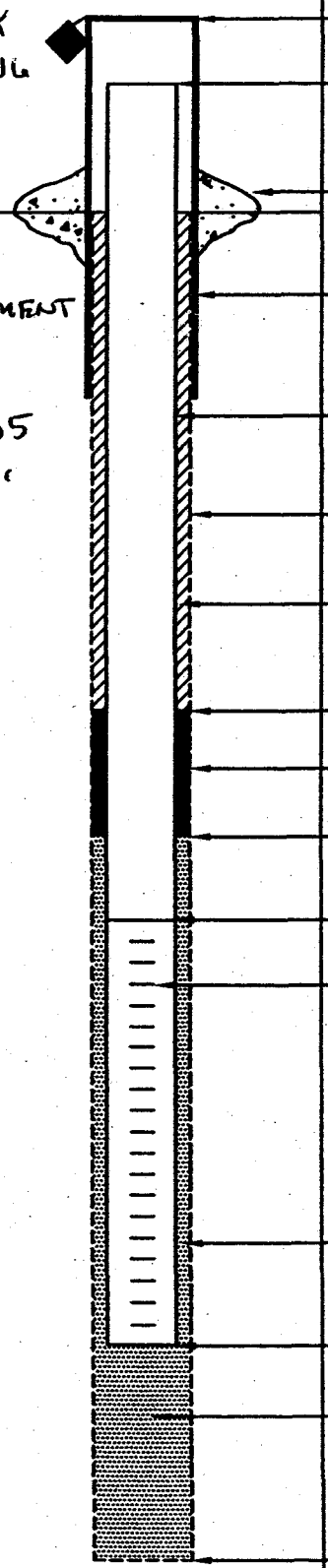
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NWS CHARLESTON	DRILLER RANDY BRAND SC LIC#B01485
PROJECT NO. 0528	BORING 17TW38	DRILLING METHOD DPT
DATE BEGUN 1-15-05	DATE COMPLETED 1-15-05	DEVELOPMENT METHOD PUMP
FIELD GEOLOGIST FRED W. RAMSER		
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

SWL = 4'



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~3'

ELEVATION/DEPTH TOP OF SCREEN: 15'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 10'

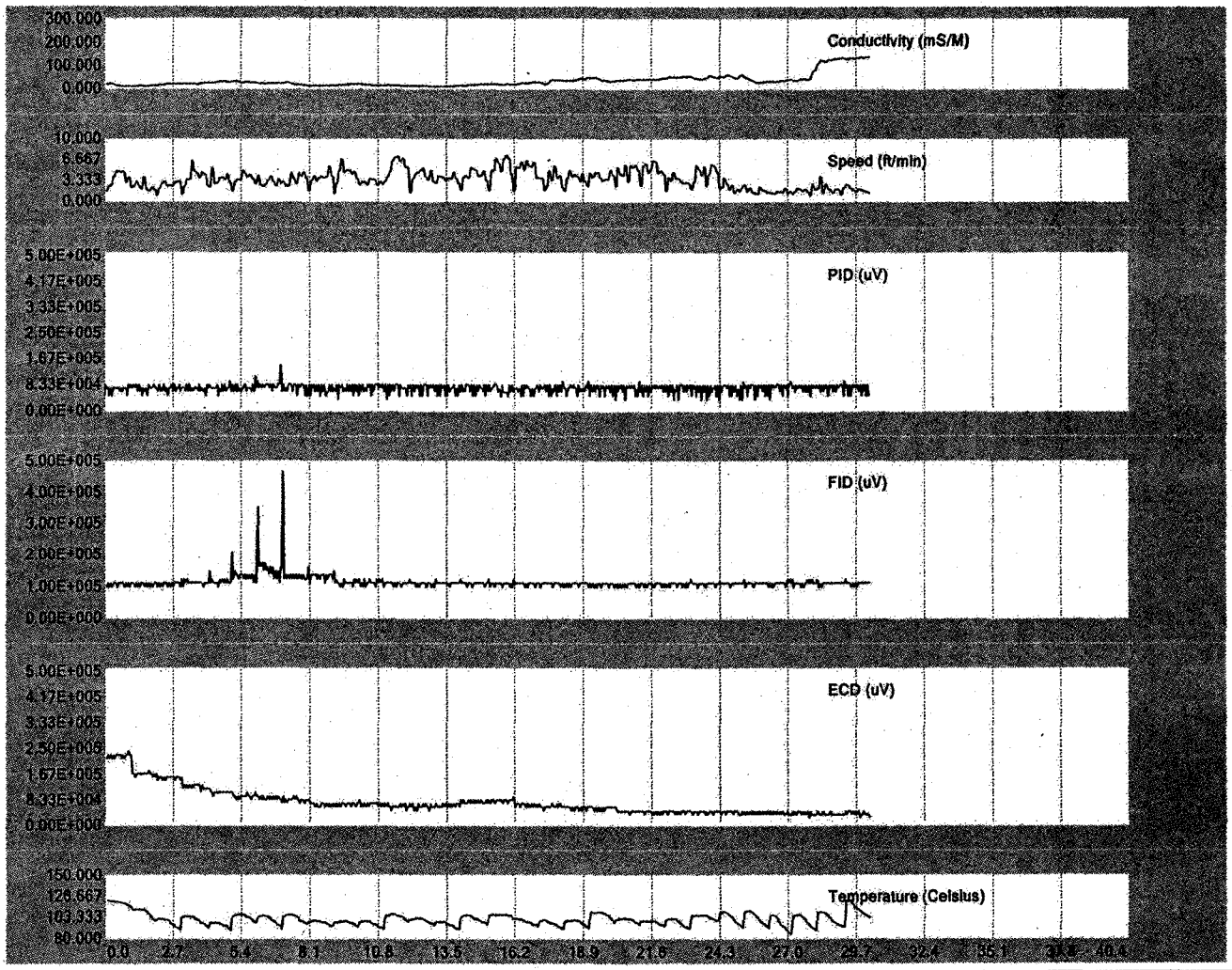
ELEVATION/DEPTH BOTTOM OF SAND PACK: 1

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 10'

ACAD:FORM_MWSU.dwg 07/28/99 INL

17MIP29



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COLUMBIA TECHNOLOGIES

17MIP29/
17TW38

WELL NO.: 17TW39

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL* SHEET STICK-UP

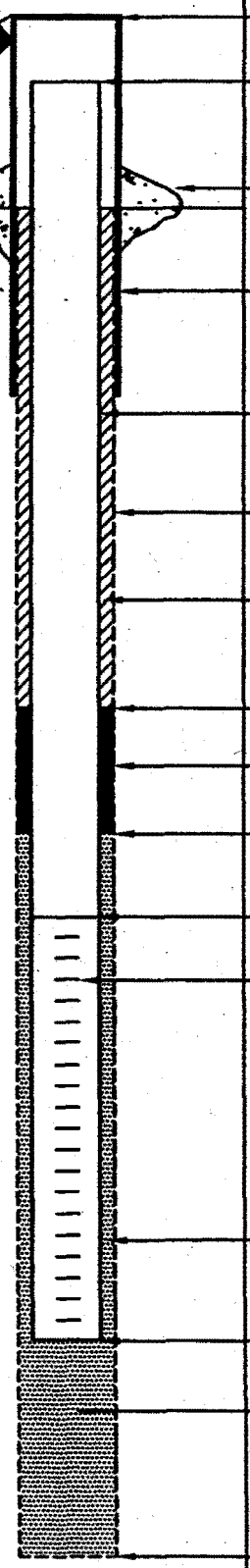
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NWS CHARLESTON	DRILLER RANDY BRAND
PROJECT NO. 0528	BORING 17TW39	DRILLING METHOD SC LIC#B01485 DPT
DATE BEGUN 1-15-05	DATE COMPLETED 1-15-05	
FIELD GEOLOGIST FRED W. RAMSER		DEVELOPMENT METHOD PUMP
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

SWL = 2' BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 1

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~3'

ELEVATION/DEPTH TOP OF SCREEN: 15'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 110'

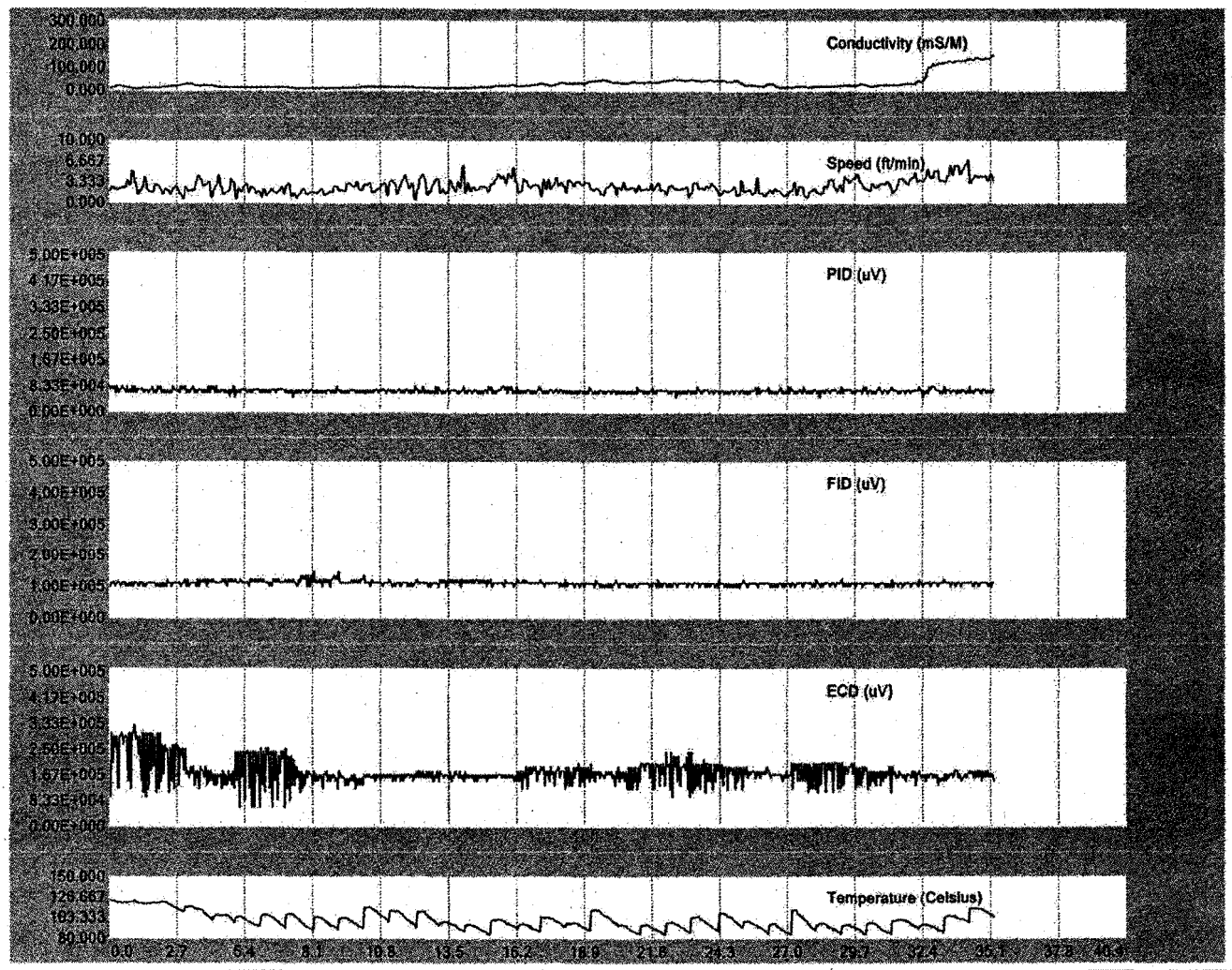
ELEVATION/DEPTH BOTTOM OF SAND PACK: 11[illegible]

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 110'

ACAD:FORM_MWSU.dwg 07/28/99 INL

17MIP30



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12/07/04

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17MIP30/
17TW39

WELL NO.: 17TW40

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OVERBURDEN MONITORING WELL* SHEET STICK-UP

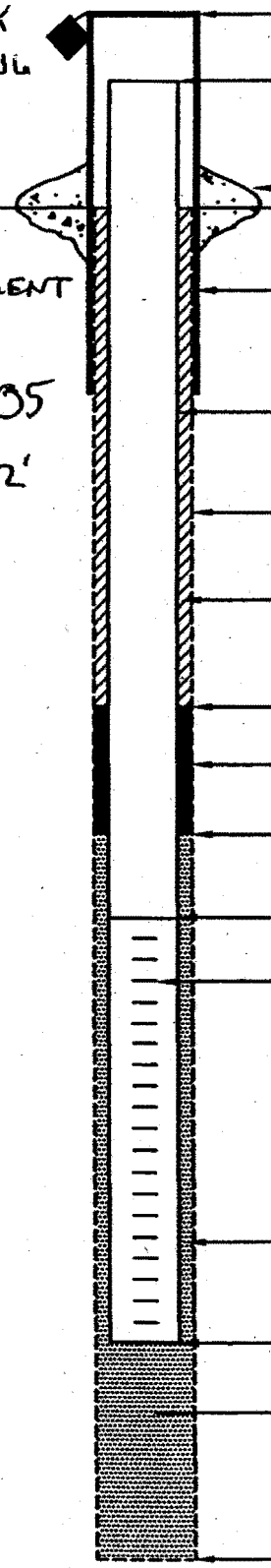
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NWS CHARLESTON	DRILLER RANDY BRAND
PROJECT NO. 0528	BORING 17TW40	DRILLING METHOD SC LIC.#B01485 DPT
DATE BEGUN 1-15-05	DATE COMPLETED 1-15-05	
FIELD GEOLOGIST FRED W. RAMSER		DEVELOPMENT METHOD PUMP
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

SWL = 2' BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~4'

ELEVATION/DEPTH TOP OF SCREEN: 16'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 11'

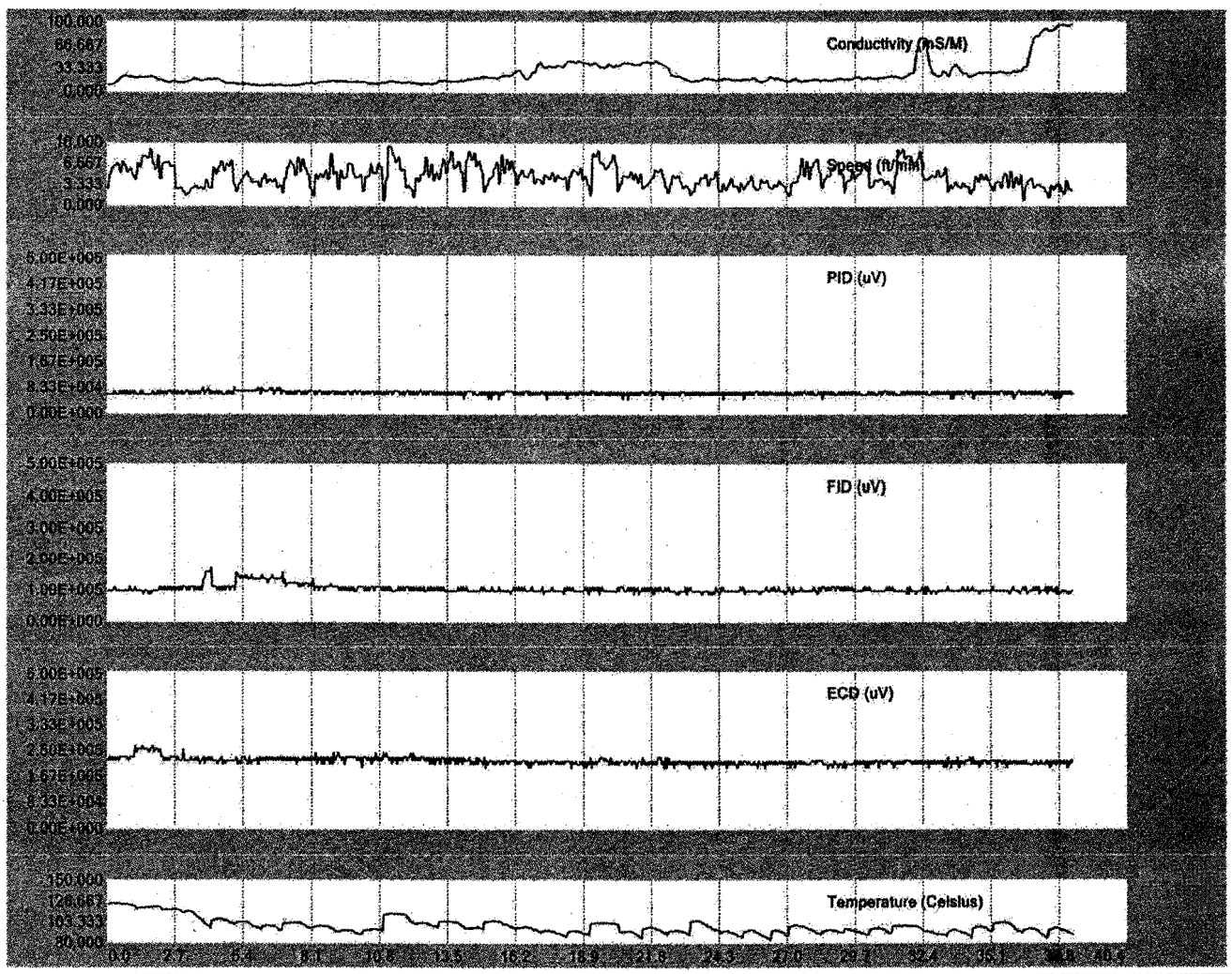
ELEVATION/DEPTH BOTTOM OF SAND PACK: /

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 11'

ACAD:FORM_MWSU.dwg 07/28/99 INL

17MIP31



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COLUMBIA TECHNOLOGIES

17MIP31/
17TW40

WELL NO.: 17TW41

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OVERBURDEN MONITORING WELL* SHEET STICK-UP

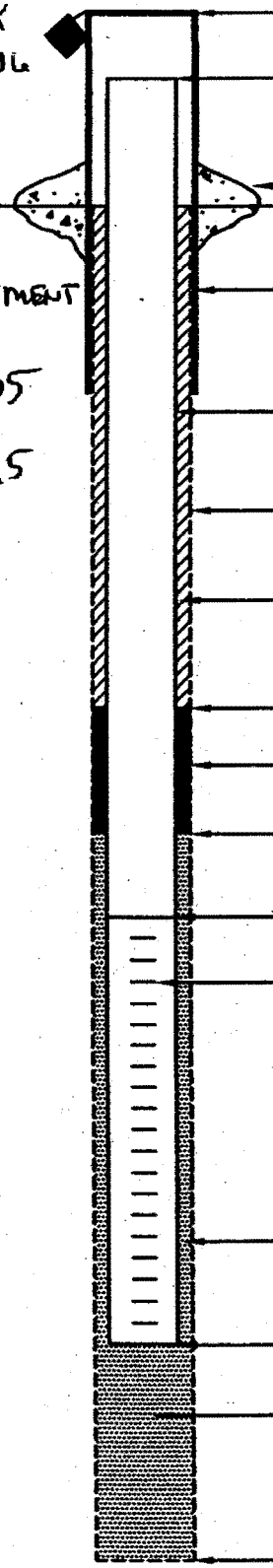
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NUS CHARLESTON	DRILLER RANDY BRMD SCLICE B01485
PROJECT NO. 0528	BORING 17TW41	DRILLING METHOD DPT
DATE BEGUN 1-13-05	DATE COMPLETED 1-13-05	
FIELD GEOLOGIST FRED W. RAMSER		DEVELOPMENT METHOD PUMP
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

SWL = 6.5 BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~4'

ELEVATION/DEPTH TOP OF SCREEN: 16'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 11'

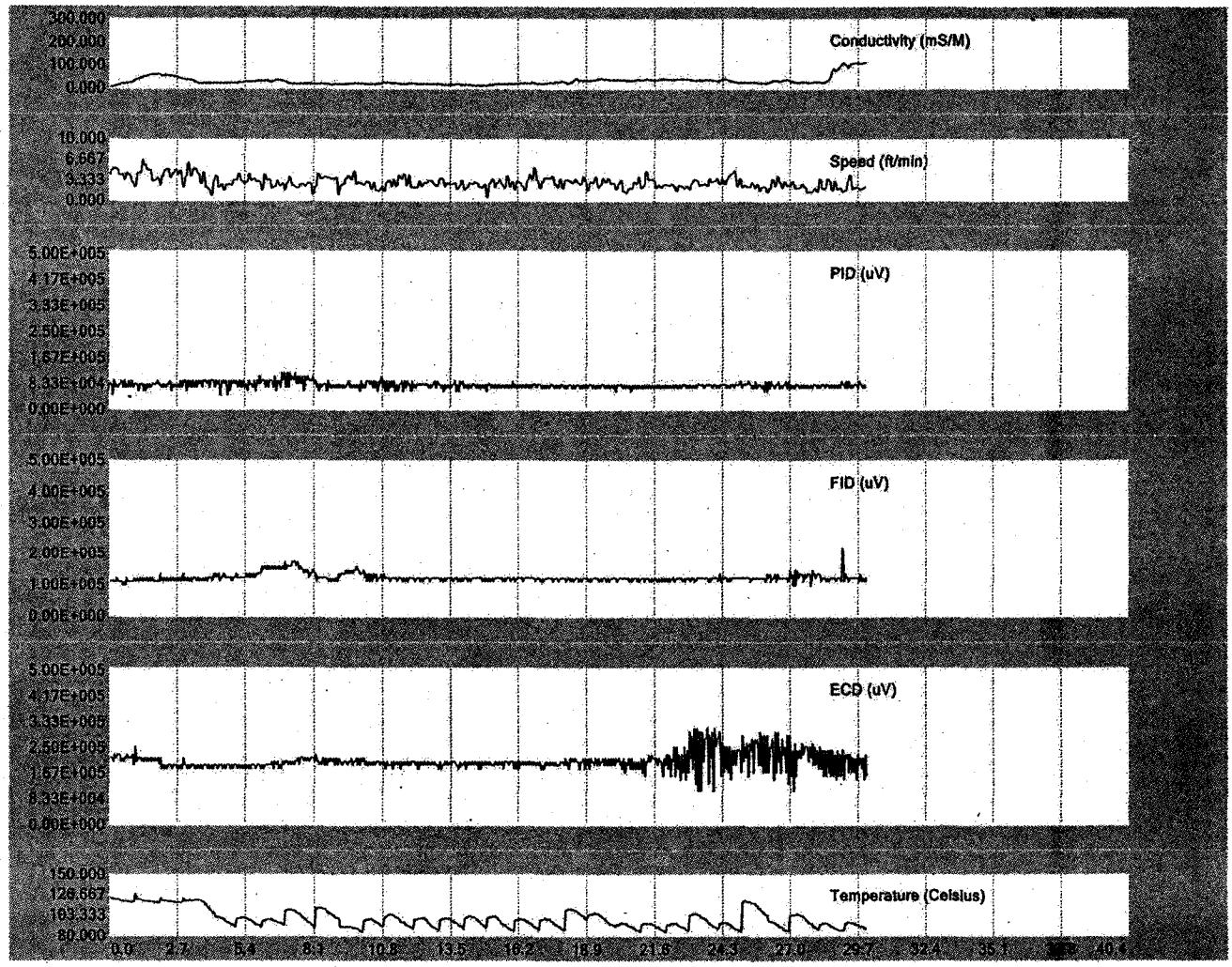
ELEVATION/DEPTH BOTTOM OF SAND PACK: 1

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 11'

ACAD:FORM_MWSU.dwg 07/28/99 INL

17MIP32



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17MIP32/
17TW41

WELL NO.: 17TW42

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OVERBURDEN MONITORING WELL* SHEET STICK-UP

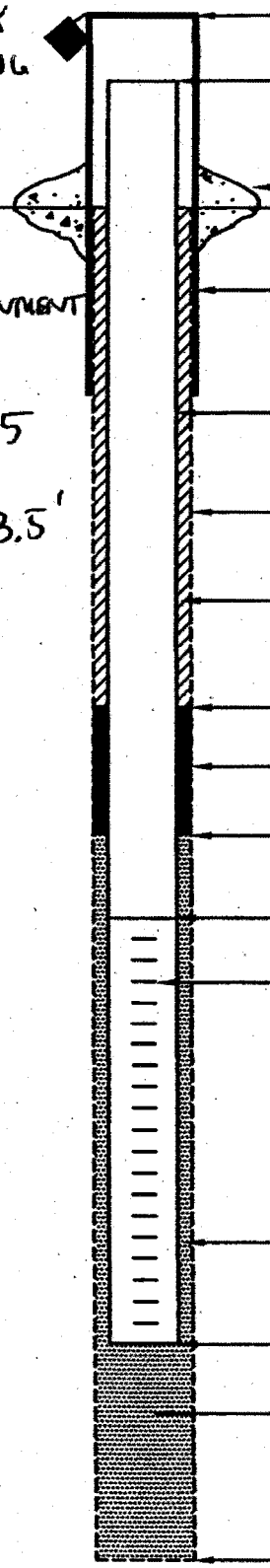
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NWS CHARLESTON	DRILLER RANDY BRAND SC. LIC #B01485
PROJECT NO. 0528	BORING 17TW42	DRILLING METHOD DPT
DATE BEGUN 1-13-05	DATE COMPLETED 1-13-05	
FIELD GEOLOGIST FRED W. RAMSER		DEVELOPMENT METHOD PUMP
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

SWL ~ 3.5' BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: /0'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~ 9'

ELEVATION/DEPTH TOP OF SCREEN: /12'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: /17'

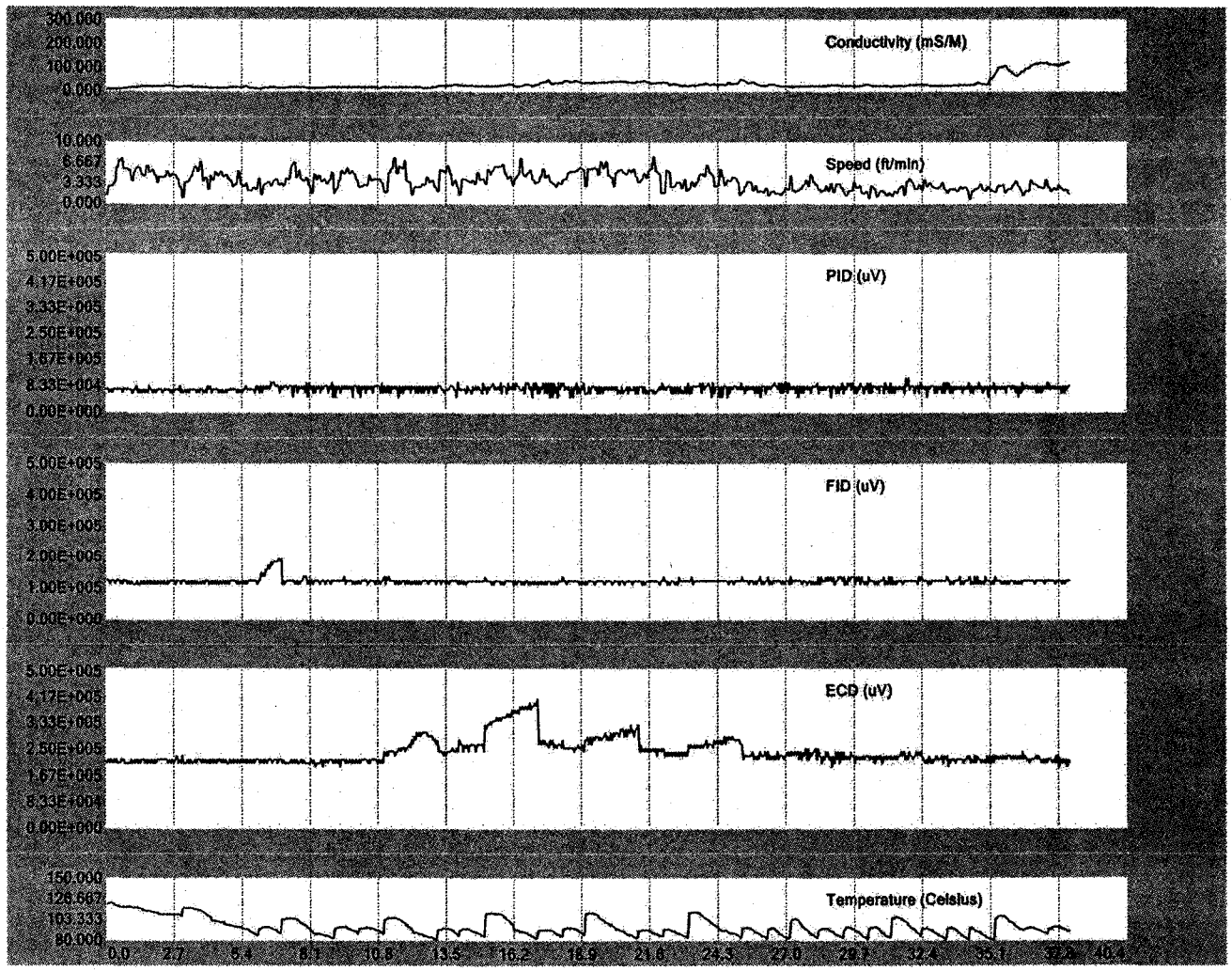
ELEVATION/DEPTH BOTTOM OF SAND PACK: /17

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: /17'

ACAD:FORM_MWSU.dwg 07/28/99 INL

17MIP33



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COLUMBIA TECHNOLOGIES

17MIP33/
17TW42

WELL NO.: 17TW43

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OVERBURDEN MONITORING WELL* SHEET STICK-UP

BORING LOG

PROJECT SWMU 16/17 SUPP. RFI
PROJECT NO. 0528
DATE BEGUN 1-13-05
FIELD GEOLOGIST FRED W. RAMSER
GROUND ELEVATION _____

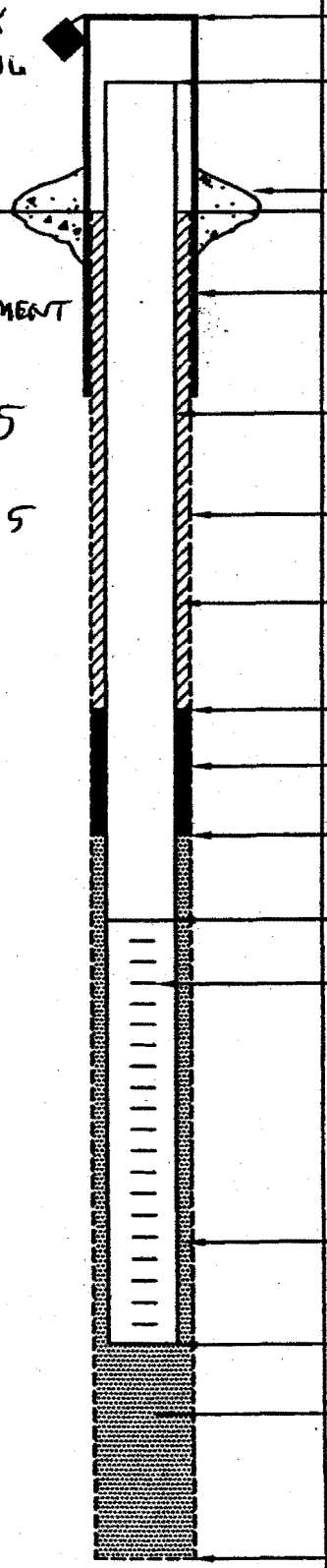
LOCATION NWS CHARLESTON
BORING 17 TW43
DATE COMPLETED 1-13-05
DATUM _____

DRILLER RANDY BRAND
DRILLING METHOD SCLIC# B01485 DPT
DEVELOPMENT METHOD PUMP

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

SWL=3.5 BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 1

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA
TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC
TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~10'

ELEVATION/DEPTH TOP OF SCREEN: 15'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 20'

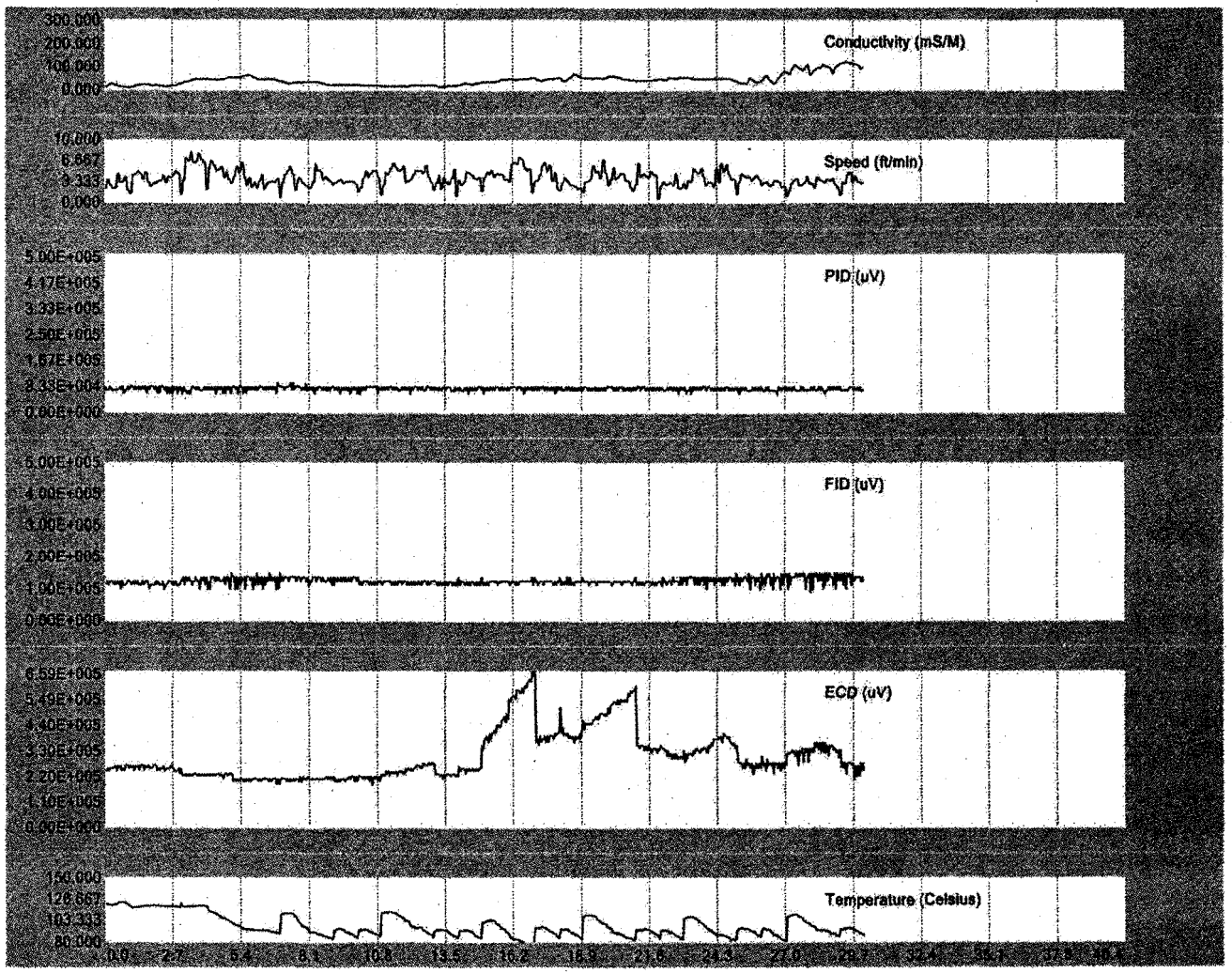
ELEVATION/DEPTH BOTTOM OF SAND PACK: 12

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 20'

ACAD:FORM_MWSU.dwg 07/28/99 INL

17MIP34



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COLUMBIA TECHNOLOGIES

17MIP34/
17TW43

WELL NO.: 17TW44

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OVERBURDEN MONITORING WELL* SHEET STICK-UP

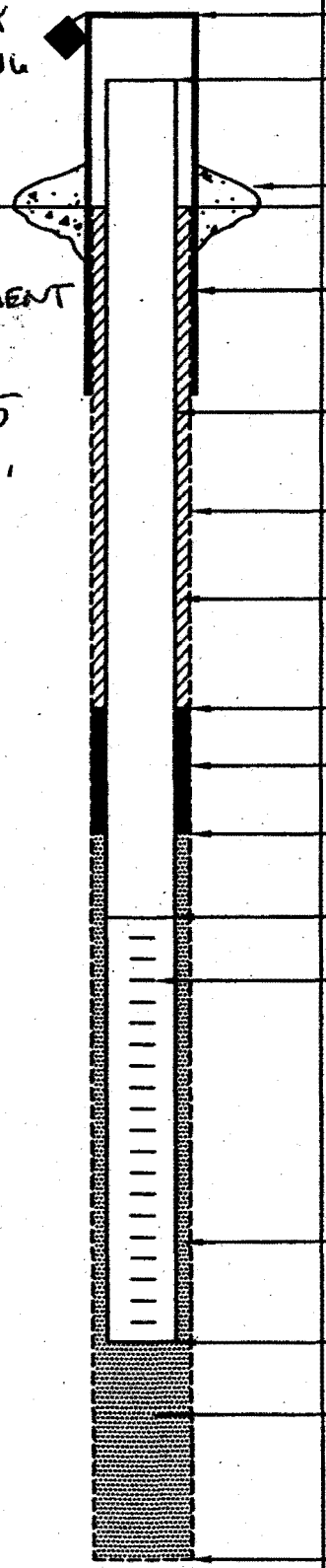
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NWS CHARLESTON	DRILLER RANDY BRAND SC. LIC# B01485
PROJECT NO. 0528	BORING 17TW44	DRILLING METHOD DPT
DATE BEGUN 1-13-05	DATE COMPLETED 1-13-05	
FIELD GEOLOGIST FRED W. RAMSER		DEVELOPMENT METHOD PUMP
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

SWL = 3' BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~4'

ELEVATION/DEPTH TOP OF SCREEN: 16'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 11'

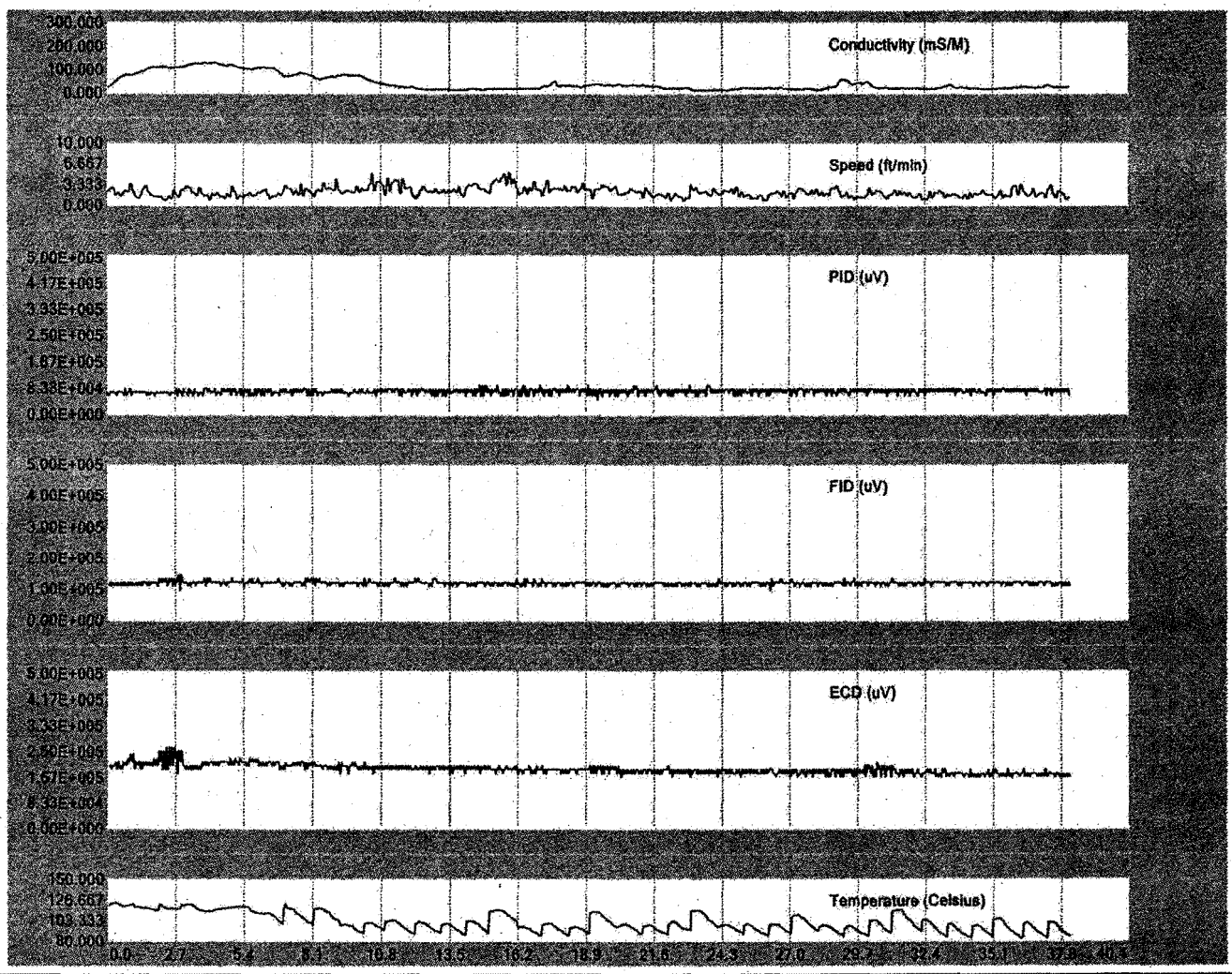
ELEVATION/DEPTH BOTTOM OF SAND PACK: 1

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 11'

ACAD:FORM_MWSU.dwg 07/20/99 INL

17MIP35



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SWMU 17 Revisit
12/12/04

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COLUMBIA TECHNOLOGIES

17MIP35/
17TW44

WELL NO.: 17TW45

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL* SHEET STICK-UP

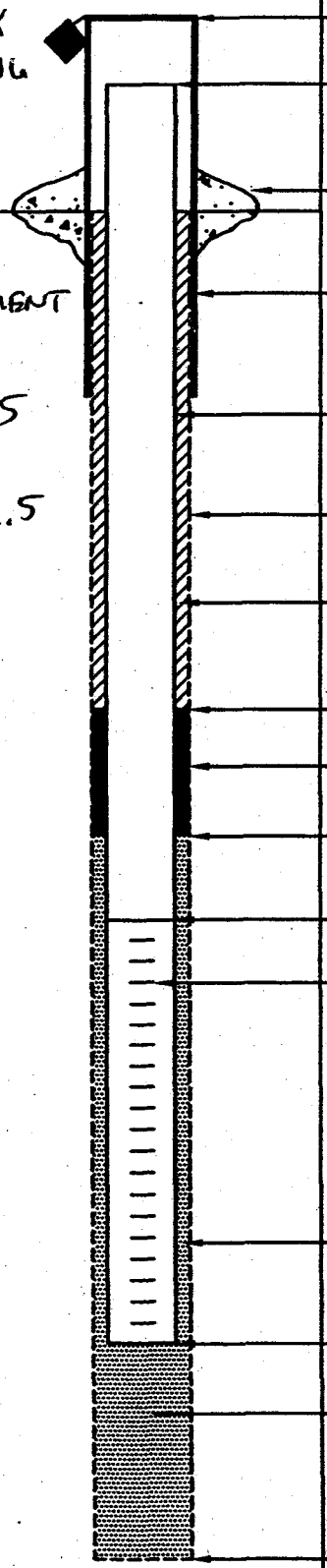
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NWS CHARLESTON	DRILLER RANDY BRMND SC. LIC# B01485
PROJECT NO. 0528	BORING 17TW45	DRILLING METHOD DPT
DATE BEGUN 1-13-05	DATE COMPLETED 1-13-05	DEVELOPMENT METHOD PUMP
FIELD GEOLOGIST FRED W. RAMSER		
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

SWL=2.5



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 1

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~18

ELEVATION/DEPTH TOP OF SCREEN: 127'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 132'

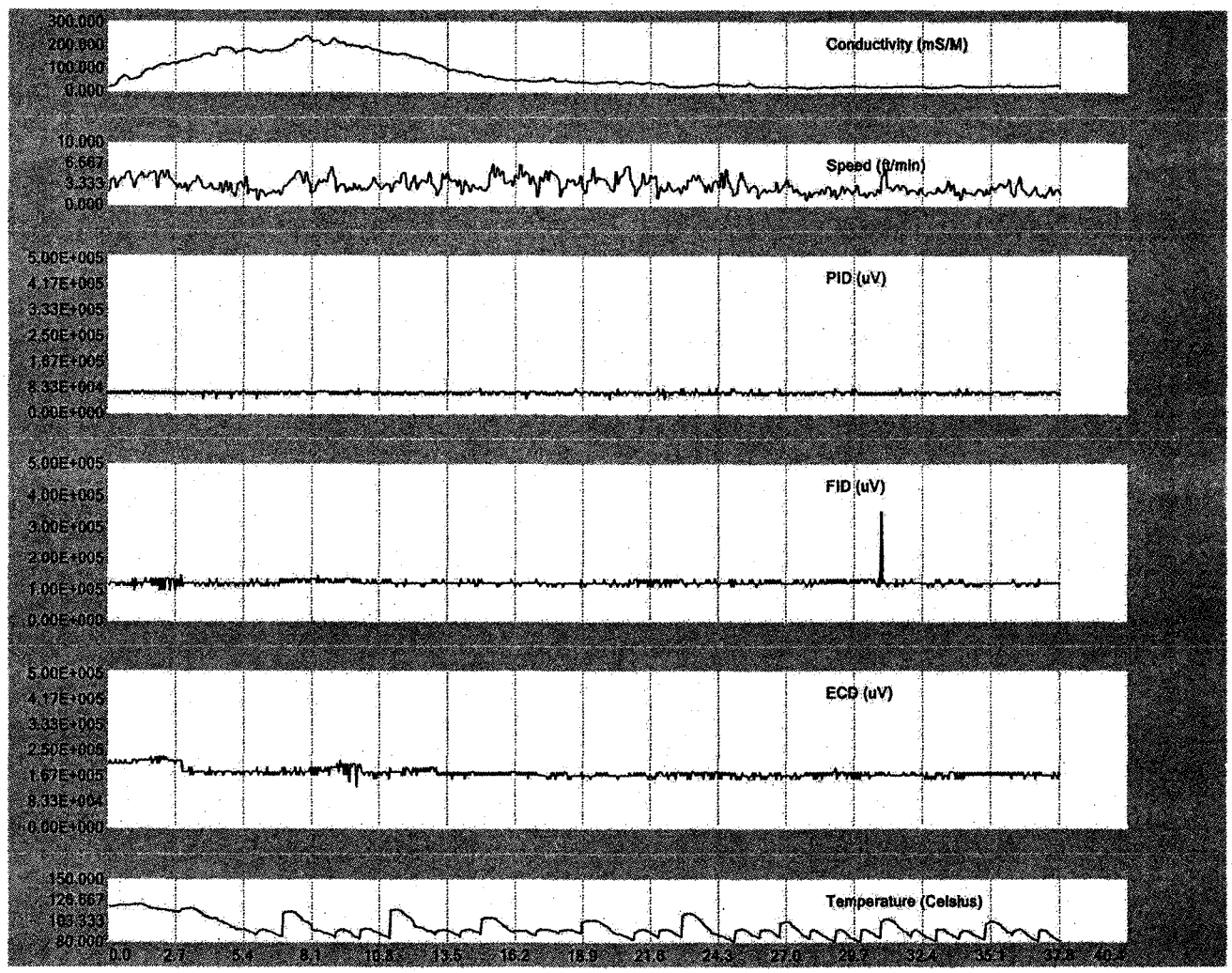
ELEVATION/DEPTH BOTTOM OF SAND PACK: 13[illegible]

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 132'

ACAD:FORM_MWSU.dwg 07/28/99 INL

17MIP36



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COLUMBIA TECHNOLOGIES

17MIP36/
17TW45

WELL NO.: 17TW46

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL* SHEET STICK-UP

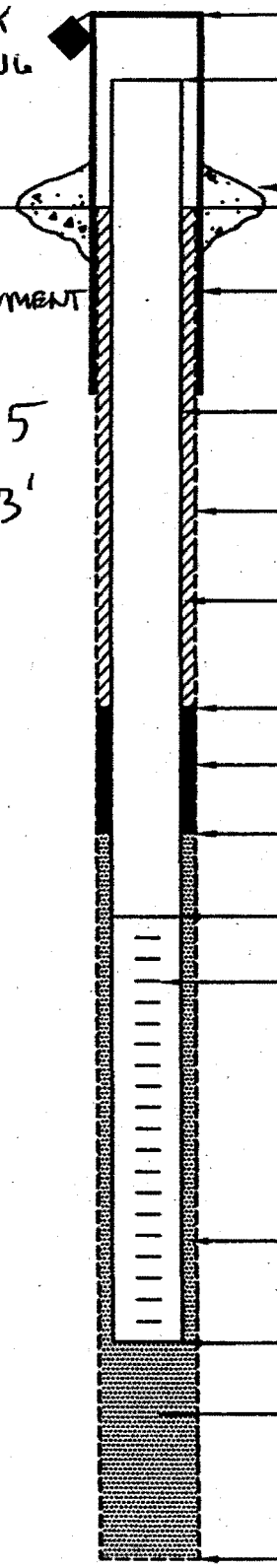
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NUS CHARLESTON	DRILLER RANDY BRAND SC. LIC# B01485
PROJECT NO. 0528	BORING 17TW46	DRILLING METHOD DPT
DATE BEGUN 1-13-05	DATE COMPLETED 1-13-05	
FIELD GEOLOGIST FRED W. RAMSER		DEVELOPMENT METHOD PUMP
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

SWL = 3' BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~8'

ELEVATION/DEPTH TOP OF SCREEN: 10'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 15'

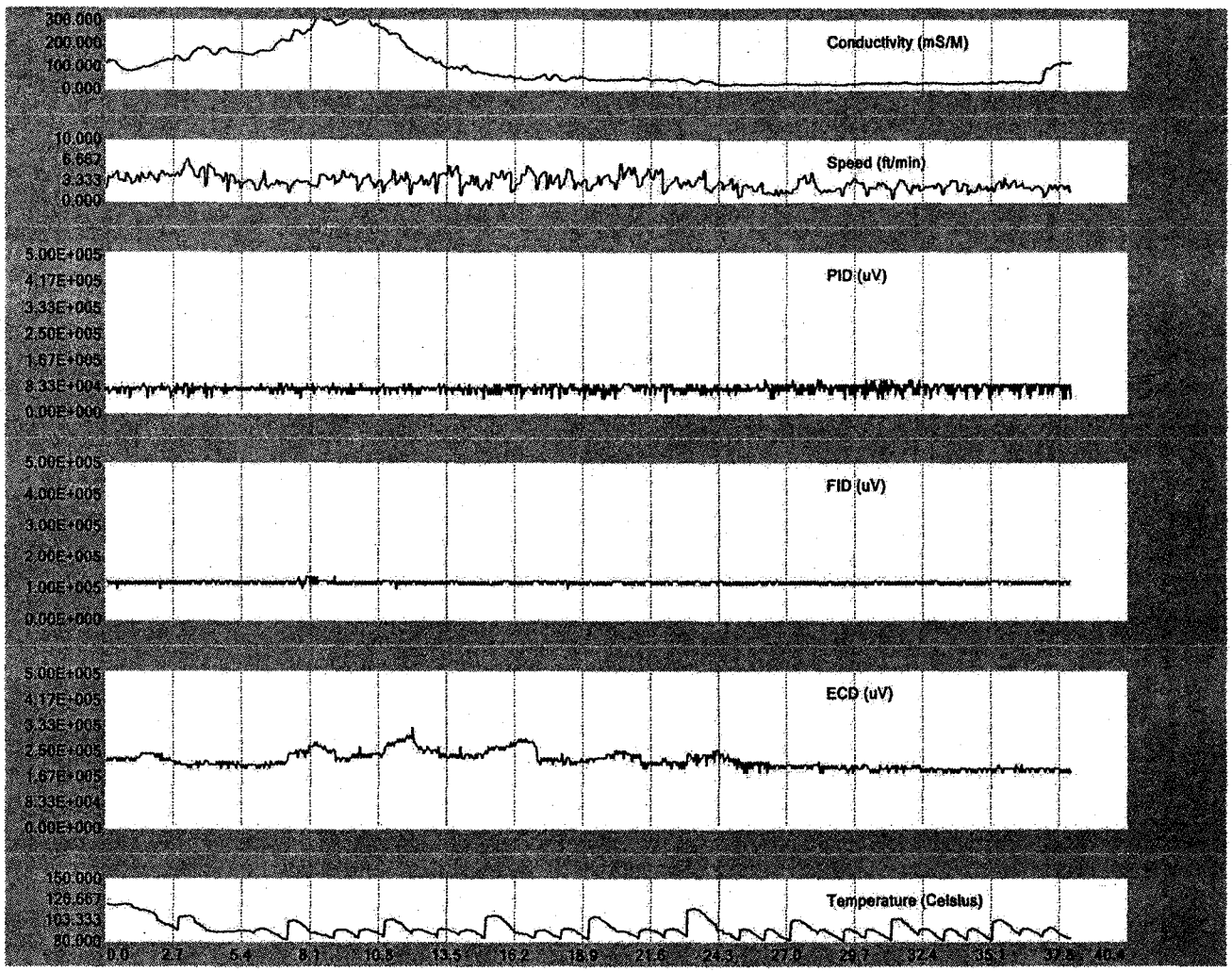
ELEVATION/DEPTH BOTTOM OF SAND PACK: 1

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 15'

ACAD:FORM_MWSU.dwg 07/28/99 INL

17MIP37



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COLUMBIA TECHNOLOGIES

17MIP37/
17TW46

WELL NO.: 17TW47

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL* SHEET STICK-UP

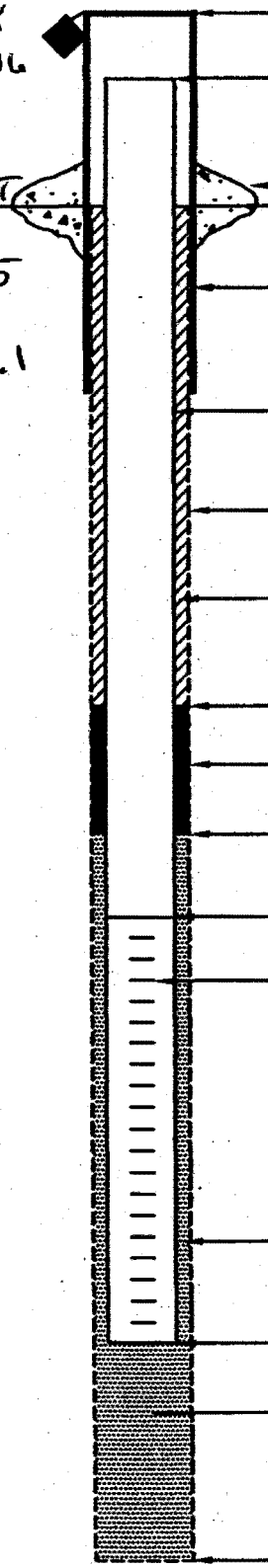
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NUS CHARLESTON	DRILLER RANDY BRMD SC# B01485
PROJECT NO. 0528	BORING 17TW47	DRILLING METHOD DPT
DATE BEGUN 1-12-05	DATE COMPLETED 1-12-05	
FIELD GEOLOGIST FRED W. RAMSER		DEVELOPMENT METHOD PUMP
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

ABANDONMENT DATE: 1-15-05

SWL = 5.1 BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: NA /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~8'

ELEVATION/DEPTH TOP OF SCREEN: 10'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 15'

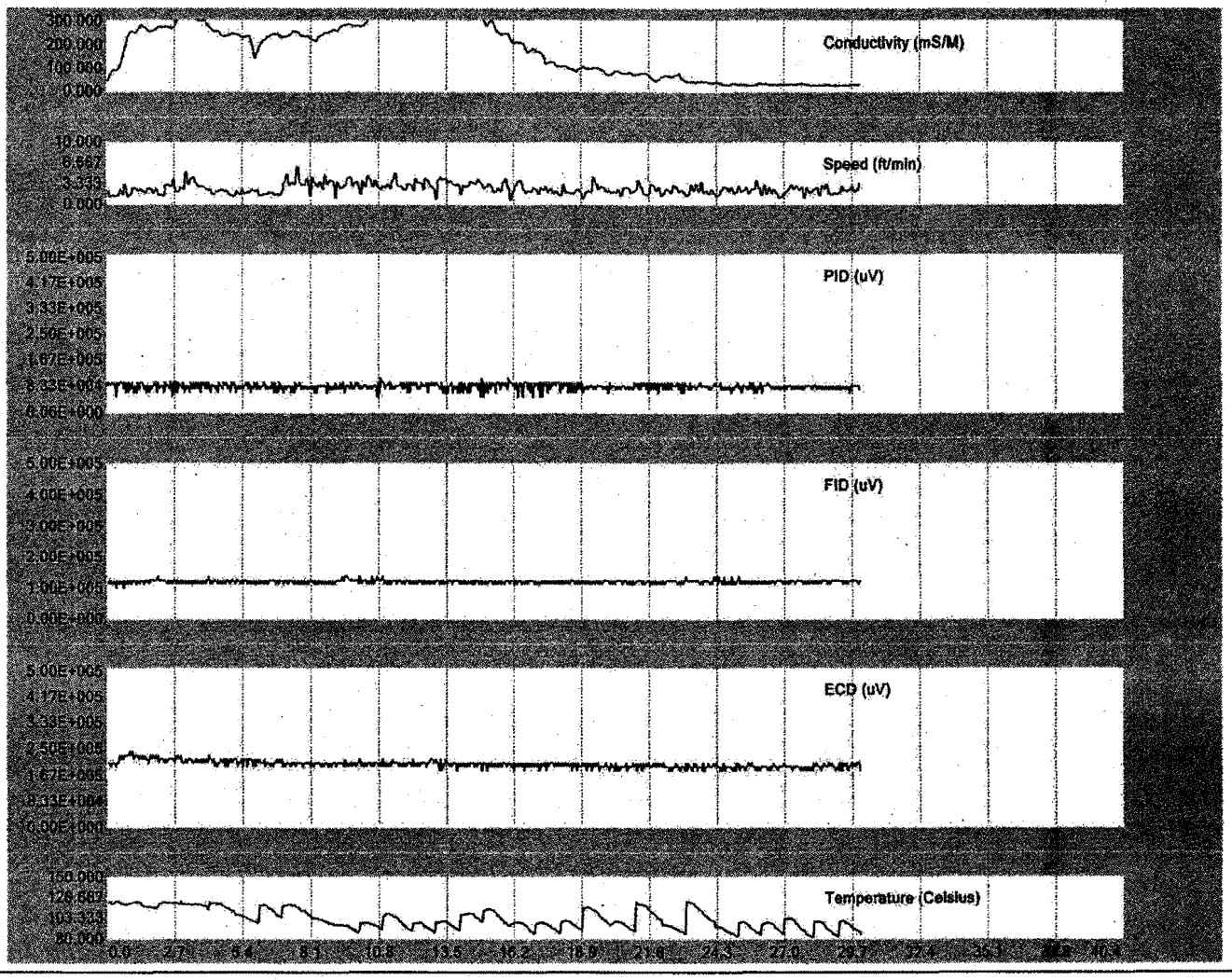
ELEVATION/DEPTH BOTTOM OF SAND PACK: 15

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 15'

ACAD: FORM_MWSU.dwg 07/28/99 INL

17MIP38



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COLUMBIA TECHNOLOGIES

17MIP38/
17TW47

WELL NO.: 17TW48

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL* SHEET STICK-UP

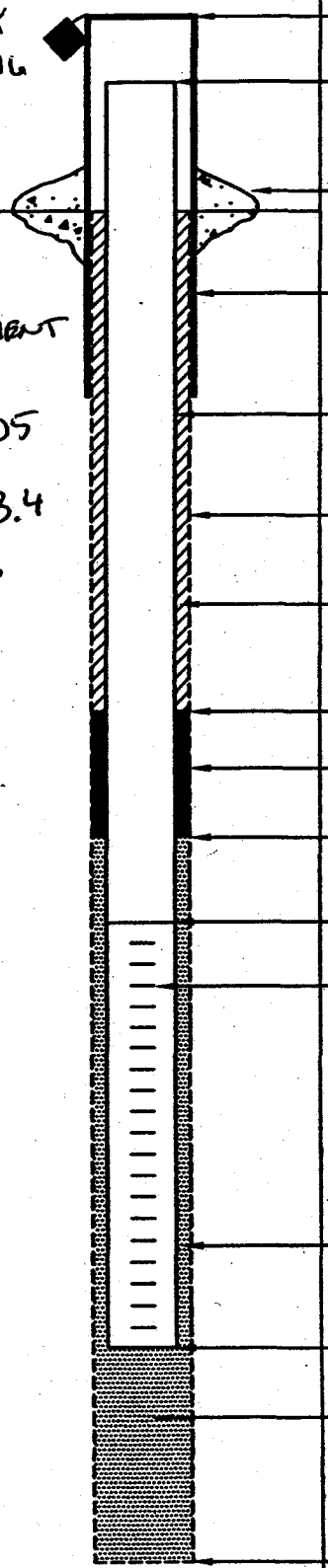
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NWS CHARLESTON	DRILLER RANDY BRMD
PROJECT NO. 0528	BORING 17TW48	DRILLING METHOD SC# B01485 DPT
DATE BEGUN 1-12-05	DATE COMPLETED 1-12-05	
FIELD GEOLOGIST FRED W. RAMSER		DEVELOPMENT METHOD PUMP
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-15-05

SWL=3.4 BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: /0'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~8'

ELEVATION/DEPTH TOP OF SCREEN: /10'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: /15'

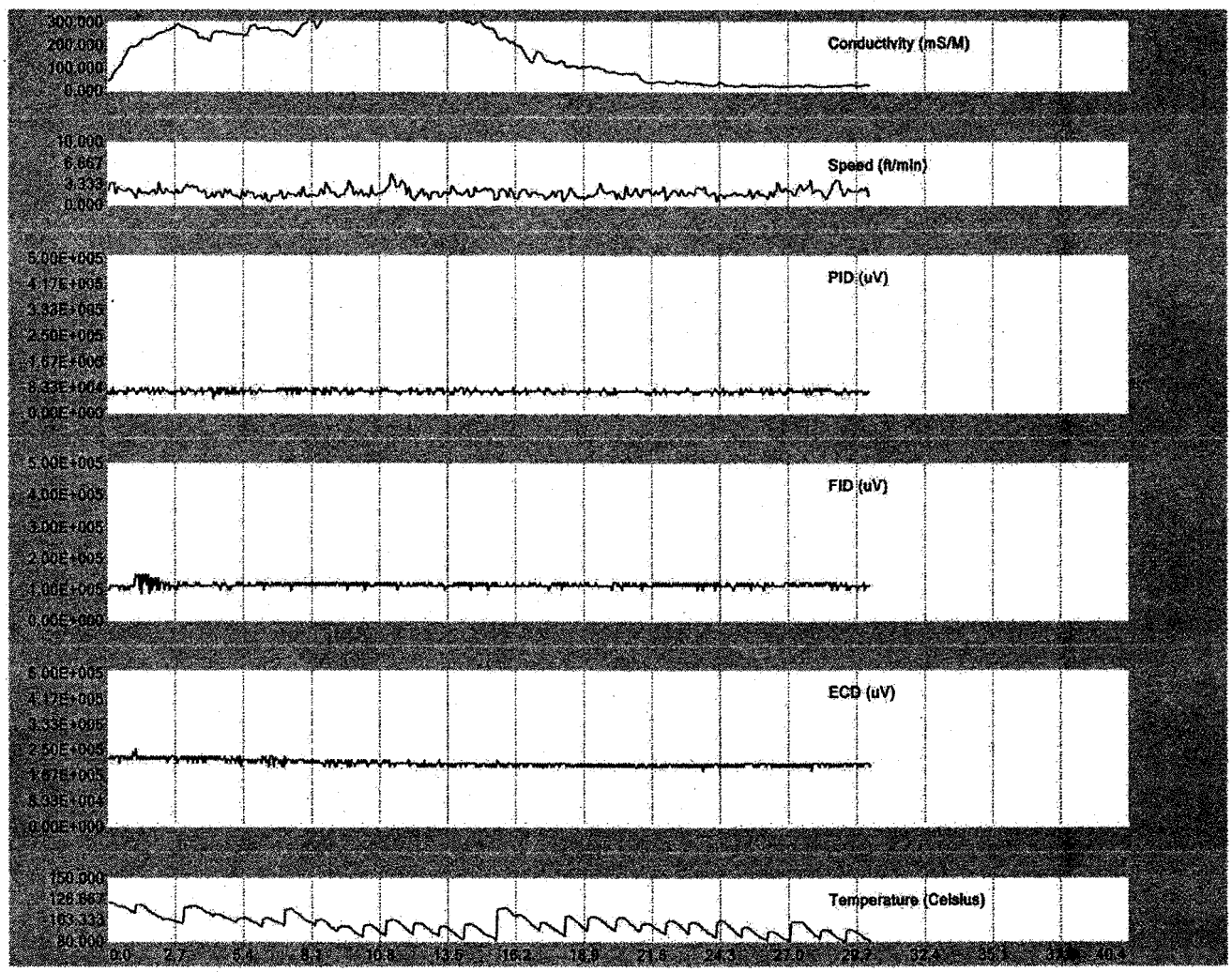
ELEVATION/DEPTH BOTTOM OF SAND PACK: /1

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: /15'

ACAD:FORM_MWSU.dwg 07/28/99 INL

17MIP39



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COLUMBIA TECHNOLOGIES

17MIP39
17TW48

WELL NO.: 17TW49

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OVERBURDEN MONITORING WELL* SHEET STICK-UP

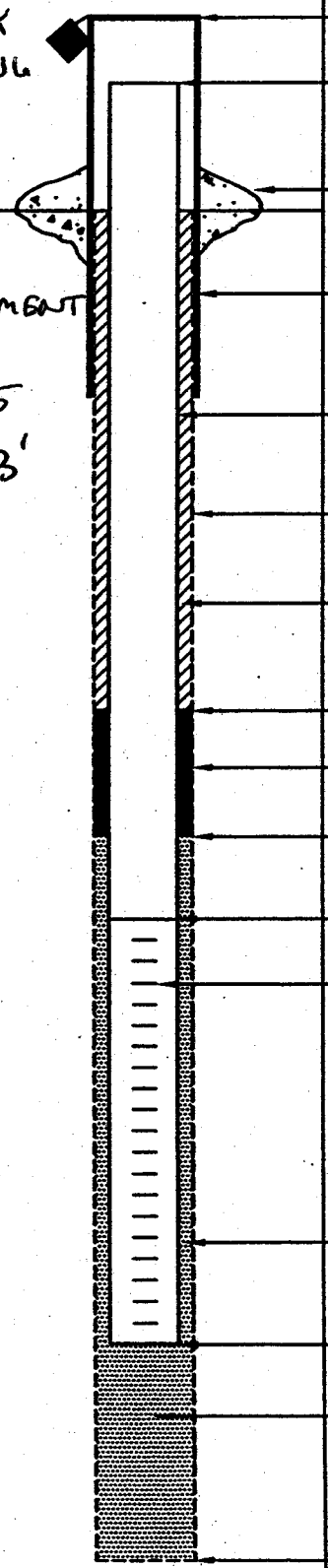
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NWS CHARLESTON	DRILLER RANDY BRAND SC# B01485
PROJECT NO. 0528	BORING 17TW49	DRILLING METHOD DPT
DATE BEGUN 1-12-05	DATE COMPLETED 1-12-05	DEVELOPMENT METHOD PUMP
FIELD GEOLOGIST FRED W. RAMSER		
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-15-05

SWL = 3' BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~12'

ELEVATION/DEPTH TOP OF SCREEN: 16'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 21'

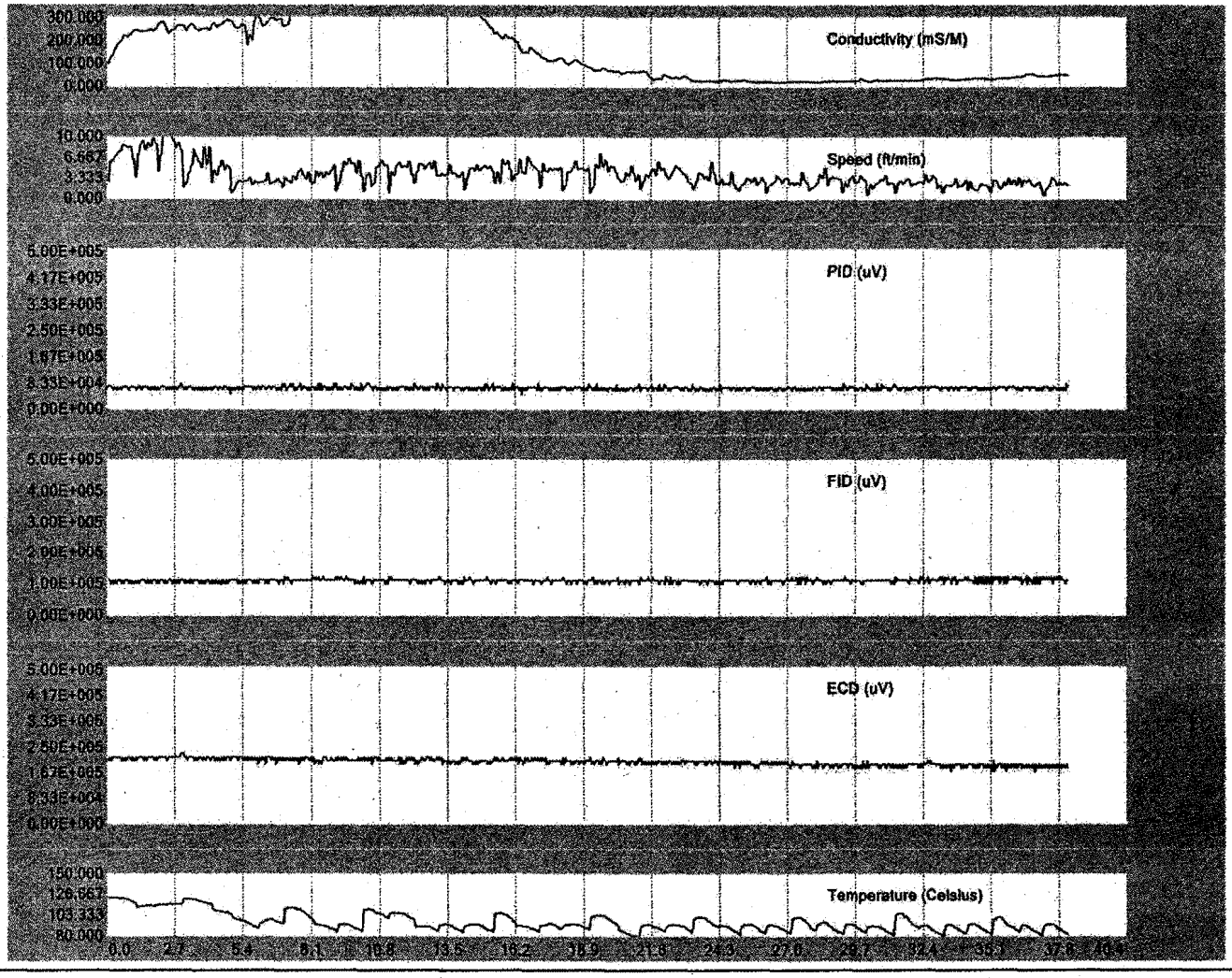
ELEVATION/DEPTH BOTTOM OF SAND PACK: 1[illegible]

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 21'

ACAD:FORM_MWSU.dwg 07/28/99 INL

17MIP40



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COLUMBIA TECHNOLOGIES

17MIP40/
17TW49

WELL NO.: 17TW50

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OVERBURDEN MONITORING WELL* SHEET STICK-UP

BORING LOG

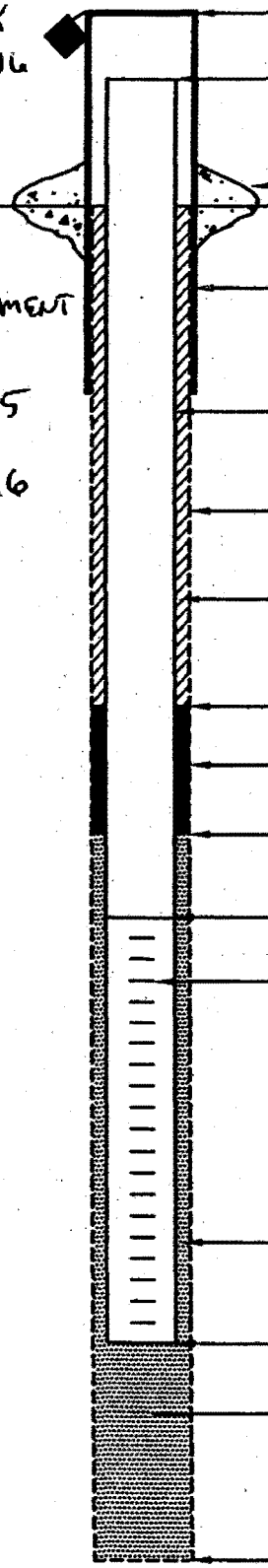
PROJECT SWMU 16/17 SUPP. RFI
PROJECT NO. 0528
DATE BEGUN 1-12-05
FIELD GEOLOGIST FRED W. RAMSER
GROUND ELEVATION
LOCATION NWS CHARLESTON
BORING 17TW50
DATE COMPLETED 1-12-05
DATUM

DRILLER RANDY BRAND
DRILLING METHOD DPT
DEVELOPMENT METHOD PUMP

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-15-05

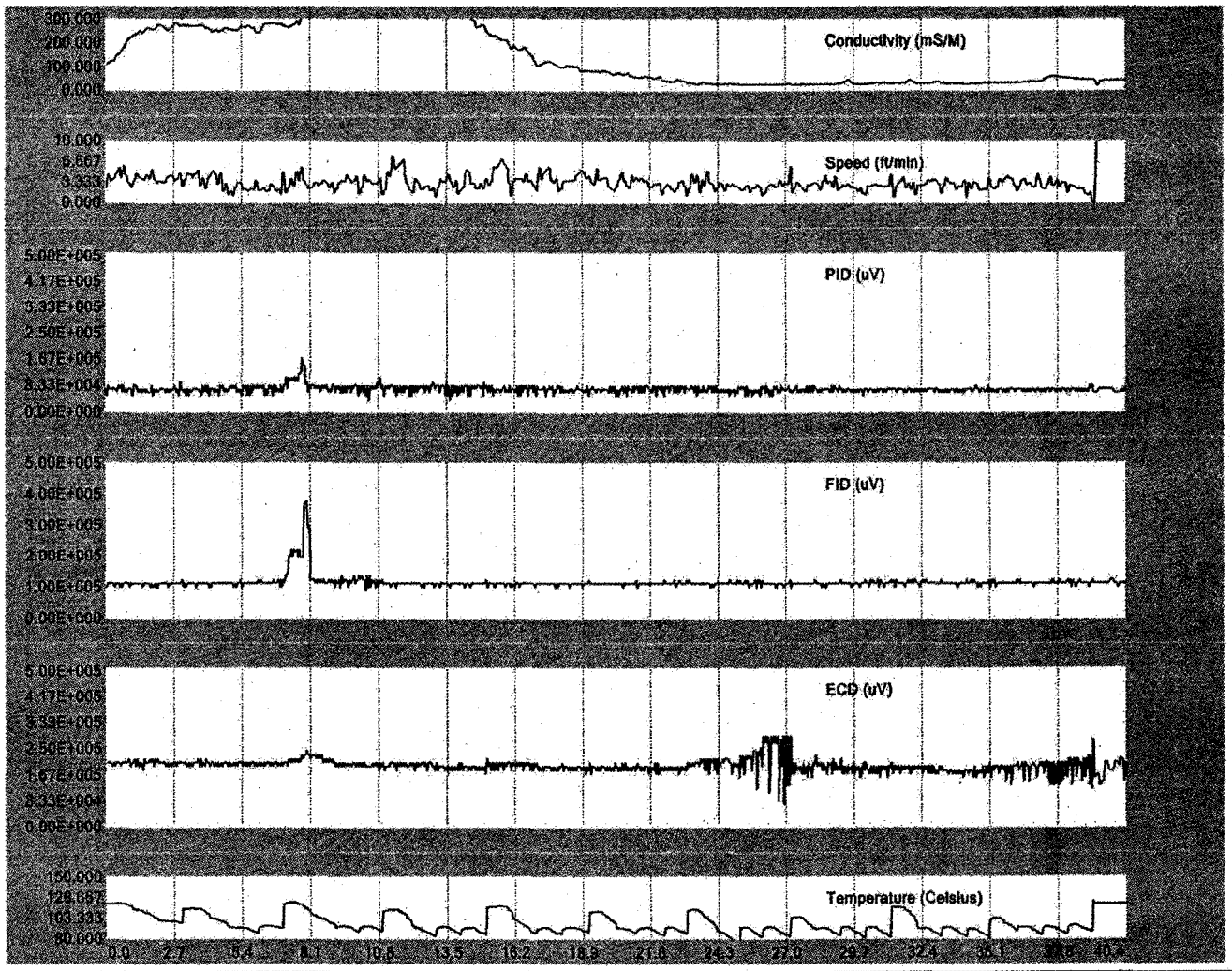
SWL = 1.6 BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /
ELEVATION/HEIGHT OF TOP OF RISER PIPE: /
TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS
I.D. OF SURFACE CASING: NA
TYPE OF SURFACE CASING: NA
RISER PIPE I.D.: 3/4" PVC
TYPE OF RISER PIPE: SCH. 40
BOREHOLE DIAMETER: 2 1/8"
TYPE OF BACKFILL: 3/8" BENTONITE CHIPS
ELEVATION/DEPTH TOP OF SEAL: 10'
TYPE OF SEAL: 3/8" BENTONITE CHIPS
DEPTH TOP OF SAND PACK: ~20'
ELEVATION/DEPTH TOP OF SCREEN: 124'
TYPE OF SCREEN: SCH. 40 PVC
SLOT SIZE x LENGTH: 0.010 x 5'
I.D. OF SCREEN: 3/4"
TYPE OF SAND PACK: 20/40 SILICA SAND
ELEVATION/DEPTH BOTTOM OF SCREEN: 129'
ELEVATION/DEPTH BOTTOM OF SAND PACK: 12[illegible]
BACKFILL MATERIAL BELOW SAND: NA
ELEVATION/DEPTH OF HOLE: 129'

ACAD:FORM_MWSU.dwg 07/28/99 INL

17MIP41



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COLUMBIA TECHNOLOGIES

17MIP41/
17TW50

WELL NO.: 17TW51

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OVERBURDEN MONITORING WELL* SHEET STICK-UP

BORING LOG

PROJECT SWMU 16/17 SUPP. RFI
PROJECT NO. 0528
DATE BEGUN 1-12-05
FIELD GEOLOGIST FRED W. RAMSER
GROUND ELEVATION _____

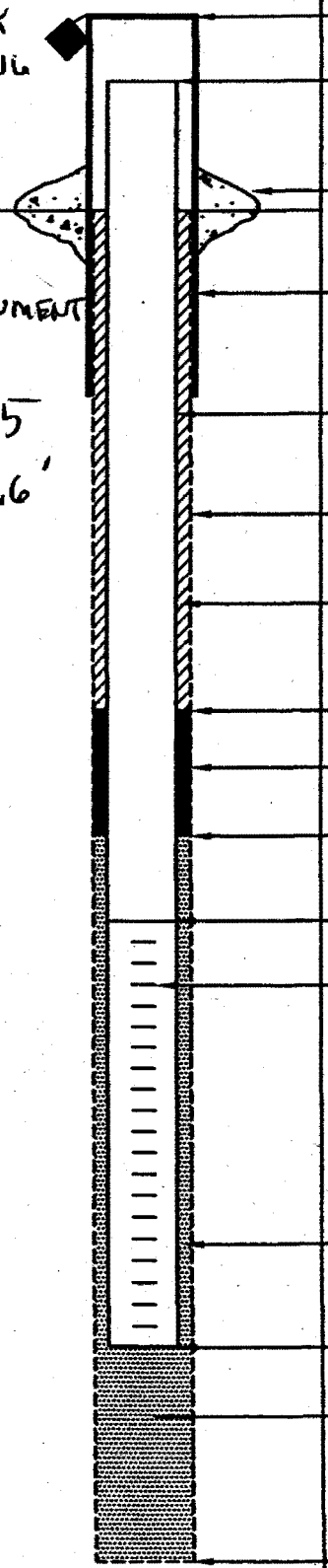
LOCATION NWS CHARLESTON
BORING 17TW51
DATE COMPLETED 1-12-05
DATUM _____

DRILLER RANDY BRAND
DRILLING SC.LIC.# B01485
METHOD DPT
DEVELOPMENT METHOD PUMP

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-15-05

SWL = 1.6' BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA
TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC
TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: /0'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~3'

ELEVATION/DEPTH TOP OF SCREEN: /5'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

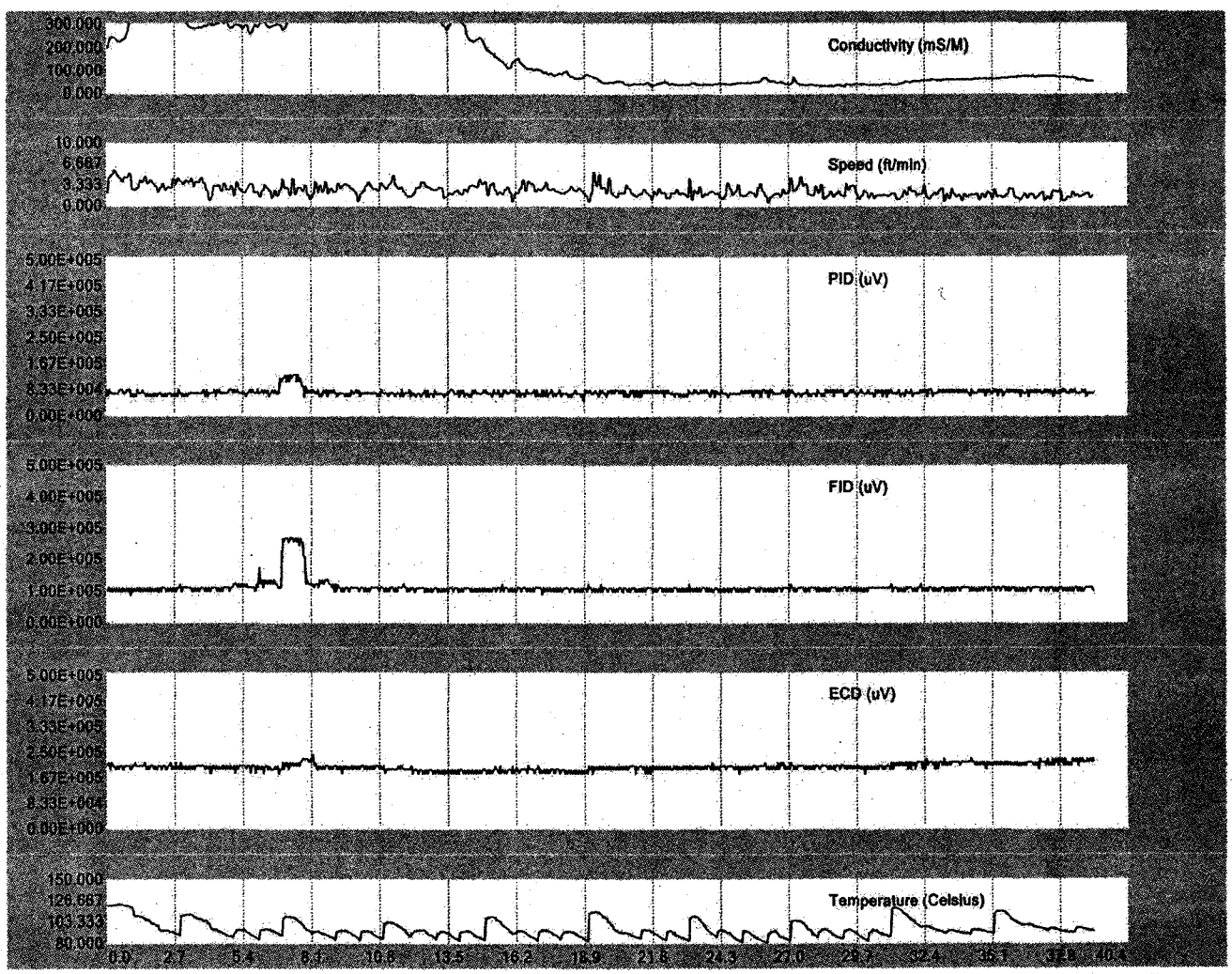
ELEVATION/DEPTH BOTTOM OF SCREEN: /10'

ELEVATION/DEPTH BOTTOM OF SAND PACK: /10
BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: /10'

ACAD:FORM_MWSU.dwg 07/20/99 INL

17MIP42



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COLUMBIA TECHNOLOGIES

17MIP42/
17TW51

WELL NO.: 17TW52

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OVERBURDEN MONITORING WELL* SHEET STICK-UP

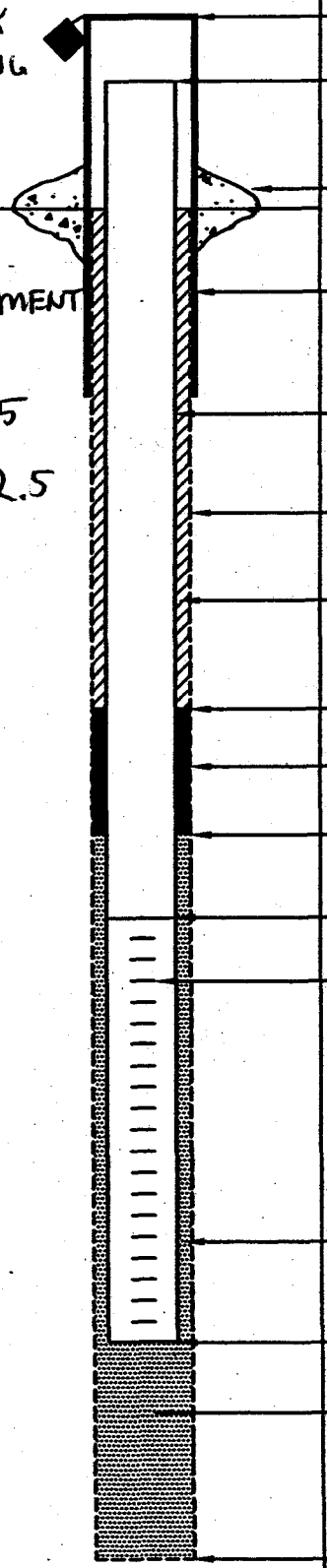
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NWS CHARLESTON	DRILLER RANDY BRAND
PROJECT NO. 0528	BORING 17TW52	DRILLING METHOD SC LIC #B01485 DPT
DATE BEGUN 1-14-05	DATE COMPLETED 1-14-05	
FIELD GEOLOGIST FRED W. RAMSER		DEVELOPMENT METHOD PUMP
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

SWL = 2.5 BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~10'

ELEVATION/DEPTH TOP OF SCREEN: 13'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 18'

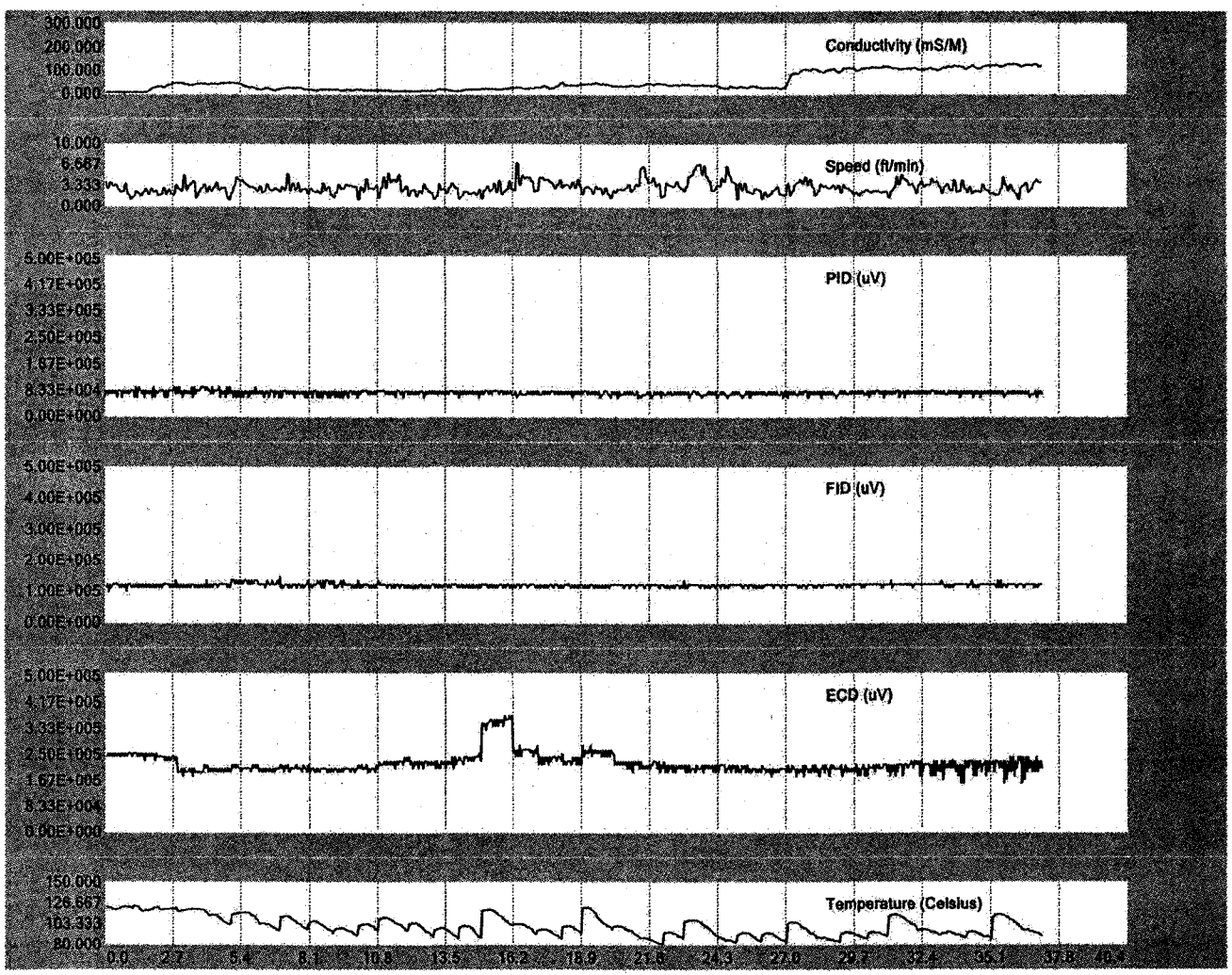
ELEVATION/DEPTH BOTTOM OF SAND PACK: 18

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 18'

ACAD:FORM_MWSU.dwg 07/28/99 INL

17MIP43



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COLUMBIA TECHNOLOGIES

17MIP43/
17TW52

WELL NO.: 17TW53

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL* SHEET STICK-UP

BORING LOG

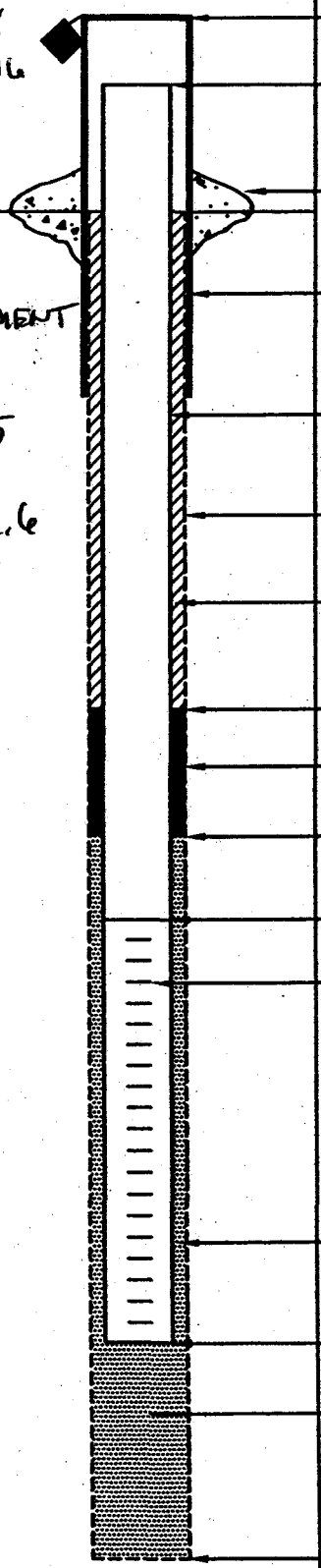
PROJECT SWMU 16/17 SUPP. RFI	LOCATION NWS CHARLESTON
PROJECT NO. 0528	BORING 17TW53
DATE BEGUN 1-13-05	DATE COMPLETED 1-13-05
FIELD GEOLOGIST FRED W. RAMSER	
GROUND ELEVATION	DATUM

DRILLER RANDY BRAND
DRILLING METHOD SC LIC#B01485 DPT
DEVELOPMENT METHOD PUMP

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-15-05

SWL= 2.6 BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA
TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC
TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~7'

ELEVATION/DEPTH TOP OF SCREEN: 10'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

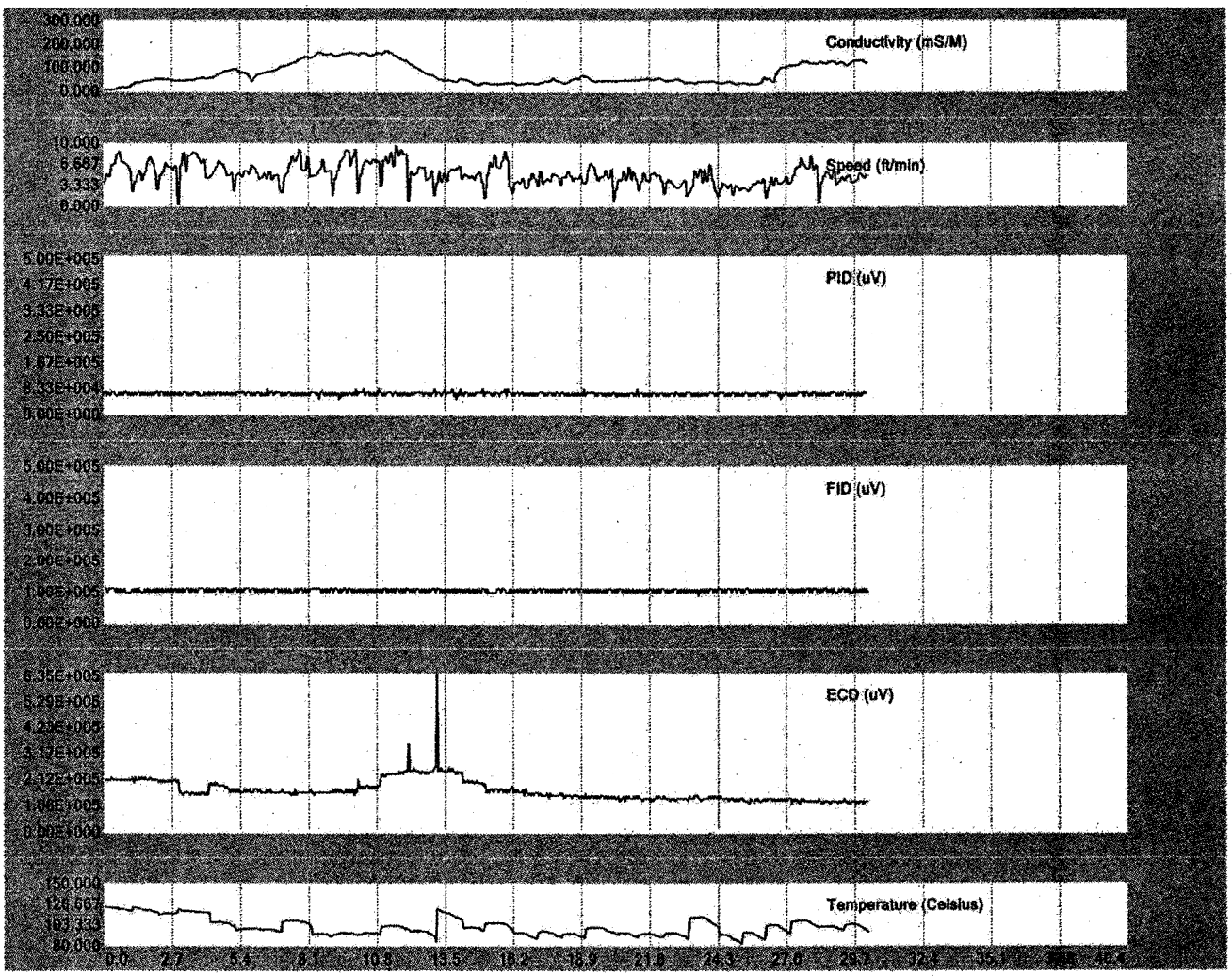
ELEVATION/DEPTH BOTTOM OF SCREEN: 15'

ELEVATION/DEPTH BOTTOM OF SAND PACK: /
BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 15'

ACAD:FORM_MWSU.dwg 07/28/99 INL

17MIP44



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COLUMBIA TECHNOLOGIES

17MIP44/
17TW53

WELL NO.: 17TW54

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL* SHEET STICK-UP

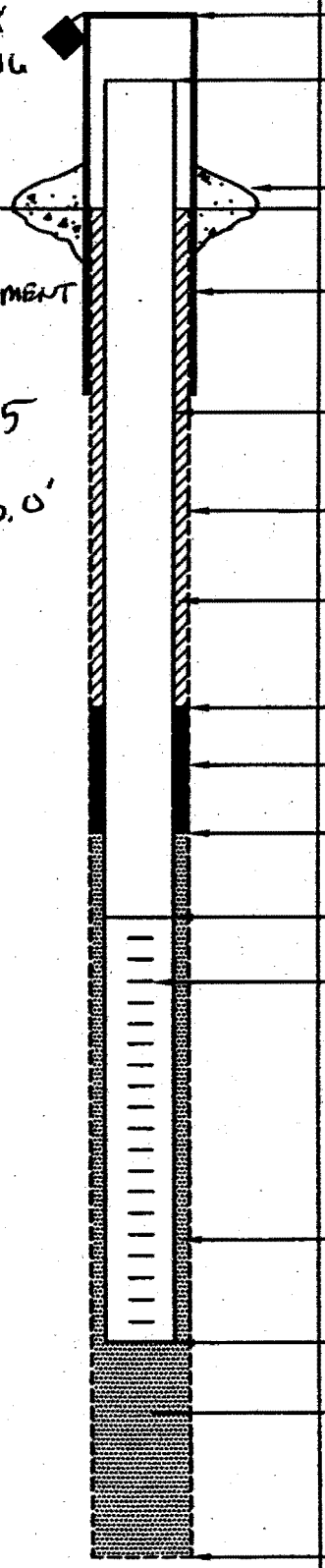
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NWS CHARLESTON	DRILLER RANDY BRAND
PROJECT NO. 0528	BORING 17TW54	DRILLING METHOD SC.LIC#B01485 DPT
DATE BEGUN 1-13-05	DATE COMPLETED 1-13-05	
FIELD GEOLOGIST FRED W. RAMSER		DEVELOPMENT METHOD PUMP
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-15-05

SWL= 3.0' BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~8'

ELEVATION/DEPTH TOP OF SCREEN: 11'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 16'

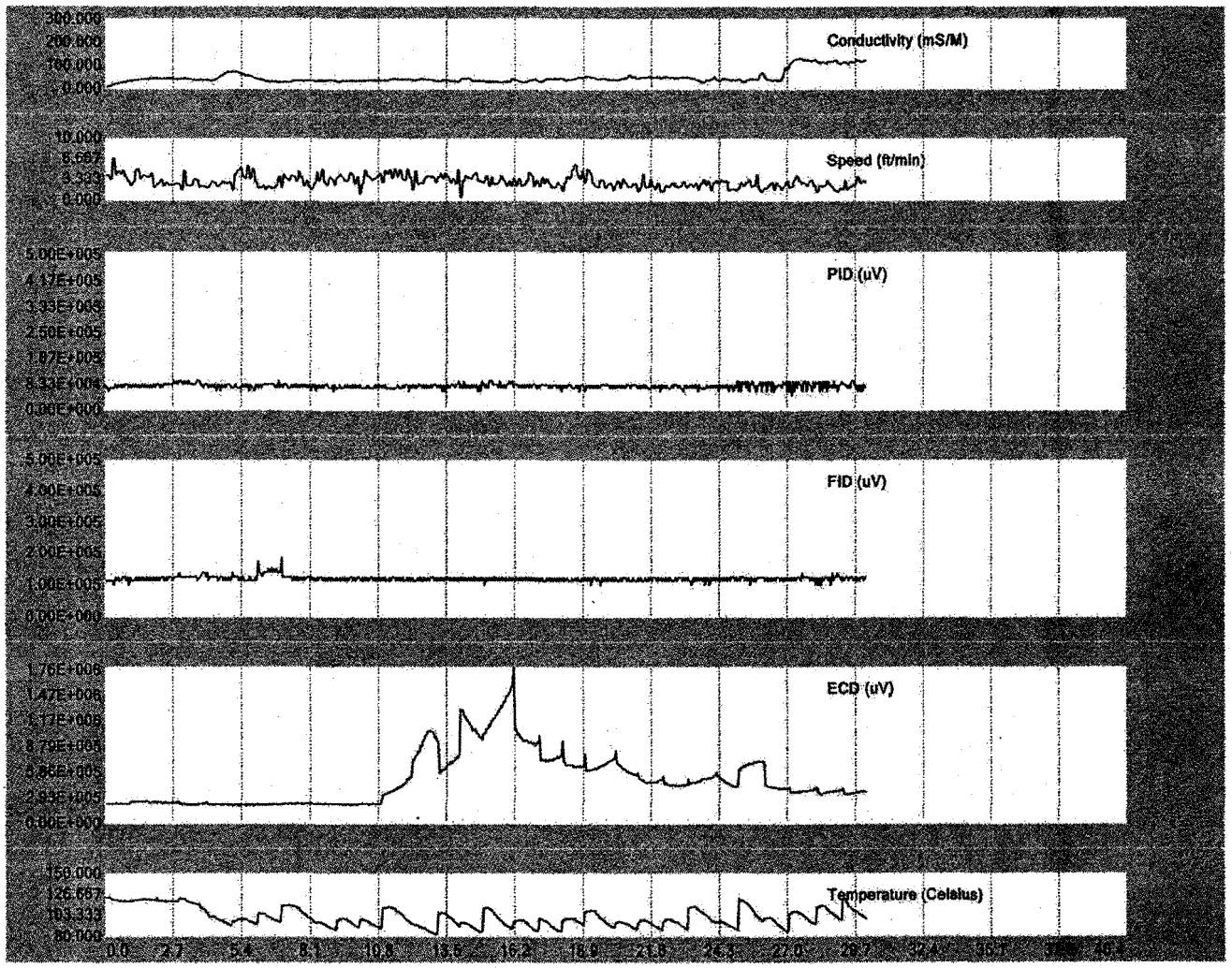
ELEVATION/DEPTH BOTTOM OF SAND PACK: 1[illegible]

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 16'

ACAD:FORM_MWSU.dwg 07/20/99 INL

17MIP45



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COLUMBIA TECHNOLOGIES

17MIP45/
17TW54

WELL NO.: 17TW55

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL* SHEET STICK-UP

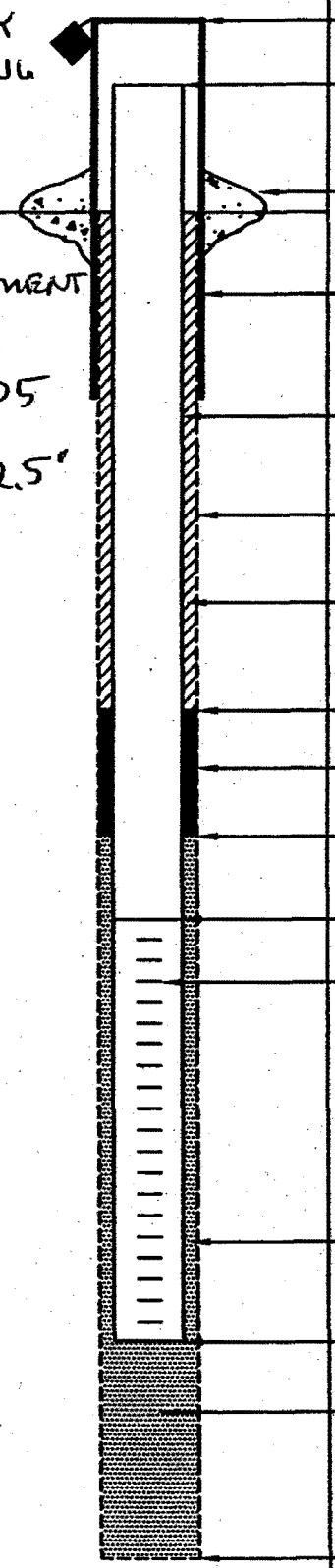
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NWS CHARLESTON	DRILLER RANDY BRAND
PROJECT NO. 0528	BORING 17TW55	DRILLING METHOD SC. LIC# B01485 DPT
DATE BEGUN 1-12-05	DATE COMPLETED 1-12-05	
FIELD GEOLOGIST FRED W. RAMSER		DEVELOPMENT METHOD PUMP
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

SWL = 2.5' BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: /0'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~7'

ELEVATION/DEPTH TOP OF SCREEN: /9'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: /14'

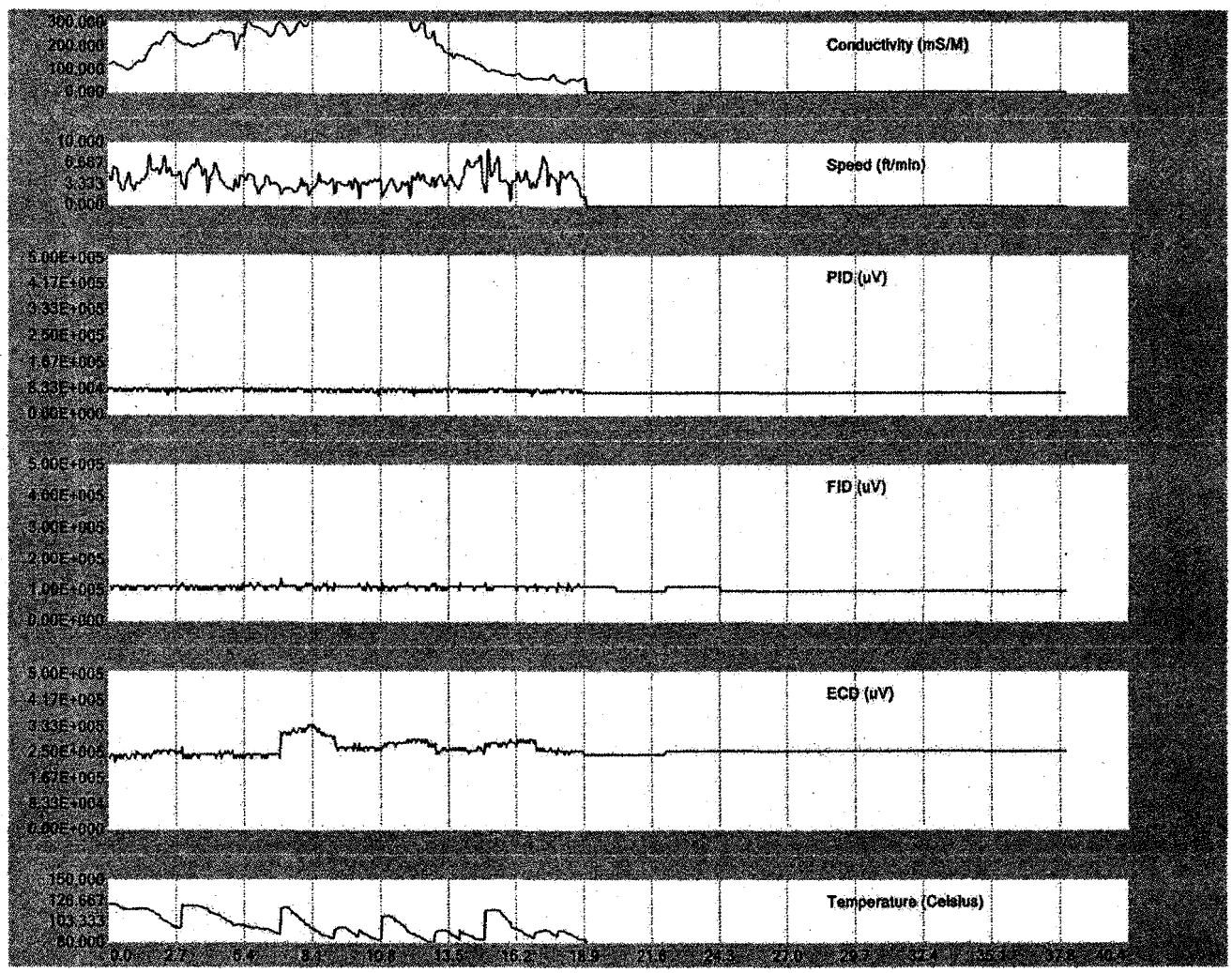
ELEVATION/DEPTH BOTTOM OF SAND PACK: /1

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: /14'

ACAD: FORM_MWSU.dwg 07/28/99 INL

17MIP46



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COLUMBIA TECHNOLOGIES

17MIP46/
17TW55

WELL NO.: 17TW56

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL* SHEET STICK-UP

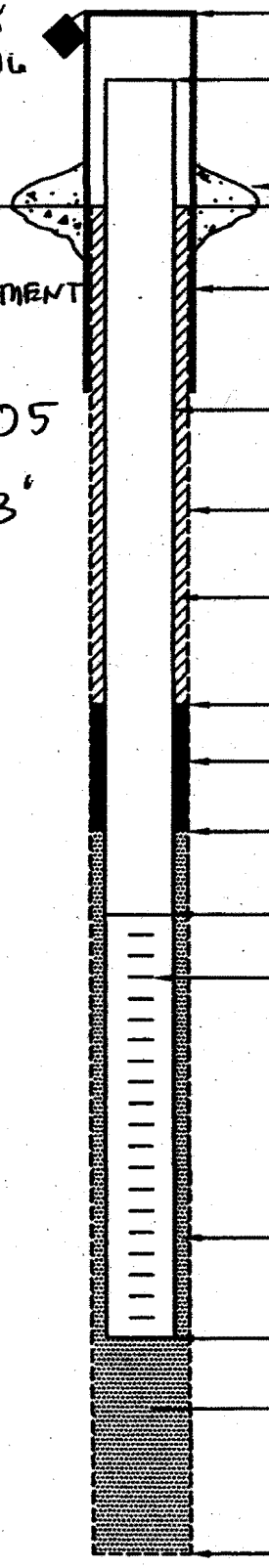
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NWS CHARLESTON	DRILLER RANDY BRAND
PROJECT NO. 0528	BORING 17TW56	DRILLING METHOD SC LIC# B01485 DPT
DATE BEGUN 1-14-05	DATE COMPLETED 1-14-05	
FIELD GEOLOGIST FRED W. RAMSER		DEVELOPMENT METHOD PUMP
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

SWL = 3' BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~9'

ELEVATION/DEPTH TOP OF SCREEN: 11'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 16'

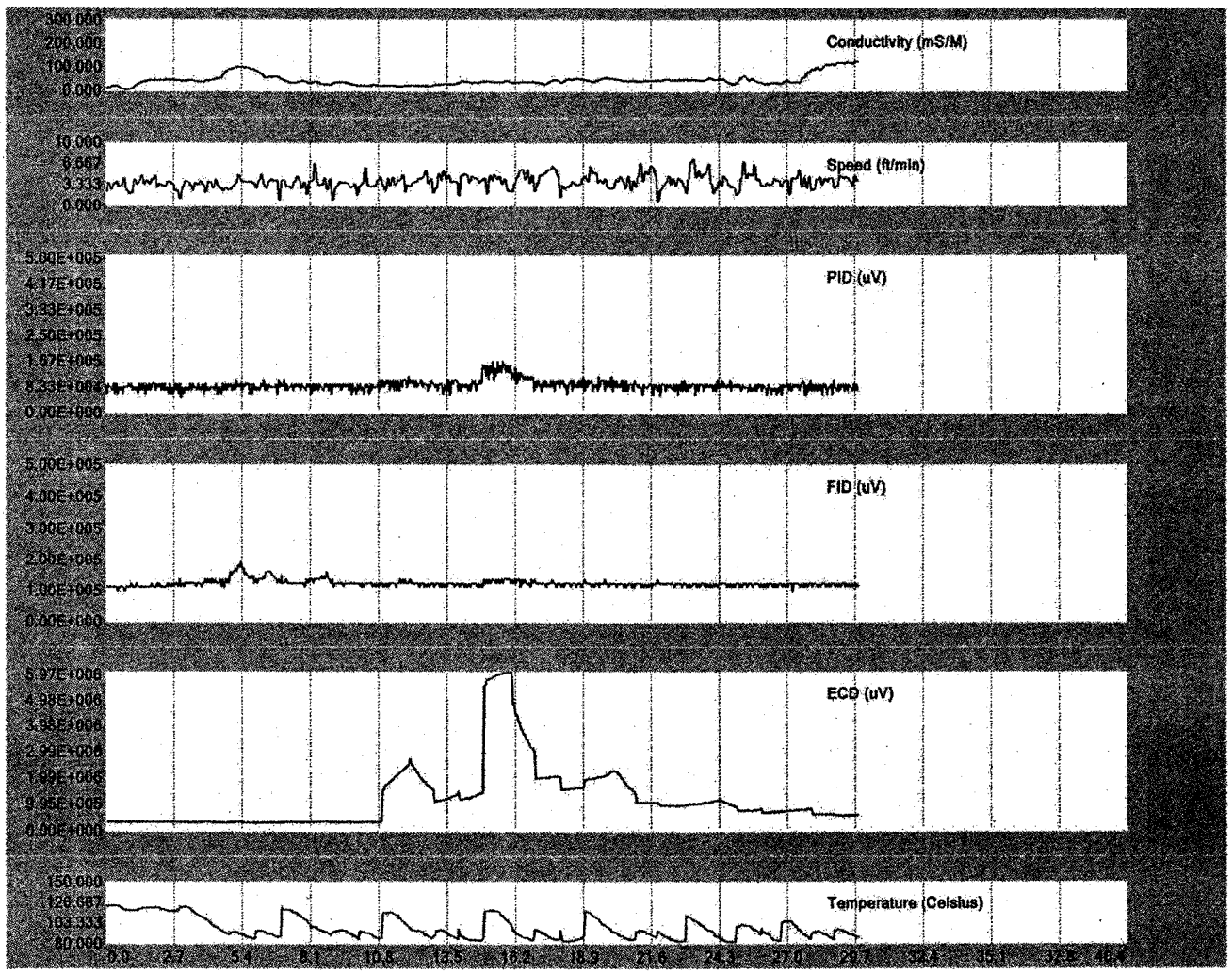
ELEVATION/DEPTH BOTTOM OF SAND PACK: /

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 16'

ACAD: FORM_MWSU.dwg 07/28/99 INL

17MIP47



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COLUMBIA TECHNOLOGIES

17MIP47/
17TW56

WELL NO.: 17TW57

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL* SHEET STICK-UP

BORING LOG

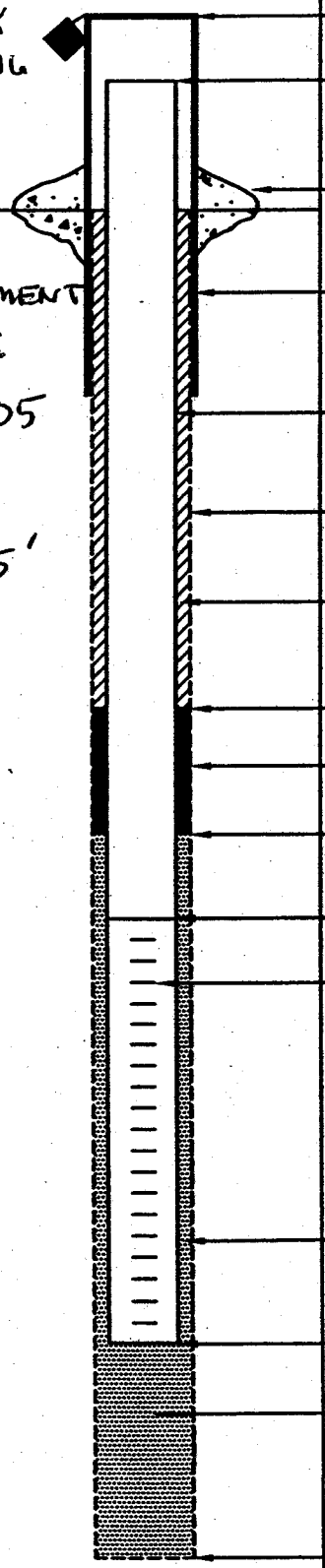
PROJECT SWMU 16/17 SUPP. RFI	LOCATION NWS CHARLESTON	DRILLER RANDY BRAND SC. LIC#B01485
PROJECT NO. 0528	BORING 17TW57	DRILLING METHOD DPT
DATE BEGUN 1-14-05	DATE COMPLETED 1-14-05	DEVELOPMENT METHOD PUMP
FIELD GEOLOGIST FRED W. RAMSER		
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

17'

SWL = 1.5' BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 1

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~ 4.5'

ELEVATION/DEPTH TOP OF SCREEN: 16.5'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 11.5'

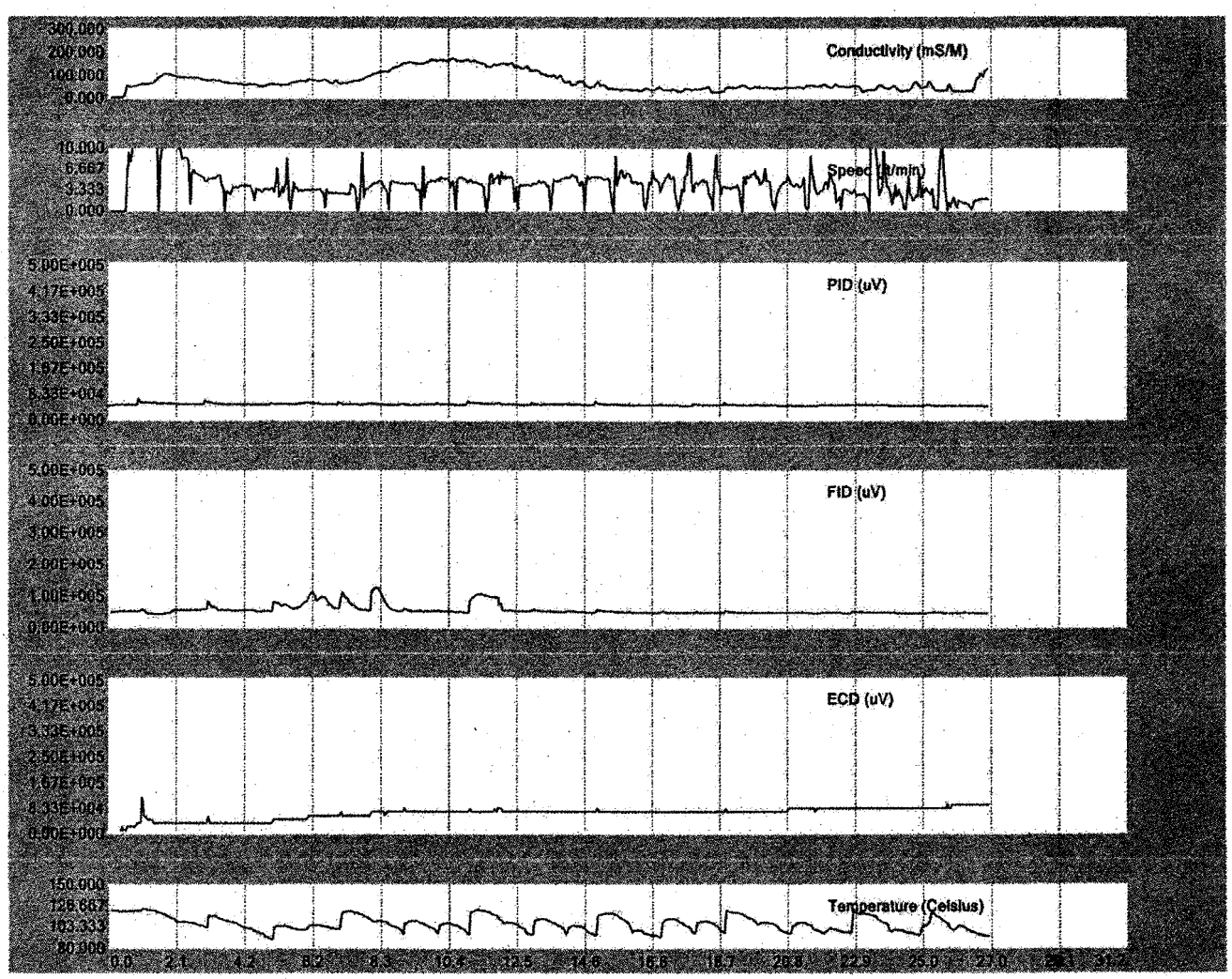
ELEVATION/DEPTH BOTTOM OF SAND PACK: 1[illegible]'

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 11.5'

ACAD:FORM_MWSU.dwg 07/28/99 INL

17MIP48



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17MIP48/17TW57

WELL NO.: 17TW58

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OVERBURDEN MONITORING WELL* SHEET STICK-UP

BORING LOG

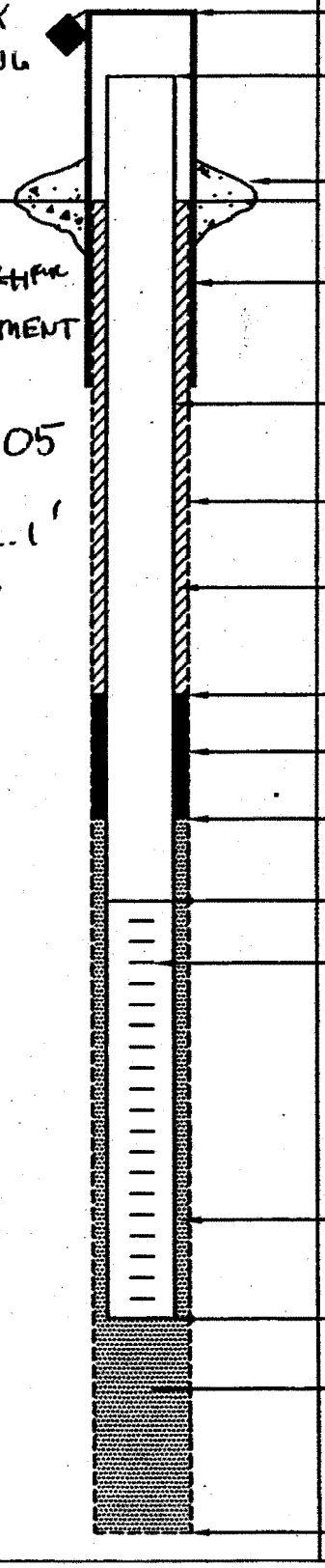
PROJECT SWMU 16/17 SUPP. RFI	LOCATION NWS CHARLESTON
PROJECT NO. 0528	BORING 17TW58
DATE BEGUN 1-14-05	DATE COMPLETED 1-14-05
FIELD GEOLOGIST FRED W. RAMSER	
GROUND ELEVATION	DATUM

DRILLER RANDY BRAND SC. LIC #B01485
DRILLING METHOD DPT
DEVELOPMENT METHOD PUMP

*TEMPORARY MONITORING WELL

WELL ~~MONITORING~~ ABANDONMENT DATE: 1-18-05

SWL = 2.1' BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA
TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC
TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: /0'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~5'

ELEVATION/DEPTH TOP OF SCREEN: /8'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: /13'

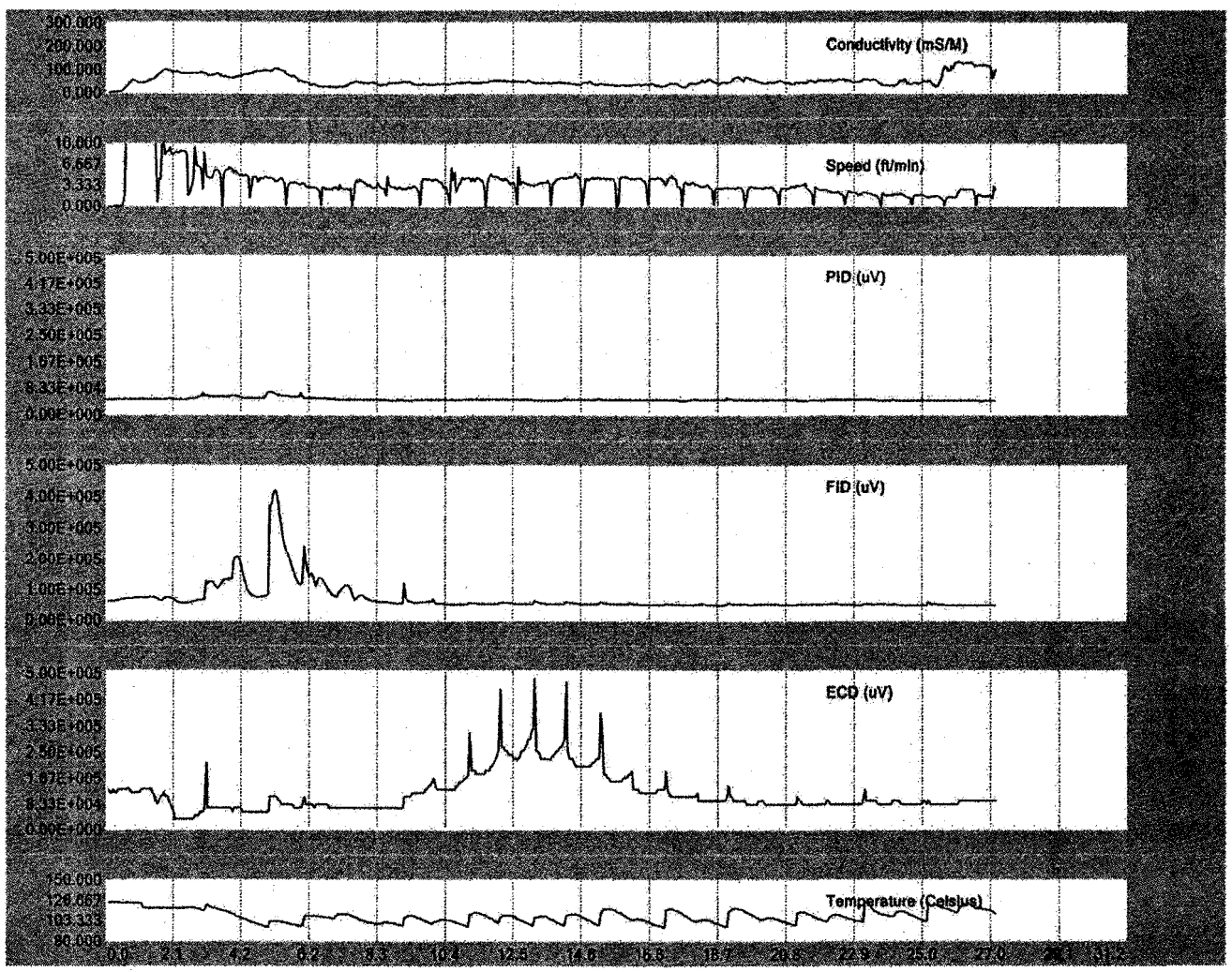
ELEVATION/DEPTH BOTTOM OF SAND PACK: /13

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: /13'

ACAD:FORM_MWSU.dwg 07/20/99 INL

17MIP49



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17MIP49/
17TW58

WELL NO.: 17TW59

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OVERBURDEN MONITORING WELL* SHEET STICK-UP

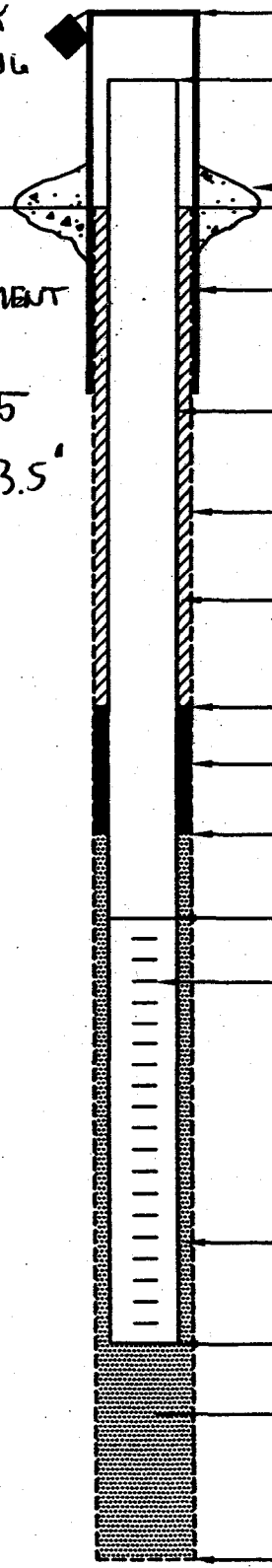
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NUS CHARLESTON	DRILLER RANDY BRAND SC. LIC# B01485
PROJECT NO. 0528	BORING 17TW59	DRILLING METHOD DPT
DATE BEGUN 1-14-05	DATE COMPLETED 1-14-05	DEVELOPMENT METHOD PUMP
FIELD GEOLOGIST FRED W. RAMSER		
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

SWL = 3.5' BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: /0'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~5'

ELEVATION/DEPTH TOP OF SCREEN: /7'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: /12'

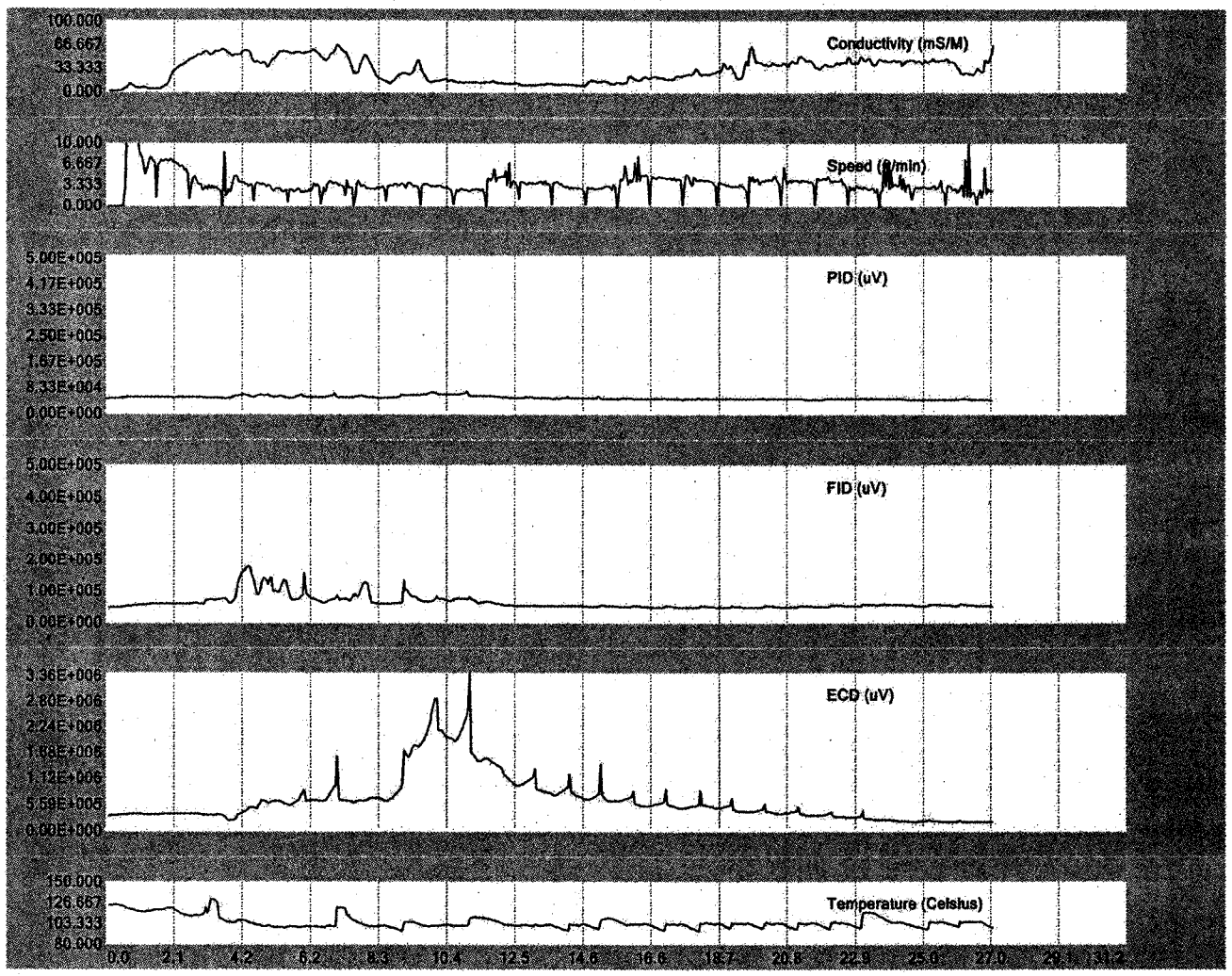
ELEVATION/DEPTH BOTTOM OF SAND PACK: /1

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: /12'

ACAD:FORM_MWSU.dwg 07/28/99 INL

17MIP50



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COLUMBIA TECHNOLOGIES

17MIP50/
17TW59

WELL NO.: 17TW60

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OVERBURDEN MONITORING WELL* SHEET STICK-UP

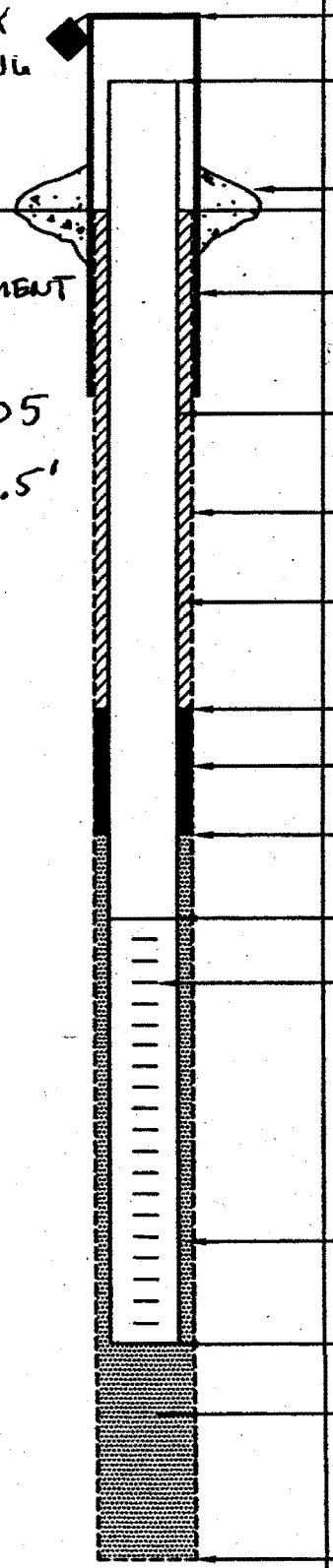
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NWS CHARLESTON	DRILLER RANDY BRAND
PROJECT NO. 0528	BORING 17TW60	DRILLING METHOD SC. LIC # B01485 DPT
DATE BEGUN 1-14-05	DATE COMPLETED 1-14-05	
FIELD GEOLOGIST FRED W. RAMSER		DEVELOPMENT METHOD PUMP
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

SWL = 1.5' BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~5'

ELEVATION/DEPTH TOP OF SCREEN: 17'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 12'

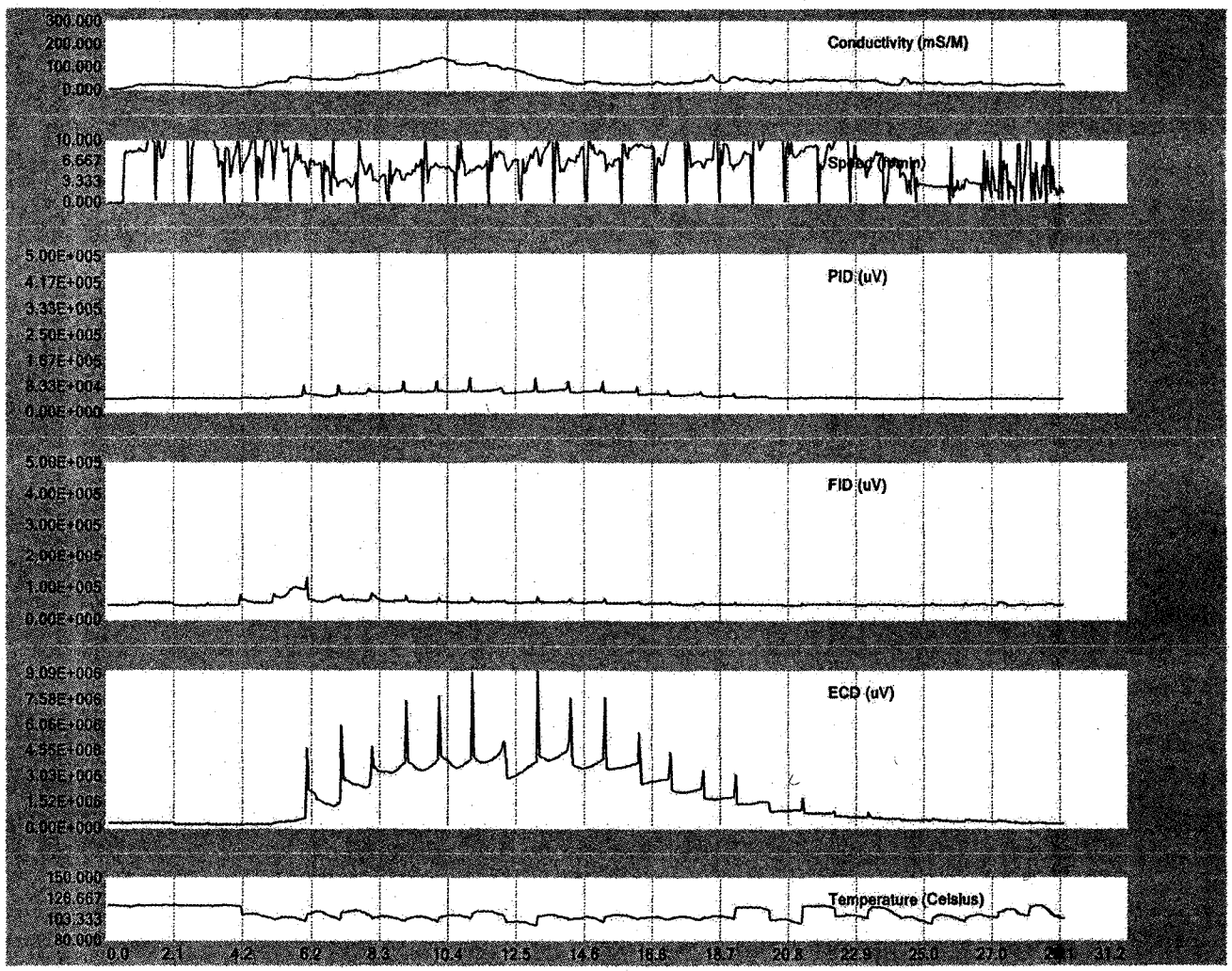
ELEVATION/DEPTH BOTTOM OF SAND PACK: 11

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 12'

ACAD:FORM_MWSU.dwg 07/20/99 INL

17MIP51



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COLUMBIA TECHNOLOGIES

17MIP51/
17TW60

WELL NO.: 17TW61

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OVERBURDEN MONITORING WELL* SHEET STICK-UP

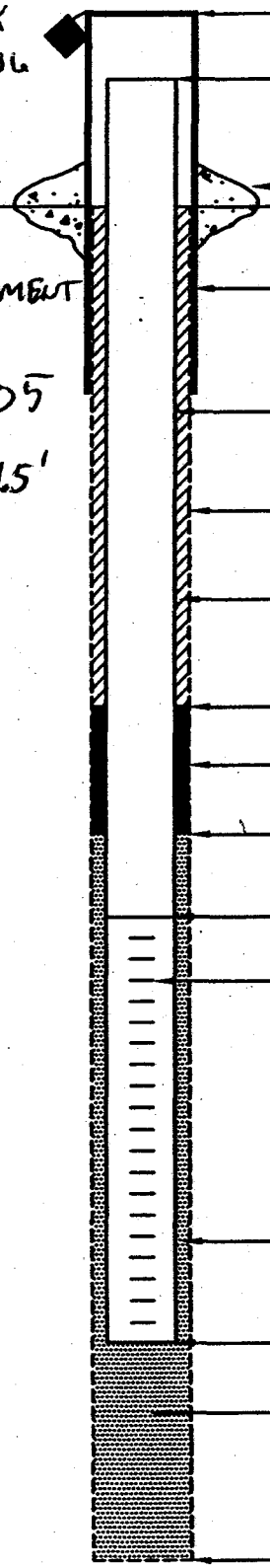
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NWS CHARLESTON	DRILLER RANDY BRAND
PROJECT NO. 0528	BORING 17TW61	DRILLING METHOD LIC. SC#B01485 DPT
DATE BEGUN 1-14-05	DATE COMPLETED 1-14-05	
FIELD GEOLOGIST FRED W. RAMSER		DEVELOPMENT METHOD PUMP
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

SWL = 1.5' BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 1

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~3'

ELEVATION/DEPTH TOP OF SCREEN: 15'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 110'

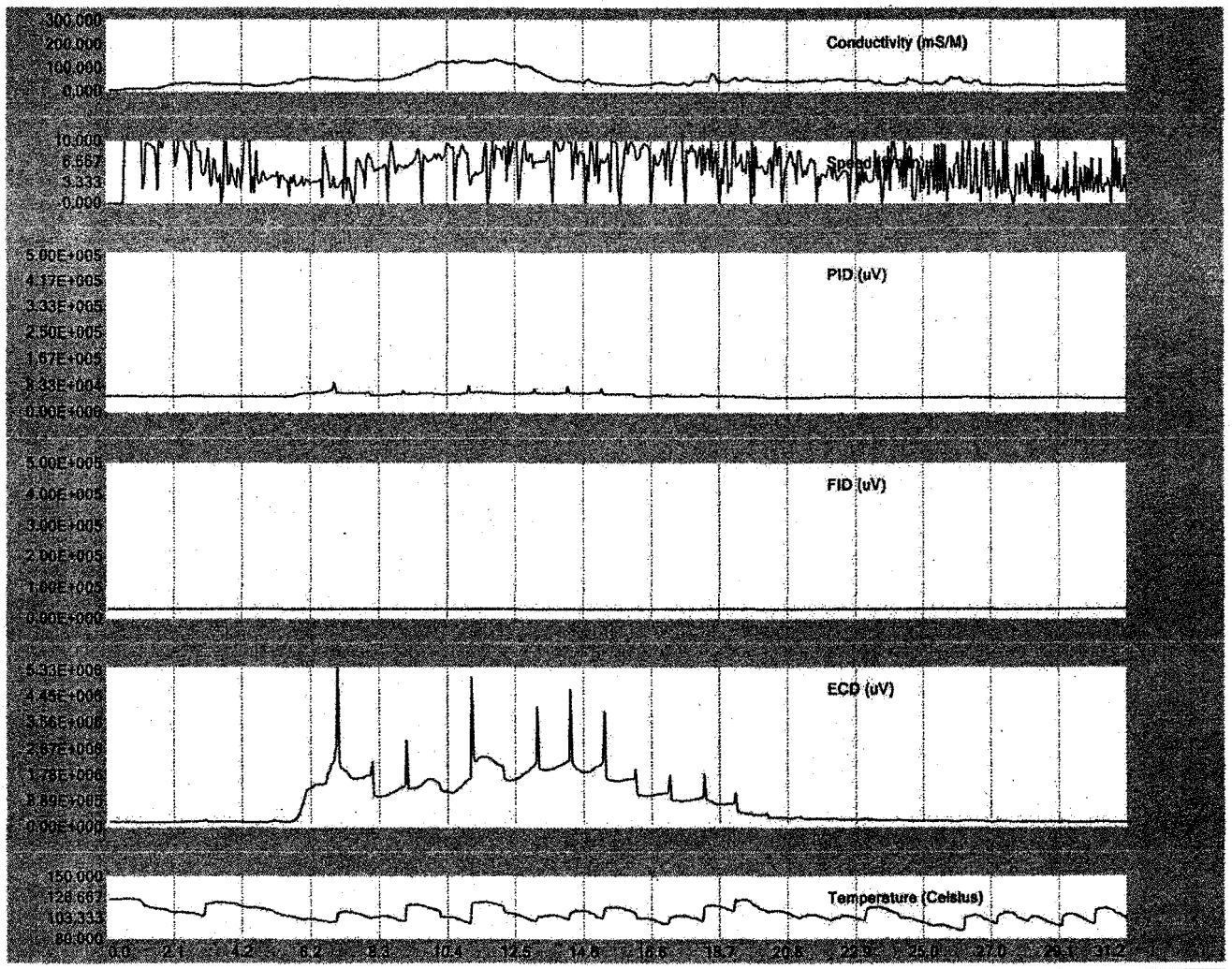
ELEVATION/DEPTH BOTTOM OF SAND PACK: 110

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 110'

ACAD:FORM_MWSU.dwg 07/28/99 INL

17MIP52



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COLUMBIA TECHNOLOGIES

17MIP52/
17TW61

WELL NO.: 17TW62

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL* SHEET STICK-UP

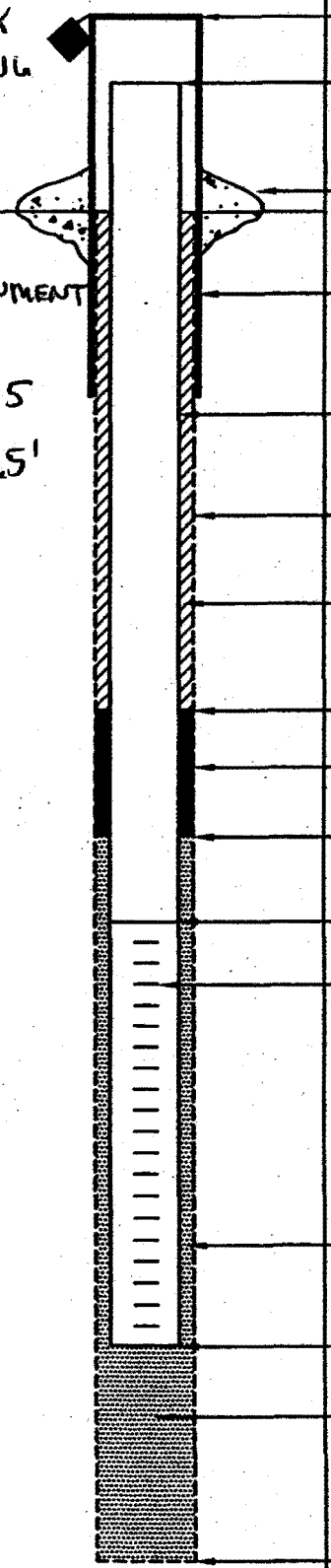
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NWS CHARLESTON	DRILLER RANDY BRAND
PROJECT NO. 0528	BORING 17TW62	DRILLING METHOD SC LIC.#B01485 DPT
DATE BEGUN 1-14-05	DATE COMPLETED 1-14-05	
FIELD GEOLOGIST FRED W. RAMSER		DEVELOPMENT METHOD PUMP
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

SWL = 1.5' BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~1'

ELEVATION/DEPTH TOP OF SCREEN: 13.5'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 18.5'

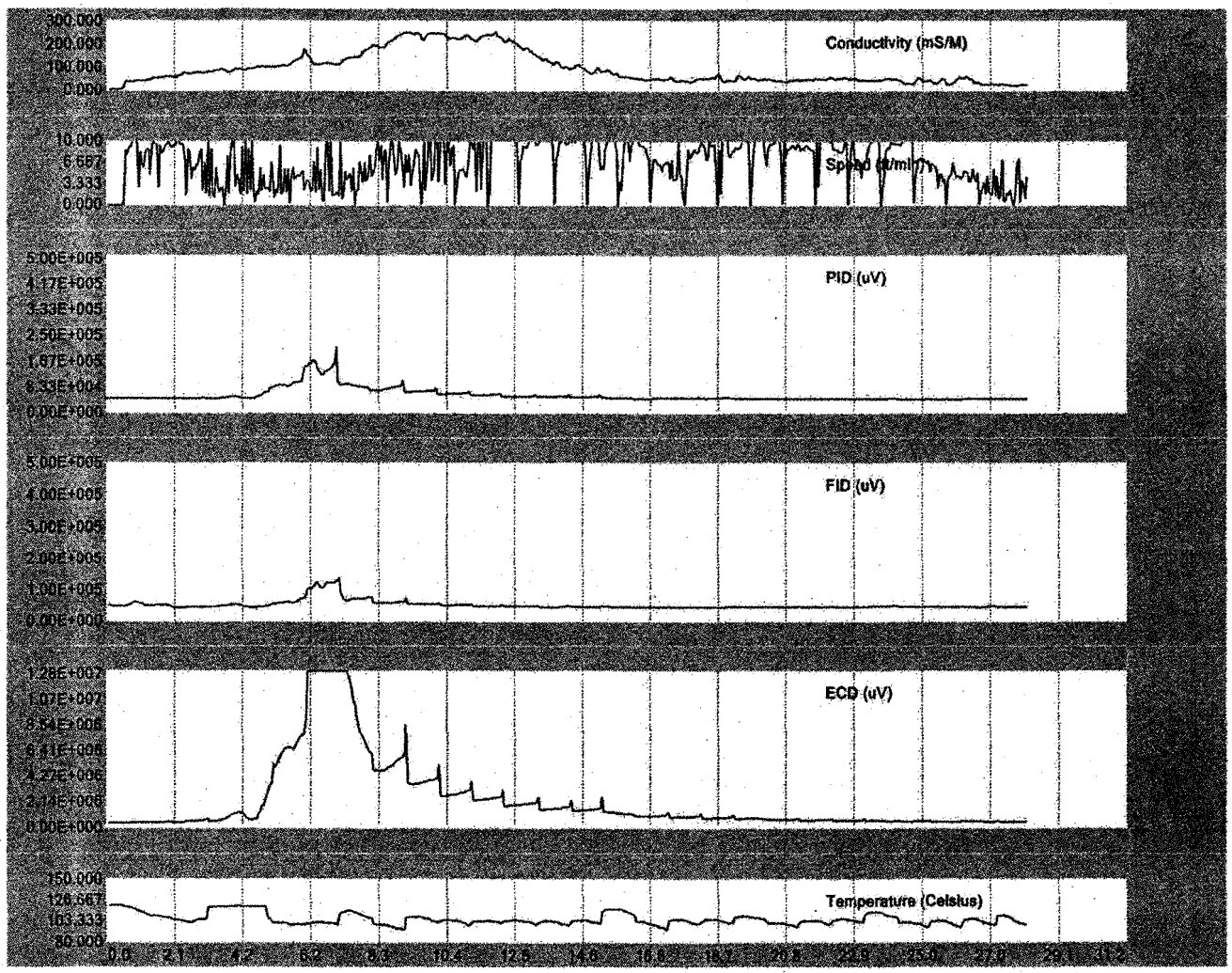
ELEVATION/DEPTH BOTTOM OF SAND PACK: 18

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 18.5'

ACAD: FORM_MWSU.dwg 07/28/99 INL

17MIP53



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COLUMBIA TECHNOLOGIES

17MIP53/
17TW62

WELL NO.: 17TW63

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OVERBURDEN MONITORING WELL* SHEET STICK-UP

BORING LOG

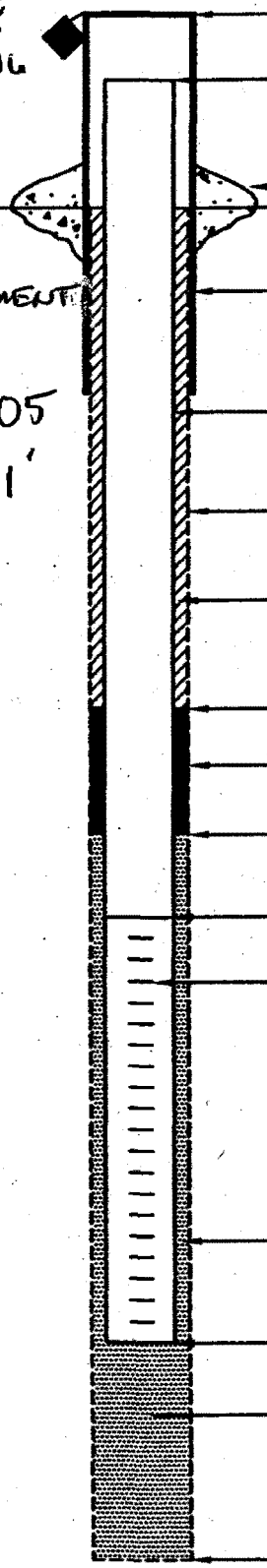
PROJECT SWMU 16/17 SUPP. RFI
PROJECT NO. 0528
DATE BEGUN 1-14-05
FIELD GEOLOGIST FRED W. RAMSER
GROUND ELEVATION
LOCATION NUS CHARLESTON
BORING 17TW63
DATE COMPLETED 1-14-05
DATUM

DRILLER RANDY BRAND
DRILLING METHOD SC LIC #B01485 DPT
DEVELOPMENT METHOD PUMP

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

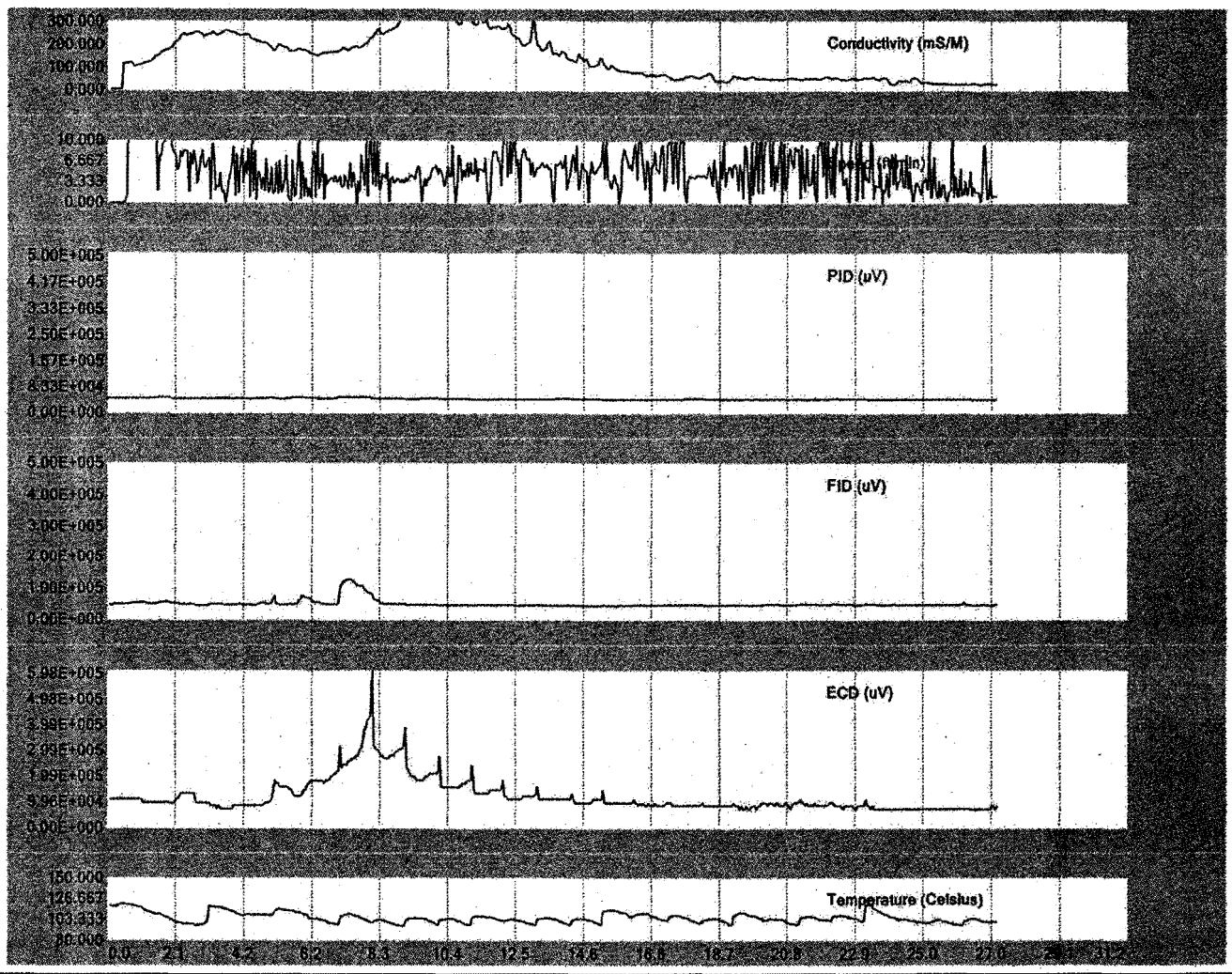
SWL = 1' BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /
ELEVATION/HEIGHT OF TOP OF RISER PIPE: /
TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS
I.D. OF SURFACE CASING: NA
TYPE OF SURFACE CASING: NA
RISER PIPE I.D.: 3/4" PVC
TYPE OF RISER PIPE: SCH. 40
BOREHOLE DIAMETER: 2 1/8"
TYPE OF BACKFILL: 3/8" BENTONITE CHIPS
ELEVATION/DEPTH TOP OF SEAL: 10'
TYPE OF SEAL: 3/8" BENTONITE CHIPS
DEPTH TOP OF SAND PACK: ~2.5'
ELEVATION/DEPTH TOP OF SCREEN: 14.5'
TYPE OF SCREEN: SCH. 40 PVC
SLOT SIZE x LENGTH: 0.010 x 5'
I.D. OF SCREEN: 3/4"
TYPE OF SAND PACK: 20/40 SILICA SAND
ELEVATION/DEPTH BOTTOM OF SCREEN: 19.5'
ELEVATION/DEPTH BOTTOM OF SAND PACK: 19.5
BACKFILL MATERIAL BELOW SAND: NA
ELEVATION/DEPTH OF HOLE: 19.5'

ACAD:FORM_MWSU.dwg 07/20/99 INL

17MIP54



Tetra Tech
SWMU 17 Revisit
01/11/05

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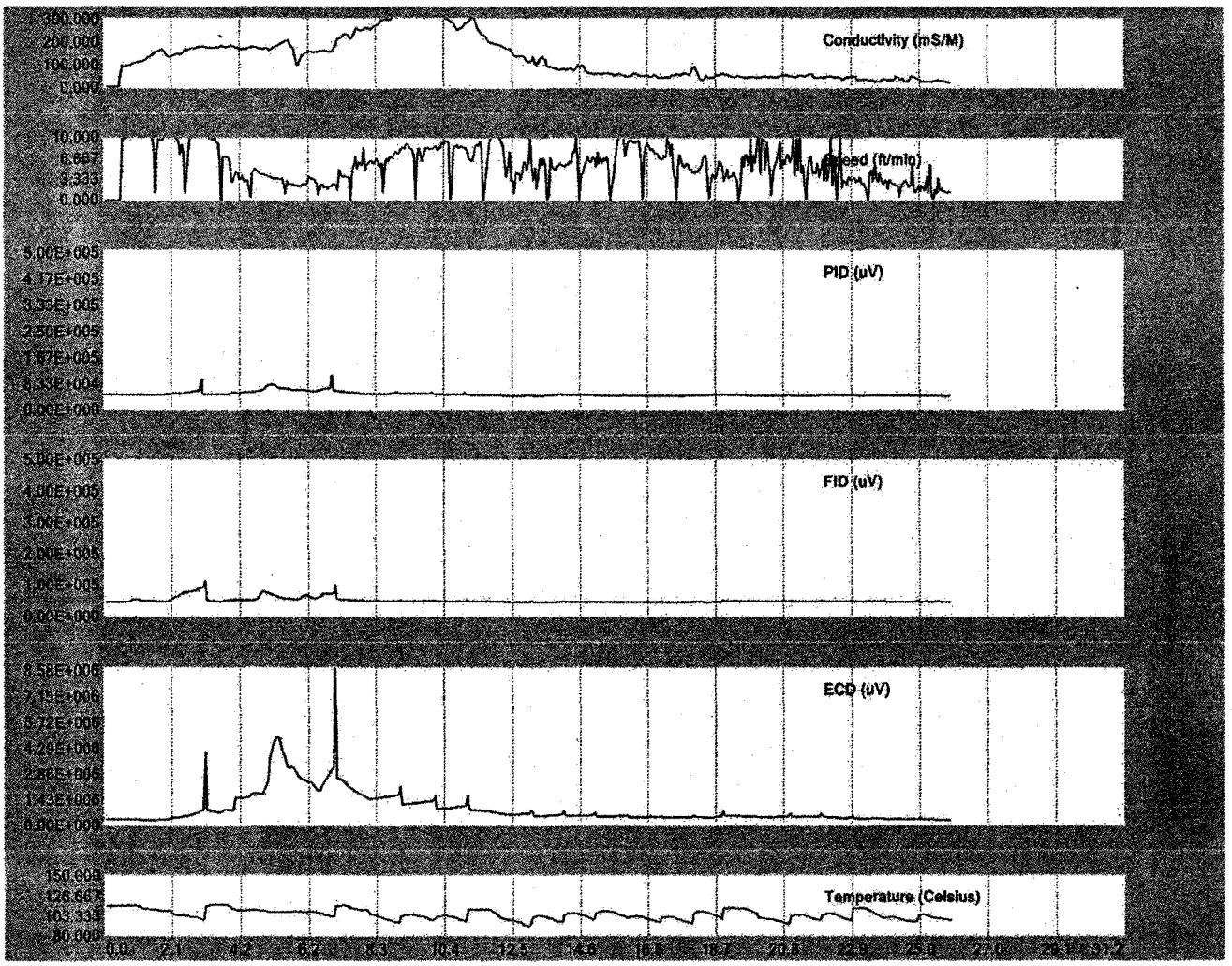
COLUMBIA TECHNOLOGIES

17MIP54/
17TW63

17MIP55



Tetra Tech
SWMU 17 Revisit
01/11/05

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COLUMBIA TECHNOLOGIES

17MIP55/
17TW64

WELL NO.: 17TW64

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL* SHEET STICK-UP

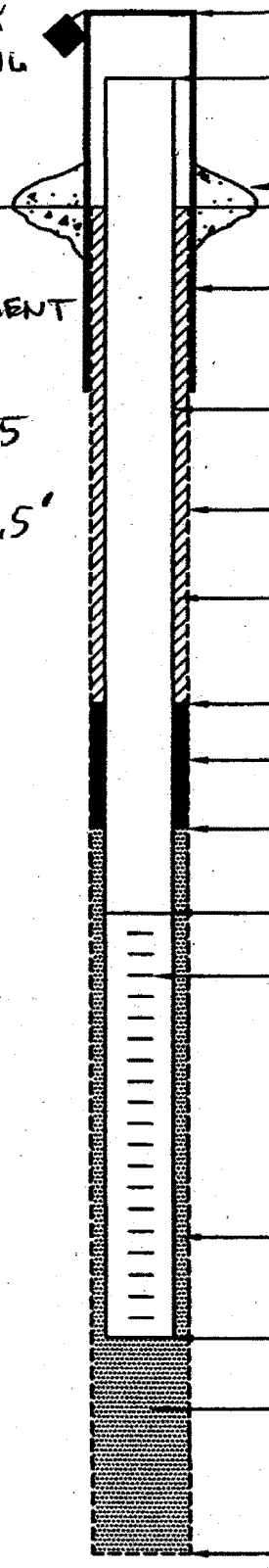
BORING LOG

PROJECT SWMU 16/17 SUPP. RFI	LOCATION NWS CHARLESTON	DRILLER RANDY BRAND SC. LIC #B01485
PROJECT NO. 0528	BORING 17TW64	DRILLING METHOD DPT
DATE BEGUN 1-14-05	DATE COMPLETED 1-14-05	DEVELOPMENT METHOD PUMP
FIELD GEOLOGIST FRED W. RAMSER		
GROUND ELEVATION	DATUM	

*TEMPORARY MONITORING WELL

WELL ABANDONMENT DATE: 1-18-05

SWL = 1.5' BGS



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: 3/8" BENTONITE CHIPS

I.D. OF SURFACE CASING: NA

TYPE OF SURFACE CASING: NA

RISER PIPE I.D.: 3/4" PVC

TYPE OF RISER PIPE: SCH. 40

BOREHOLE DIAMETER: 2 1/8"

TYPE OF BACKFILL: 3/8" BENTONITE CHIPS

ELEVATION/DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: 3/8" BENTONITE CHIPS

DEPTH TOP OF SAND PACK: ~ 1.5'

ELEVATION/DEPTH TOP OF SCREEN: 13.5'

TYPE OF SCREEN: SCH. 40 PVC

SLOT SIZE x LENGTH: 0.010 x 5'

I.D. OF SCREEN: 3/4"

TYPE OF SAND PACK: 20/40 SILICA SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 18.5'

ELEVATION/DEPTH BOTTOM OF SAND PACK: 18.5'

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 18.5'

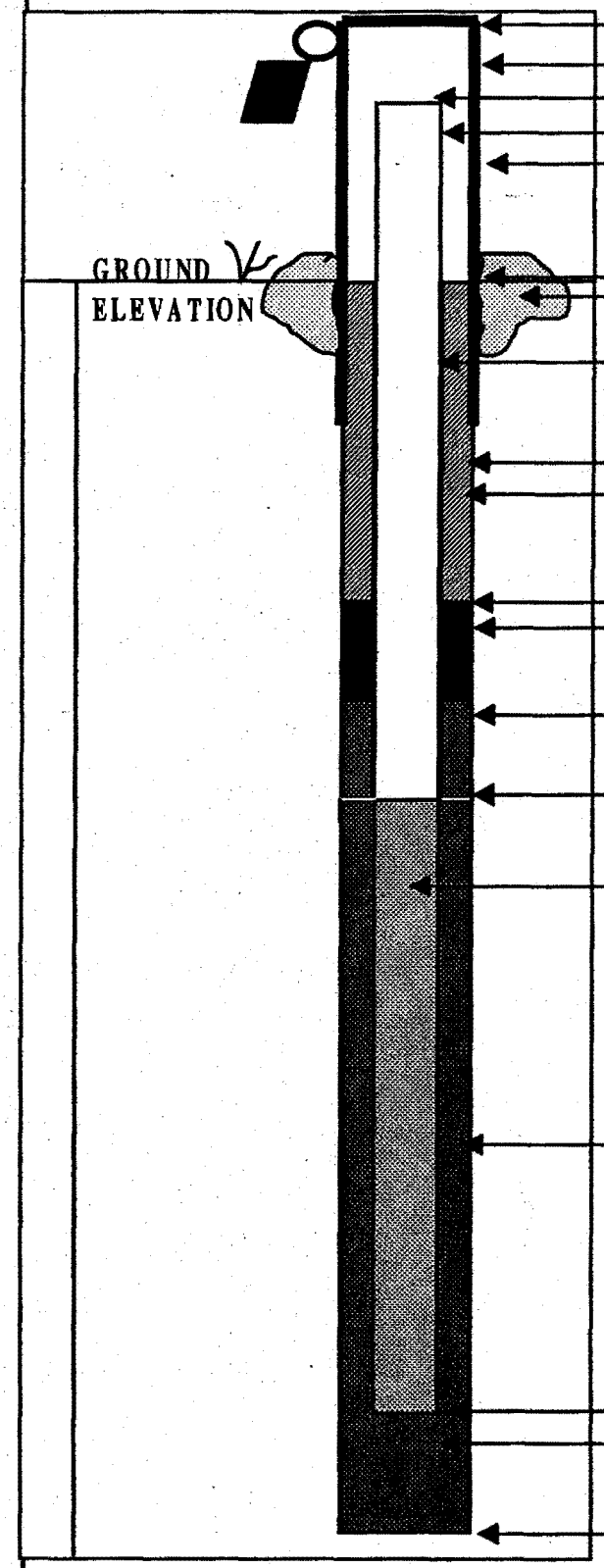
ACAD: EORM_MWSU.dwg 07/28/99 INL

APPENDIX A-3
MONITORING WELL CONSTRUCTION DIAGRAMS

BORING NO.: 16MW015

Tetra Tech NUS, Inc. **OVERBURDEN MONITORING WELL SHEET**

PROJECT:	NWS CHARLESTON	DRILLING Co.:	CAROLINA	BORING No.:	16MW015
PROJECT No.:	N0528	DRILLER:	SISTER # 273	DATE COMPLETED:	6/10/01
SITE:	SWMU 16	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	S. NEIL	DEV. METHOD:	SURGE/PUMP	EASTING:	



ELEVATION OF TOP OF SURFACE CASING:

STICK-UP TOP OF SURFACE CASING: 3 FT

ELEVATION OF TOP OF RISER PIPE:

RISER STICK-UP ABOVE GROUND SURFACE: 3 FT

I.D. OF SURFACE CASING: 5 IN

TYPE OF SURFACE CASING: ALUMINUM

GROUND ELEVATION:

TYPE OF SURFACE SEAL: TYPE 1 PORTLAND CEMENT 3FT X 3FT X 6 IN

RISER PIPE I.D.: 2 IN

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: 8 IN

TYPE OF SEAL: CEMENT / BENTONITE GROUT

ELEVATION / DEPTH OF SEAL: 11 FT

TYPE OF SEAL: BENTONITE PELLETS

ELEVATION / DEPTH TOP OF FILTER PACK: 13 FT

ELEVATION / DEPTH TOP OF SCREEN: 14 FT

TYPE OF SCREEN: SCH 40 PVC

SLOT SIZE X LENGTH: 0.01 IN X 10 FT

I.D. OF SCREEN: 2 IN

TYPE OF FILTER PACK: #2 SAND

ELEVATION / DEPTH BOTTOM OF SCREEN: 14 FT

ELEVATION / DEPTH BOTTOM OF FILTER PACK: 15 FT

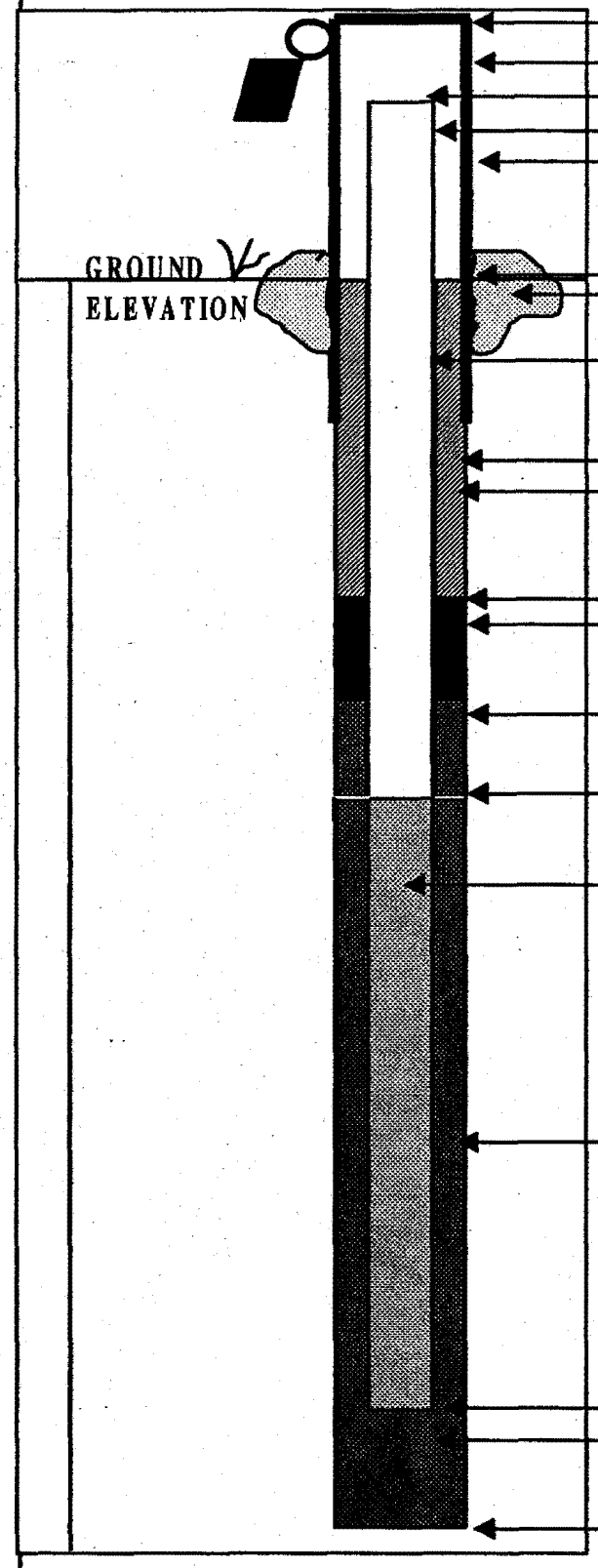
TYPE OF BACKFILL BELOW WELL: #2 SAND

ELEVATION / DEPTH OF BOREHOLE: 15 FT

BORING NO.: 16MW02S

Tetra Tech NUS, Inc. **OVERBURDEN MONITORING WELL SHEET**

PROJECT:	NWS CHARLESTON	DRILLING Co.:	CAROLINA	BORING No.:	16MW02S
PROJECT No.:	N0528	DRILLER:	EISTER #173	DATE COMPLETED:	6/11/01
SITE:	SWMU 16	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	S. NGIL	DEV. METHOD:	SURGE/Pump	EASTING:	



ELEVATION OF TOP OF SURFACE CASING:

STICK-UP TOP OF SURFACE CASING: 3 FT *

ELEVATION OF TOP OF RISER PIPE:

RISER STICK-UP ABOVE GROUND SURFACE: 3 FT

I.D. OF SURFACE CASING: 5"

TYPE OF SURFACE CASING: Aluminum

GROUND ELEVATION:

TYPE OF SURFACE SEAL: TYPE V PORTLAND CEMENT 3FT X 3FT X 8 IN PAD

RISER PIPE I.D.: 2 IN

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: 8"

TYPE OF SEAL: CEMENT/BENTONITE GROUT

ELEVATION / DEPTH OF SEAL: 11 FT

TYPE OF SEAL: ~~CEMENT/BENTONITE GROUT~~ SURGE BENTONITE PELLETS

ELEVATION / DEPTH TOP OF FILTER PACK: 12 FT

ELEVATION / DEPTH TOP OF SCREEN: 13 FT

TYPE OF SCREEN: SCH 40 PVC

SLOT SIZE X LENGTH: 0.01 IN X 10 FT

I.D. OF SCREEN: 2 IN

TYPE OF FILTER PACK: #2 SAND

ELEVATION / DEPTH BOTTOM OF SCREEN: 13 FT

ELEVATION / DEPTH BOTTOM OF FILTER PACK: 13 FT

TYPE OF BACKFILL BELOW WELL: NATURAL FORMATION

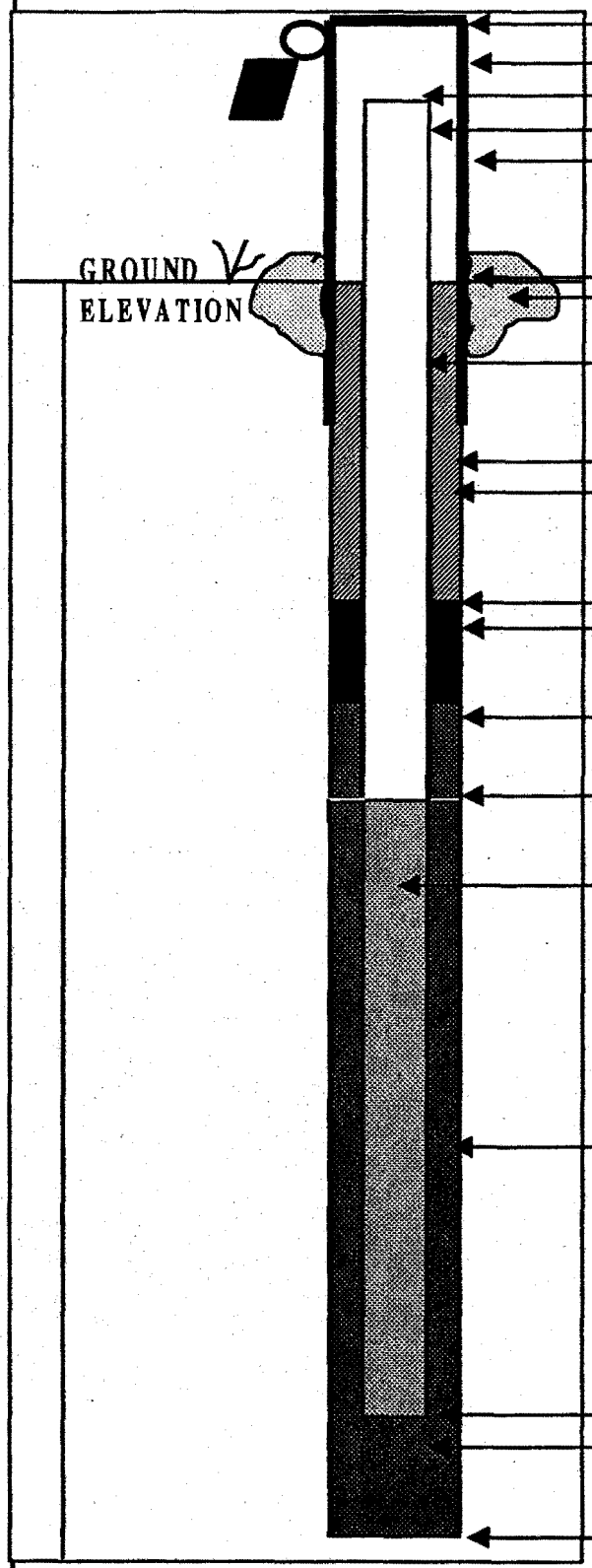
ELEVATION / DEPTH OF BOREHOLE: 13 FT

* ADDITIONAL 1.95' OF 2" RISER PIPE (PVC) ADDED TO WELL ON 10-19-01 TO PREVENT HIGH TIDE WATER FROM RUNNING INTO WEL

BORING NO.: 16MW 035

Tetra Tech NUS, Inc. **OVERBURDEN MONITORING WELL SHEET**

PROJECT:	NWS CHARLESTON	DRILLING Co.:	CAROLINA	BORING No.:	16MW035
PROJECT No.:	N0528	DRILLER:	EISTER #1273	DATE COMPLETED:	6/12/01
SITE:	SWMU 16	DRILLING METHOD:		NORTHING:	
GEOLOGIST:	S. NEIL	DEV. METHOD:	SURGE/PUMP	EASTING:	



ELEVATION OF TOP OF SURFACE CASING:

STICK-UP TOP OF SURFACE CASING: 3 FT

ELEVATION OF TOP OF RISER PIPE:

RISER STICK-UP ABOVE GROUND SURFACE: 3 FT

I.D. OF SURFACE CASING: 5"

TYPE OF SURFACE CASING: ALUMINUM

GROUND ELEVATION:

TYPE OF SURFACE SEAL: AT TYPE V PORTLAND CEMENT 3FT X 3FT X 8 IN PAD

RISER PIPE I.D.: 2 IN

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~~8"~~ 7"

TYPE OF SEAL: CEMENT/BENTONITE GROUT

ELEVATION / DEPTH OF SEAL: 11 FT

TYPE OF SEAL: BENTONITE PELLETS

ELEVATION / DEPTH TOP OF FILTER PACK: 12 FT

ELEVATION / DEPTH TOP OF SCREEN: 13 FT

TYPE OF SCREEN: SCH 40 PVC

SLOT SIZE X LENGTH: 0.01 IN X 10 FT

I.D. OF SCREEN: 2 IN

TYPE OF FILTER PACK: #2 SAND

ELEVATION / DEPTH BOTTOM OF SCREEN: 113 FT

ELEVATION / DEPTH BOTTOM OF FILTER PACK: 113 FT

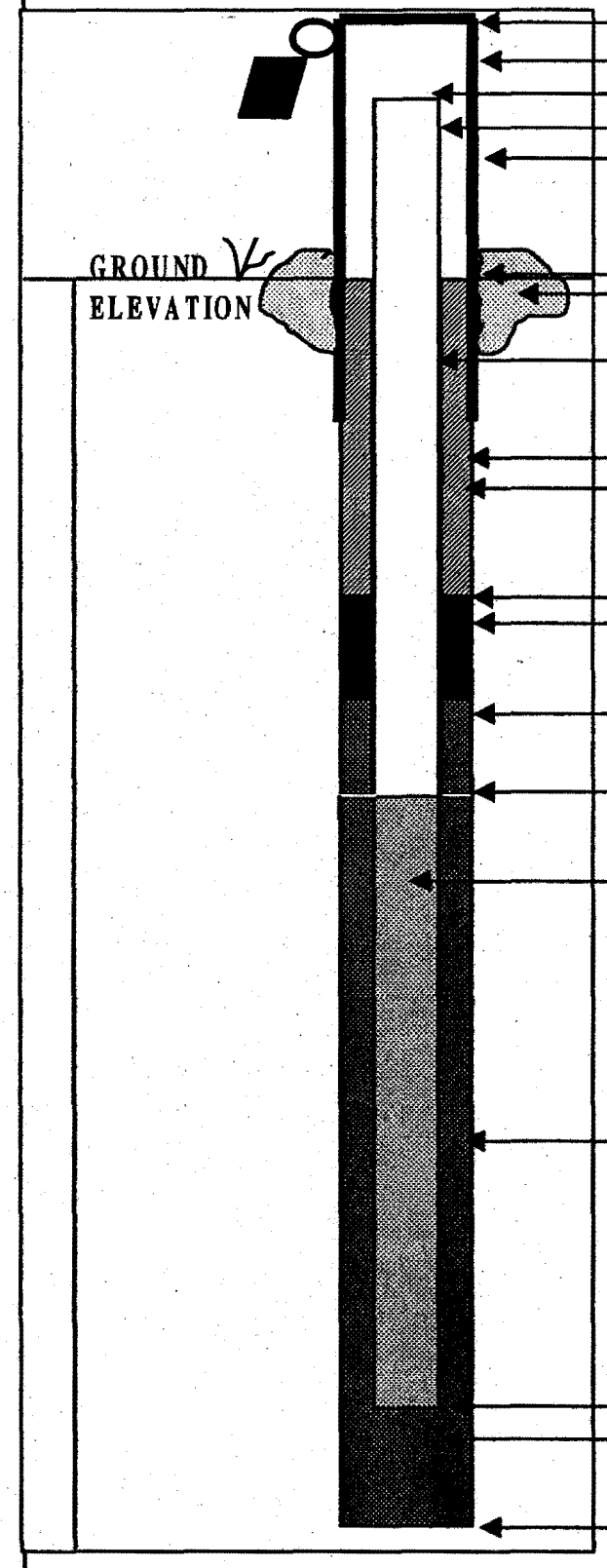
TYPE OF BACKFILL BELOW WELL: NATURAL FORMATION

ELEVATION / DEPTH OF BOREHOLE: 113 FT

BORING NO.: 16MW04S

Tetra Tech NUS, Inc. **OVERBURDEN MONITORING WELL SHEET**

PROJECT:	NNS CHARLESTON	DRILLING Co.:	CAROLINA	BORING No.:	16MW04S
PROJECT No.:	N0528	DRILLER:	EISTER # 1273	DATE COMPLETED:	6/12/01
SITE:	SWMU 16	DRILLING METHOD:		NORTHING:	
GEOLOGIST:	S. NEIL	DEV. METHOD:	SURGE/PUMP	EASTING:	



ELEVATION OF TOP OF SURFACE CASING:

STICK-UP TOP OF SURFACE CASING: 3 FT

ELEVATION OF TOP OF RISER PIPE:

RISER STICK-UP ABOVE GROUND SURFACE: 3 FT

I.D. OF SURFACE CASING: 5"

TYPE OF SURFACE CASING: ALUMINUM

GROUND ELEVATION:

TYPE OF SURFACE SEAL: TYPE V PORTLAND CEMENT 3FT X 3FT X 8 IN PAD

RISER PIPE I.D.: 2 IN

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~~8~~ 7"

TYPE OF SEAL: CEMENT/BENTONITE GROUT

ELEVATION / DEPTH OF SEAL: 11 FT

TYPE OF SEAL: BENTONITE PELLETS

ELEVATION / DEPTH TOP OF FILTER PACK: 12 FT

ELEVATION / DEPTH TOP OF SCREEN: 13 FT

TYPE OF SCREEN: SCH 40 PVC

SLOT SIZE X LENGTH: 0.01 IN X 10 FT

I.D. OF SCREEN: 2 IN

TYPE OF FILTER PACK: #2 SAND

ELEVATION / DEPTH BOTTOM OF SCREEN: 113 FT

ELEVATION / DEPTH BOTTOM OF FILTER PACK: 113 FT

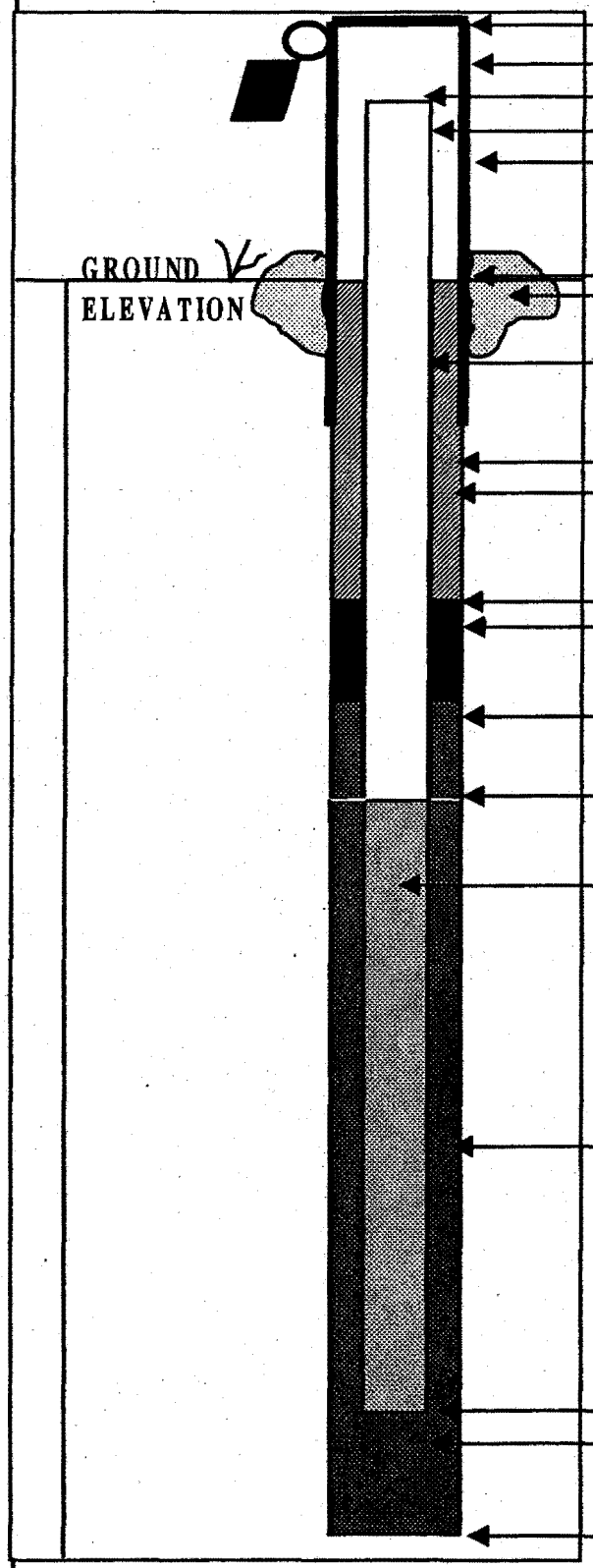
TYPE OF BACKFILL BELOW WELL: NATURAL FORMATION

ELEVATION / DEPTH OF BOREHOLE: 113 FT

BORING NO.: 16MW055

Tetra Tech NUS, Inc. **OVERBURDEN MONITORING WELL SHEET**

PROJECT:	NWS CHARLESTON	DRILLING Co.:	CAROLINA	BORING No.:	16MW055
PROJECT No.:	N0528	DRILLER:	EISTER #1273	DATE COMPLETED:	6/11/01
SITE:	SWMU 16	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	S. NEIL	DEV. METHOD:	SURGE/PUMP	EASTING:	



ELEVATION OF TOP OF SURFACE CASING:

STICK-UP TOP OF SURFACE CASING: 3 FT

ELEVATION OF TOP OF RISER PIPE:

RISER STICK-UP ABOVE GROUND SURFACE: 3 FT

I.D. OF SURFACE CASING: 5 IN

TYPE OF SURFACE CASING: ALUMINUM

GROUND ELEVATION:

TYPE OF SURFACE SEAL: TYPE V PORTLAND CEMENT 3 FT x 3 FT x 8 IN PAD

RISER PIPE I.D.: 2 IN

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: 8 IN

TYPE OF SEAL: CEMENT / BENTONITE GROUT

ELEVATION / DEPTH OF SEAL: 11 FT

TYPE OF SEAL: BENTONITE PELLETS

ELEVATION / DEPTH TOP OF FILTER PACK: 12 FT

ELEVATION / DEPTH TOP OF SCREEN: 13 FT

TYPE OF SCREEN: SCH 40 PVC

SLOT SIZE X LENGTH: 0.01 IN x 10 FT

I.D. OF SCREEN: 2 IN

TYPE OF FILTER PACK: #2 SAND

ELEVATION / DEPTH BOTTOM OF SCREEN: 113 FT

ELEVATION / DEPTH BOTTOM OF FILTER PACK: 113 FT

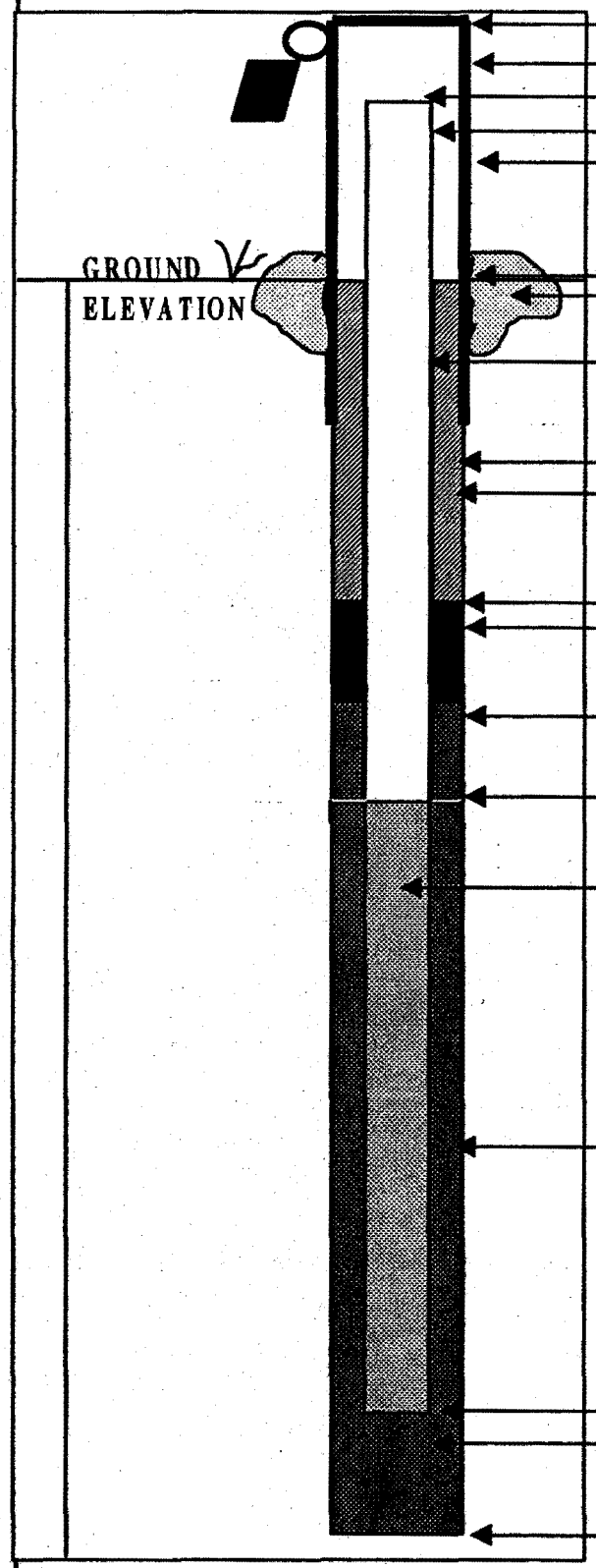
TYPE OF BACKFILL BELOW WELL: NATURAL FORMATION

ELEVATION / DEPTH OF BOREHOLE: 113 FT

BORING NO.: 17MW015

Tetra Tech NUS, Inc. **OVERBURDEN MONITORING WELL SHEET**

PROJECT:	NWS CHARLESTON	DRILLING Co.:	CAROLINA	BORING No.:	17MW015
PROJECT No.:	N0528	DRILLER:	ZISERMAN	DATE COMPLETED:	6/10/01
SITE:	SWMU 17	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	S. NEIL	DEV. METHOD:	SURGE/PUMP	EASTING:	



ELEVATION OF TOP OF SURFACE CASING:

STICK-UP TOP OF SURFACE CASING: 2FT

ELEVATION OF TOP OF RISER PIPE:

RISER STICK-UP ABOVE GROUND SURFACE: 3FT

I.D. OF SURFACE CASING: 5 IN

TYPE OF SURFACE CASING: ALUMINUM

GROUND ELEVATION:

TYPE OF SURFACE SEAL: TYPE I PORTLAND CEMENT 3FT x 3FT x 6 IN PAD

RISER PIPE I.D.:

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: 8 IN

TYPE OF SEAL: CEMENT / BENTONITE GROUT

ELEVATION / DEPTH OF SEAL: 11 FT

TYPE OF SEAL: BENTONITE PELLETS

ELEVATION / DEPTH TOP OF FILTER PACK: 13 FT

ELEVATION / DEPTH TOP OF SCREEN: 14 FT

TYPE OF SCREEN: SCH 40 PVC

SLOT SIZE X LENGTH: 0.01 IN x 10 FT

I.D. OF SCREEN: 2 IN

TYPE OF FILTER PACK: #2 SAND

ELEVATION / DEPTH BOTTOM OF SCREEN: 114 FT

ELEVATION / DEPTH BOTTOM OF FILTER PACK: 116 FT

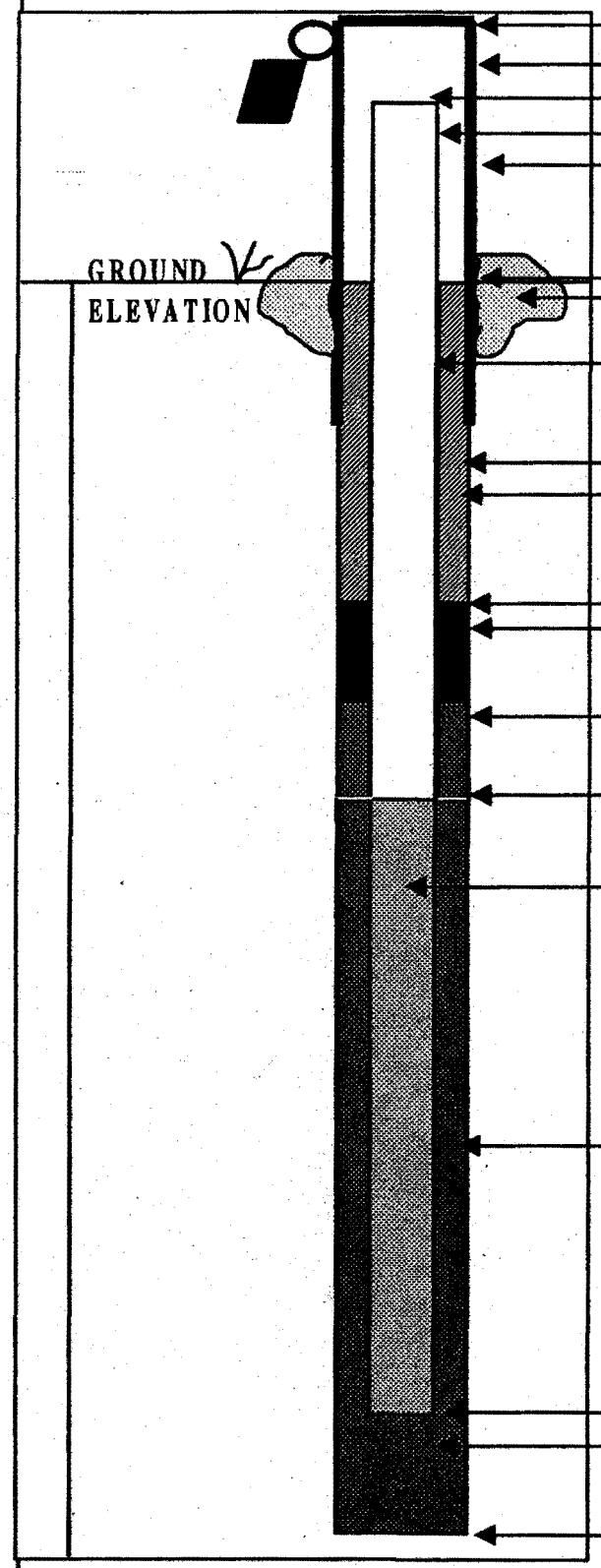
TYPE OF BACKFILL BELOW WELL: #2 SAND

ELEVATION / DEPTH OF BOREHOLE: 116 FT

BORING NO.: 17MW02S

Tetra Tech NUS, Inc. **OVERBURDEN MONITORING WELL SHEET**

PROJECT:	NWS CHARLESTON	DRILLING Co.:	CAROLINA	BORING No.:	17MW02S
PROJECT No.:	N0524	DRILLER:	ELSTRAHDT	DATE COMPLETED:	6/7/01
SITE:	SWMU 17	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	S. NEIL	DEV. METHOD:	SURGE/PUMP	EASTING:	



ELEVATION OF TOP OF SURFACE CASING:

STICK-UP TOP OF SURFACE CASING: 3 FT

ELEVATION OF TOP OF RISER PIPE:

RISER STICK-UP ABOVE GROUND SURFACE: 3 FT

I.D. OF SURFACE CASING: 5 IN

TYPE OF SURFACE CASING: ALUMINUM

GROUND ELEVATION:

TYPE OF SURFACE SEAL: TYPE 1 PORTLAND CEMENT 3 FT X 3FT X 6IN PAD

RISER PIPE I.D.: 2 IN

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: 8"

TYPE OF SEAL: CEMENT/BENTONITE GROUT

ELEVATION / DEPTH OF SEAL: 12 FT

TYPE OF SEAL: BENTONITE PELLETS

ELEVATION / DEPTH TOP OF FILTER PACK: 14 FT

ELEVATION / DEPTH TOP OF SCREEN: 15 FT

TYPE OF SCREEN: SCH 40 PVC

SLOT SIZE X LENGTH: 0.01 IN X 10 FT

I.D. OF SCREEN: 2 IN

TYPE OF FILTER PACK: #2 SAND

ELEVATION / DEPTH BOTTOM OF SCREEN: 115 FT

ELEVATION / DEPTH BOTTOM OF FILTER PACK: 116 FT

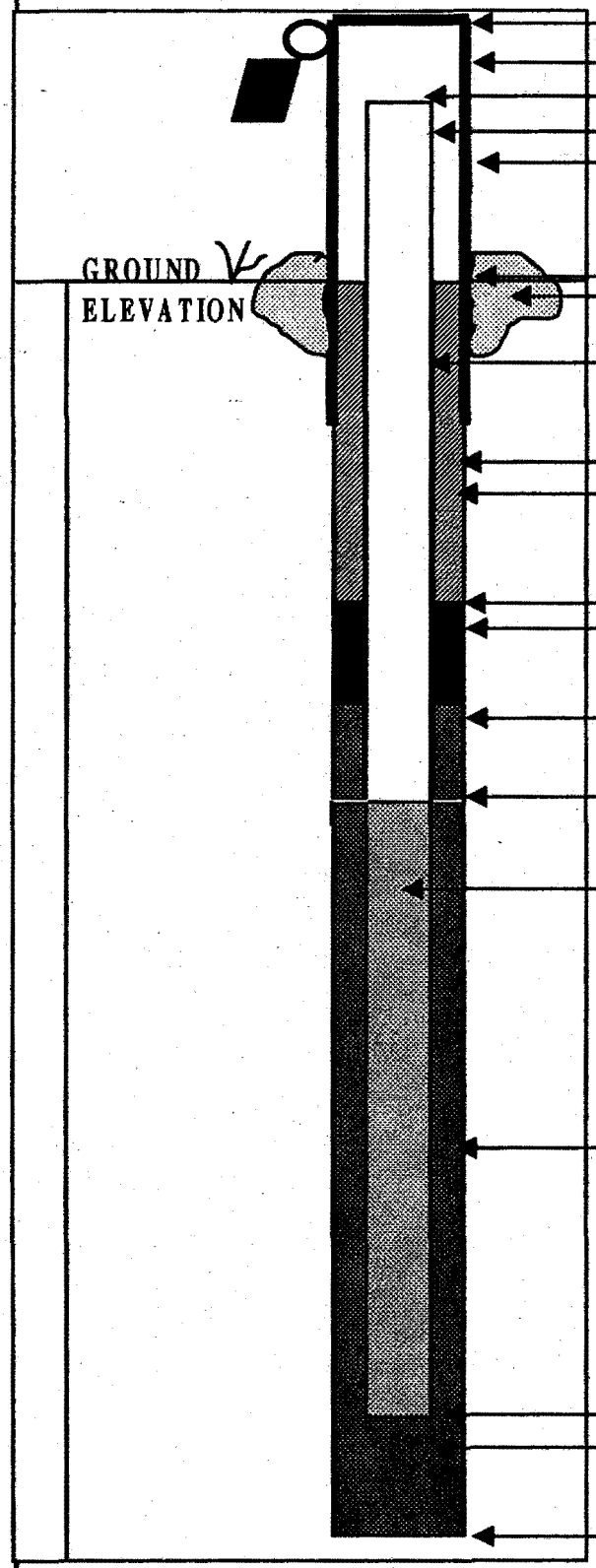
TYPE OF BACKFILL BELOW WELL: #2 SAND

ELEVATION / DEPTH OF BOREHOLE: 116 FT

BORING NO.: 17MW035

Tetra Tech NUS, Inc. **OVERBURDEN MONITORING WELL SHEET**

PROJECT:	NWS CHARLESTON	DRILLING Co.:	CAROLINA	BORING No.:	17MW035
PROJECT No.:	N0528	DRILLER:	EISTAL HILTY	DATE COMPLETED:	6/7/01
SITE:	SWMU 17	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	S. NEIL	DEV. METHOD:	SURGE/PUMP	EASTING:	



ELEVATION OF TOP OF SURFACE CASING:

STICK-UP TOP OF SURFACE CASING: 3 FT

ELEVATION OF TOP OF RISER PIPE:

RISER STICK-UP ABOVE GROUND SURFACE: 3 FT

I.D. OF SURFACE CASING: 5"

TYPE OF SURFACE CASING: ALUMINUM

GROUND ELEVATION:

TYPE OF SURFACE SEAL: TYPE 1 PORTLAND CEMENT 3 FT X 3 FT X 6 IN PAD

RISER PIPE I.D.: 2 IN

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: 8"

TYPE OF SEAL: CEMENT / BENTONITE GROUT

ELEVATION / DEPTH OF SEAL: 12 FT

TYPE OF SEAL: BENTONITE PELLETS

ELEVATION / DEPTH TOP OF FILTER PACK: 14 FT

ELEVATION / DEPTH TOP OF SCREEN: 15 FT

TYPE OF SCREEN: SCH 40 PVC

SLOT SIZE X LENGTH: 0.01 IN X 10 FT

I.D. OF SCREEN: 2 IN

TYPE OF FILTER PACK: #2 SAND

ELEVATION / DEPTH BOTTOM OF SCREEN: 115 FT

ELEVATION / DEPTH BOTTOM OF FILTER PACK: 116 FT

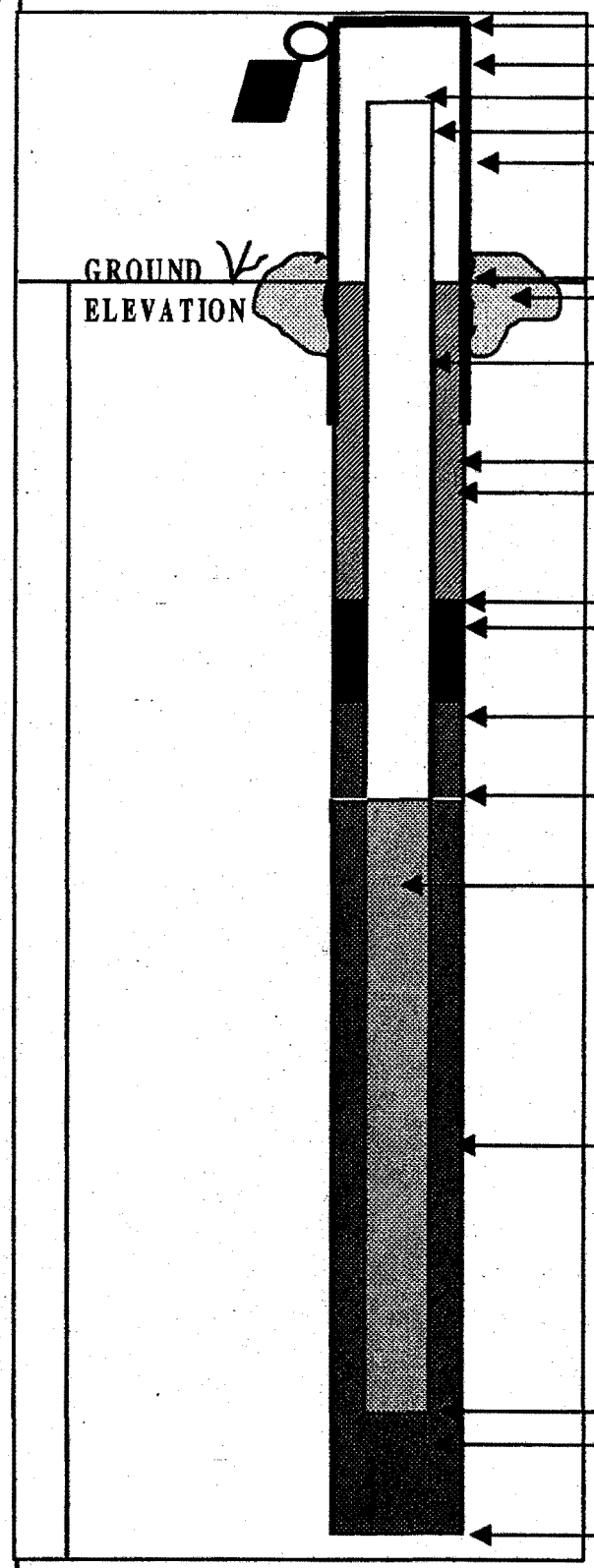
TYPE OF BACKFILL BELOW WELL: #2 SAND

ELEVATION / DEPTH OF BOREHOLE: 116 FT

BORING NO.: 17MW04S

Tetra Tech NUS, Inc. **OVERBURDEN MONITORING WELL SHEET**

PROJECT:	NWS CHARLESTON	DRILLING Co.:	CAROLINA	BORING No.:	17MW04S
PROJECT No.:	N0528	DRILLER:	ESTRA #1873	DATE COMPLETED:	6/8/01
SITE:	SWMU 17	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	S. NEIL	DEV. METHOD:	SURGE/PUMP	EASTING:	



ELEVATION OF TOP OF SURFACE CASING:

STICK-UP TOP OF SURFACE CASING: 3 FT

ELEVATION OF TOP OF RISER PIPE:

RISER STICK-UP ABOVE GROUND SURFACE: 3 FT

I.D. OF SURFACE CASING: 5"

TYPE OF SURFACE CASING: ALUMINUM

GROUND ELEVATION:

TYPE OF SURFACE SEAL: TYPE I PORTLAND CEMENT - 3FT X 3FT X 6IN PAD

RISER PIPE I.D.: 2 IN

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: 8 IN

TYPE OF SEAL: CEMENT / BENTONITE GROUT

ELEVATION / DEPTH OF SEAL: 12 FT

TYPE OF SEAL: BENTONITE PELLETS

ELEVATION / DEPTH TOP OF FILTER PACK: 14 FT

ELEVATION / DEPTH TOP OF SCREEN: 15 FT

TYPE OF SCREEN: SCH 40 PVC

SLOT SIZE X LENGTH: 0.01 IN X 10 FT

I.D. OF SCREEN: 2 IN

TYPE OF FILTER PACK: #2 SAND

ELEVATION / DEPTH BOTTOM OF SCREEN: 115 FT

ELEVATION / DEPTH BOTTOM OF FILTER PACK: 118 FT

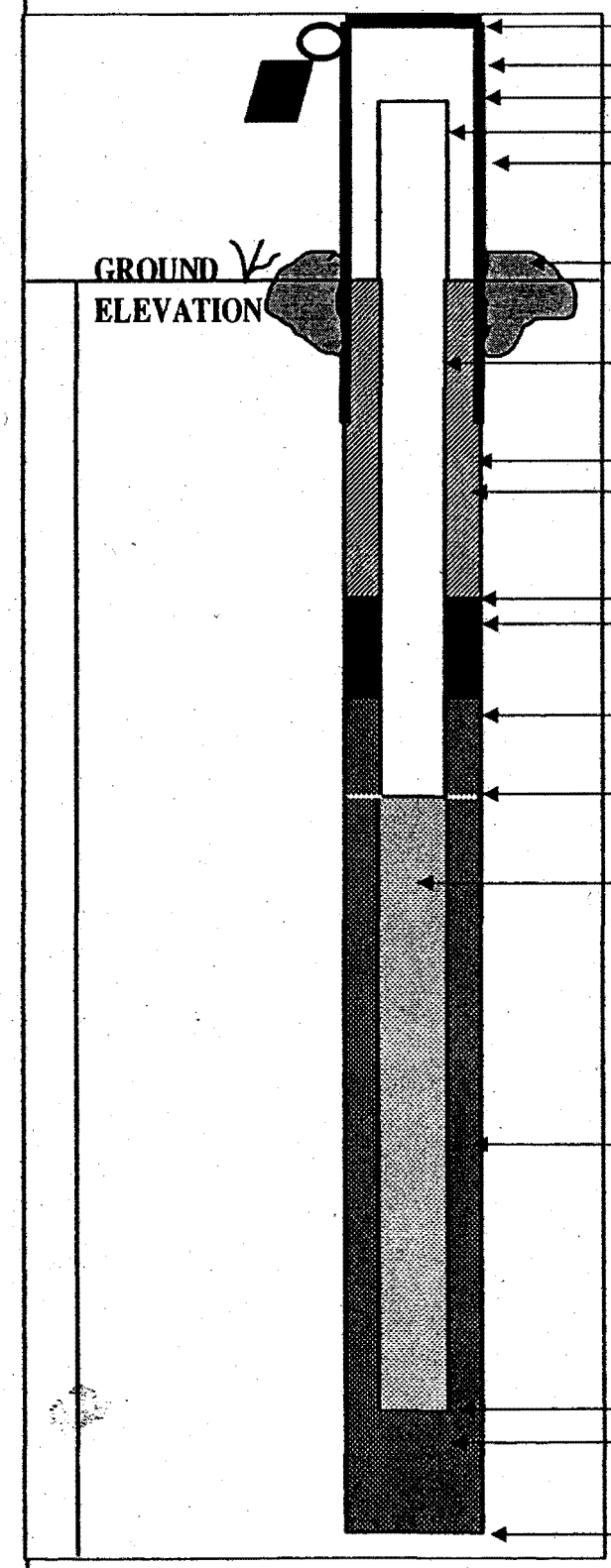
TYPE OF BACKFILL BELOW WELL: #2 SAND

ELEVATION / DEPTH OF BOREHOLE: 118 FT

BORING NO.: 17MW055

Tetra Tech NUS, Inc. **OVERBURDEN MONITORING WELL SHEET**

PROJECT	NWS CHARLESTON	LOCATION	SWMU 17	DRILLER	McKAY #1607
PROJECT NO.	CTO 137/0528	BORING	17MW055	METHOD:	4 1/4" HSA
ELEVATION		DATE	3-23-04	DRILLING	
FIELD GEOLOGIST	WUDKWYCH			DEVELOPMENT	



ELEVATION OF TOP OF SURFACE CASING:

ELEVATION OF TOP OF RISER PIPE:

STICK -UP TOP OF SURFACE CASING:

STICK-UP RISER PIPE:

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING: ALUMINUM

TYPE OF SURFACE SEAL: 3'x3'x6" CONCRETE PAD

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 8.25"

TYPE OF SEAL: CONCRETE

ELEVATION / DEPTH OF SEAL: 15

TYPE OS SEAL: BENTONITE CHIPS

DEPTH TOP OF SAND PACK: 5.9

ELEVATION / DEPTH TOP OF SCREEN: 18

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 0.01" X 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #2 SAND

ELEVATION / DEPTHBOTTOM OF SCREEN: 18

ELEVATION / DEPTH BOTTOM OF SAND PACK: 19

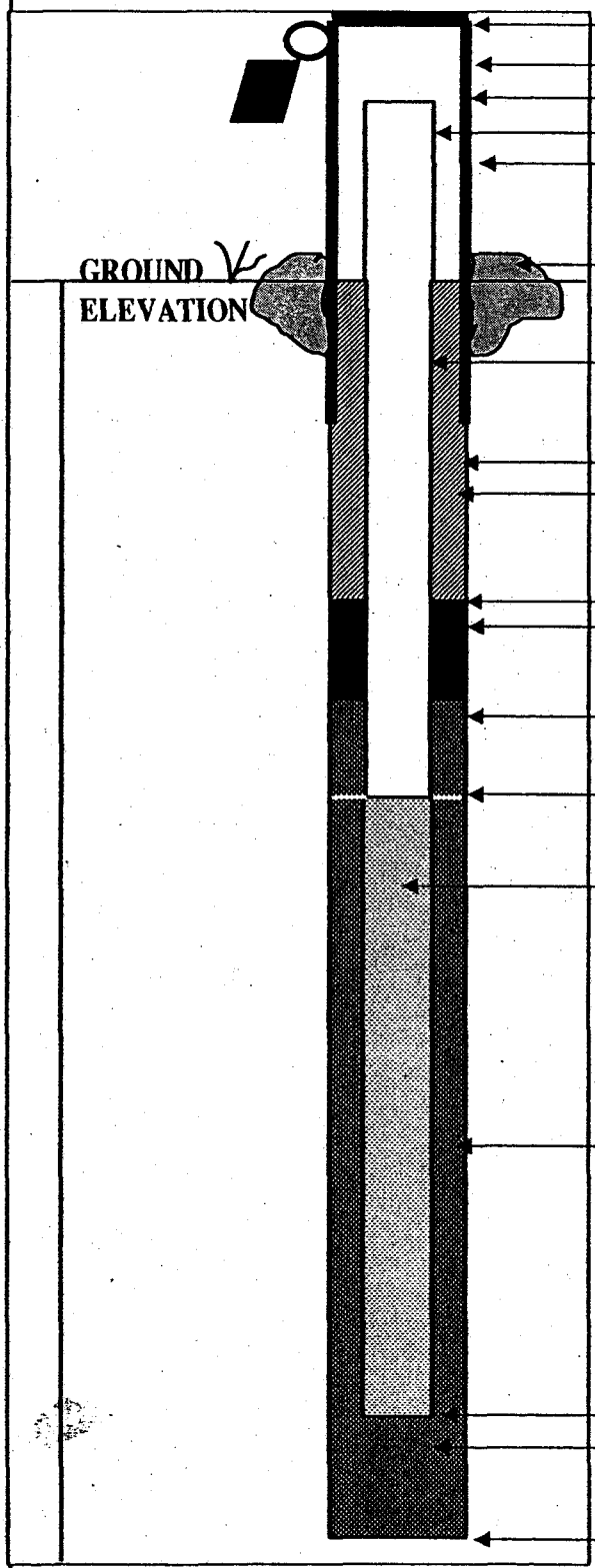
TYPE OF BACKFILL BELOW OBSERVATION WELL: #2 SAND

ELEVATION / DEPTH OF HOLE: 19

BORING NO.: 17MW06S

Tetra Tech NUS, Inc. **OVERBURDEN MONITORING WELL SHEET**

PROJECT	NWS CHARLESTON	LOCATION	SWMU 17	DRILLER	McKAY #1607
PROJECT NO.	CTO 137/0528	BORING	17MW06S	METHOD:	4 1/4" HSA
ELEVATION		DATE	3-22-04	DRILLING	
FIELD GEOLOGIST	WUDKWYCH			DEVELOPMENT	PUMP+SURGE



ELEVATION OF TOP OF SURFACE CASING: _____

ELEVATION OF TOP OF RISER PIPE: _____

STICK -UP TOP OF SURFACE CASING: _____

STICK-UP RISER PIPE: _____

I.D. OF SURFACE CASING: _____

TYPE OF SURFACE CASING: ALUMINUM

TYPE OF SURFACE SEAL: 3'x3' x 6" CONCRETE PAD

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 8.25"

TYPE OF SEAL: CONCRETE

ELEVATION / DEPTH OF SEAL: 11.5

TYPE OS SEAL: ~~BENTO~~ FOD BENTONITE PELLETS

DEPTH TOP OF SAND PACK: 6.0

ELEVATION / DEPTH TOP OF SCREEN: 18

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 0.01" x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #2 SAND

ELEVATION / DEPTHBOTTOM OF SCREEN: 118

ELEVATION / DEPTH BOTTOM OF SAND PACK: 119

TYPE OF BACKFILL BELOW OBSERVATION WELL: #2 SAND

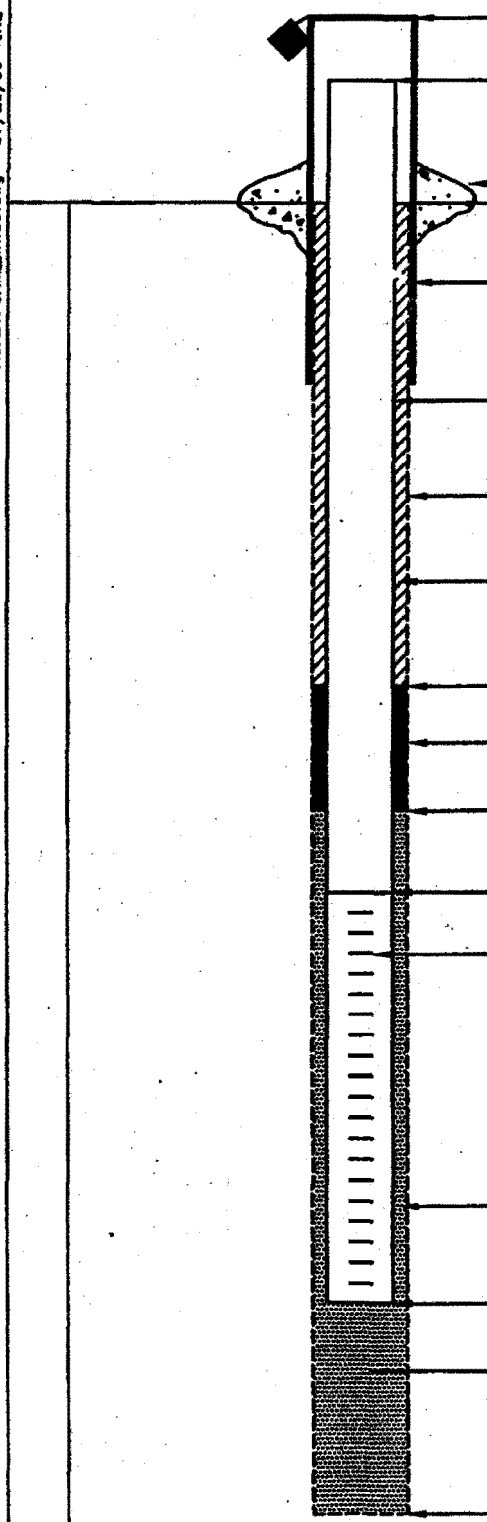
ELEVATION / DEPTH OF HOLE: 119

WELL NO.: 17MW06D

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NW SCHARLESTON	DRILLER FRANK COOPER
PROJECT NO. 0528	BORING 17MW06D	DRILLING SC. LIC#A00965
DATE BEGUN 2-9-05	DATE COMPLETED 2-24-05	METHOD HSA
FIELD GEOLOGIST FRED W RAMSER		DEVELOPMENT METHOD BAILER+PUMP
GROUND ELEVATION 5.37	DATUM NAVD 88	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: – /~3'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 7.69/2.32

TYPE OF SURFACE SEAL: CONCRETE PAD 3' x 3'

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING: 6" x 6" SQ AL.

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~ 8"

TYPE OF BACKFILL: "SHURGROUT" BENTONITE GROUT

ELEVATION/DEPTH TOP OF SEAL: -8.13/13.5'

TYPE OF SEAL: 3/8" SHUR PLUG BENTONITE

DEPTH TOP OF SAND PACK: 16'

ELEVATION/DEPTH TOP OF SCREEN: -12.63/18'

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2.

ELEVATION/DEPTH BOTTOM OF SCREEN: -17.63/23'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -17.63/23'

BACKFILL MATERIAL BELOW SAND: NONE

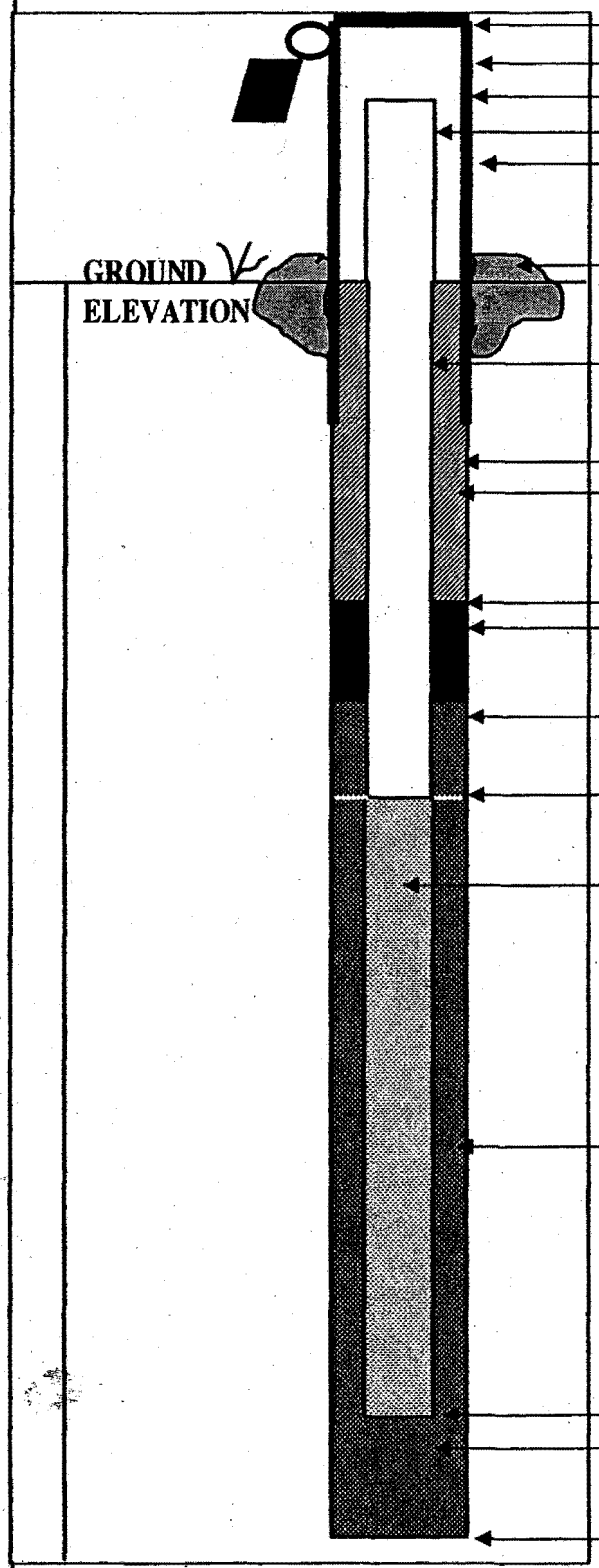
ELEVATION/DEPTH OF HOLE: -18.13/23.5'

ACAD:FORM_MWSU.dwg 07/28/99 INL

BORING NO.: 17MW07S

Tetra Tech NUS, Inc. **OVERBURDEN MONITORING WELL SHEET**

PROJECT	NWS CHARLESTON	LOCATION	SWMU 17	DRILLER	MCKAY # 1607
PROJECT NO.	CTO 137/0528	BORING	17MW07S	METHOD:	4 1/4" HSA
ELEVATION		DATE	3-22-04	DRILLING	PUMP+SURGE
FIELD GEOLOGIST	WUDKWYCH			DEVELOPMENT	



ELEVATION OF TOP OF SURFACE CASING:

ELEVATION OF TOP OF RISER PIPE:

STICK -UP TOP OF SURFACE CASING:

STICK-UP RISER PIPE:

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING: ALUMINUM

TYPE OF SURFACE SEAL: 3'x3'x6" CONCRETE PAD

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 8.25"

TYPE OF SEAL: CONCRETE

ELEVATION / DEPTH OF SEAL: 12

TYPE OS SEAL: BENTONITE PELLETS BARIOD HOLE PLUG

DEPTH TOP OF SAND PACK: 5.8 ~~5.8~~

ELEVATION / DEPTH TOP OF SCREEN: 18

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 0.01" x 10

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #2 SAND

ELEVATION / DEPTHBOTTOM OF SCREEN: 118

ELEVATION / DEPTH BOTTOM OF SAND PACK: 119

TYPE OF BACKFILL BELOW OBSERVATION WELL: #2 SAND

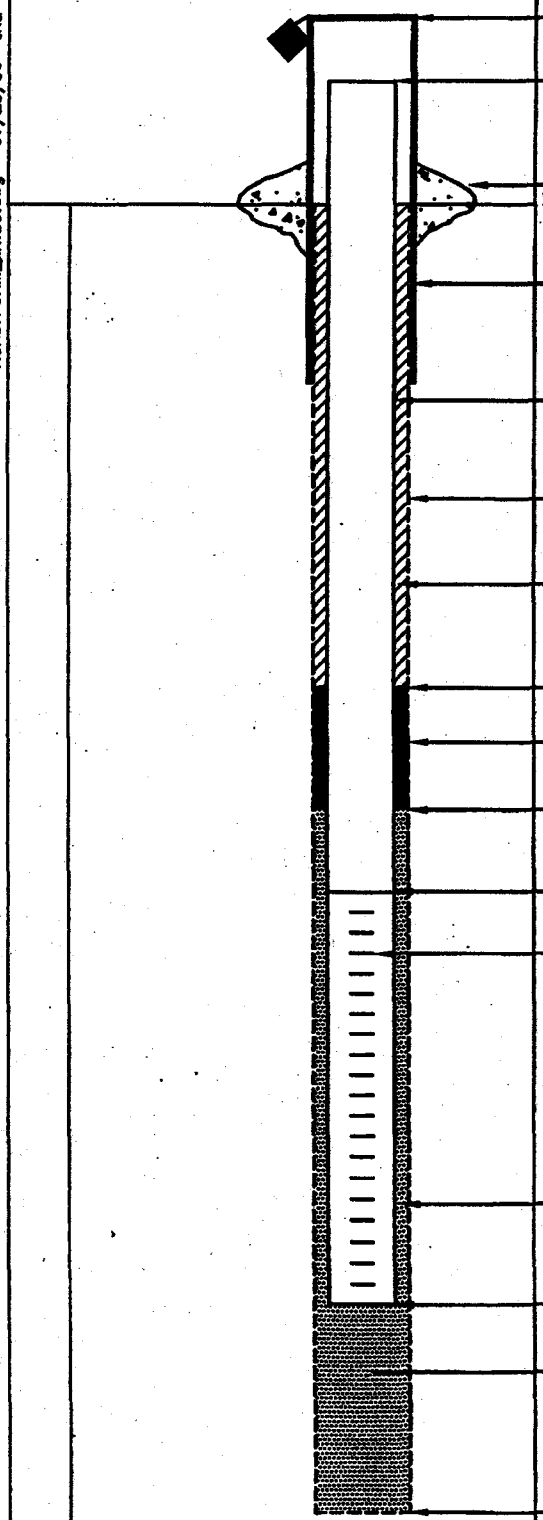
ELEVATION / DEPTH OF HOLE: 119

WELL NO.: 17MW11S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NWS CHARLESTON	DRILLER FRANK COOPER
PROJECT NO. 0528	BORING 17MW11S	DRILLING SC. LIC #A00965
DATE BEGUN 1-27-05	DATE COMPLETED 2-24-05	METHOD HSA
FIELD GEOLOGIST FRED W RAMSER		DEVELOPMENT METHOD BAILER + PUMP
GROUND ELEVATION 7.36	DATUM NAVD 88	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: ~3

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 9.78/2.42

TYPE OF SURFACE SEAL: CONCRETE

I.D. OF SURFACE CASING: 6"x6" AL SQ

TYPE OF SURFACE CASING:

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~ 8"

TYPE OF BACKFILL: "SHURGROUT" BENTONITE GROUT

ELEVATION/DEPTH TOP OF SEAL: 1.36'/ 6'

TYPE OF SEAL: 3/8" SHUR PLUG BENTONITE

DEPTH TOP OF SAND PACK: 8'

ELEVATION/DEPTH TOP OF SCREEN: -2.64'/ 10'

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2.

ELEVATION/DEPTH BOTTOM OF SCREEN: -12.64/20'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -12.64/20'

BACKFILL MATERIAL BELOW SAND: NONE

ELEVATION/DEPTH OF HOLE: -12.64/20

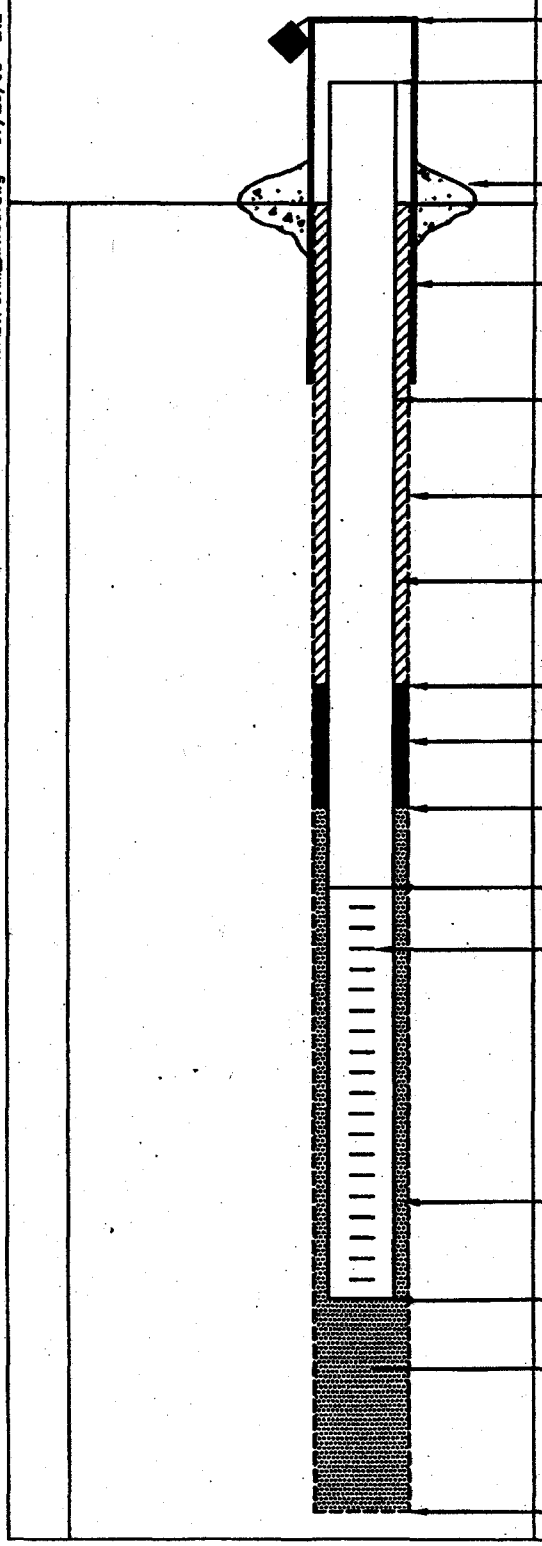
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 17MW12S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NWS CHARLESTON	DRILLER FRANK COOPER
PROJECT NO. 0528	BORING 17MW12S	DRILLING SC. LIC#A00965
DATE BEGUN 1-28-05	DATE COMPLETED 2-25-05	METHOD HSA
FIELD GEOLOGIST FRED W RAMSER		DEVELOPMENT METHOD BAILER + PUMP
GROUND ELEVATION 5.41	DATUM NAVD 88	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1~3'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 7.48'/2.07

TYPE OF SURFACE SEAL: 3'x3' CONCRETE PAD

I.D. OF SURFACE CASING: 6" SQ AL.
TYPE OF SURFACE CASING:

RISER PIPE I.D.: 2"
TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~8"

TYPE OF BACKFILL: "SHURGROUT" BENTONITE GROUT

ELEVATION/DEPTH TOP OF SEAL: 4.01'/1.4'

TYPE OF SEAL: 3/8" SHUR PLUG BENTONITE

DEPTH TOP OF SAND PACK: 2.4'

ELEVATION/DEPTH TOP OF SCREEN: 1.41'/4'

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2.

ELEVATION/DEPTH BOTTOM OF SCREEN: -8.59'/14'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -8.59'/14'

BACKFILL MATERIAL BELOW SAND: NONE

ELEVATION/DEPTH OF HOLE: -8.59'/14'

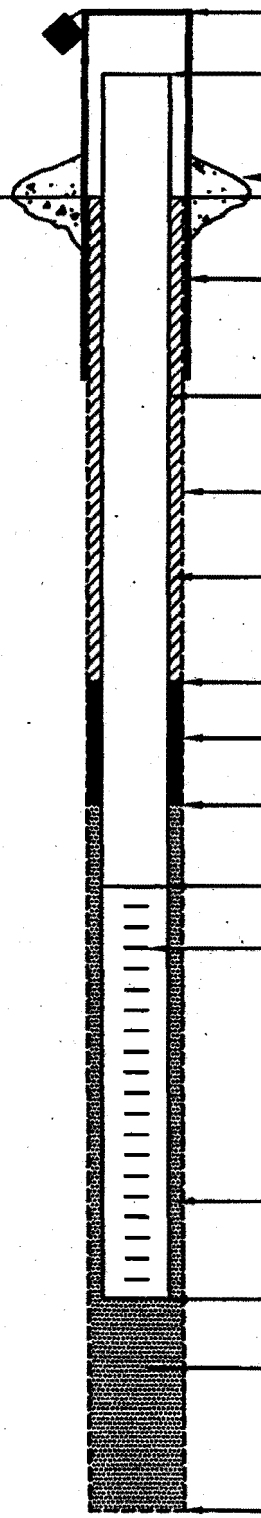
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 17MW12D

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NWS CHARLESTON	DRILLER FRANK COOPER SC.LIC#A00965
PROJECT NO. 0528	BORING 17MW12D	DRILLING METHOD HSA
DATE BEGUN 1-28-05	DATE COMPLETED 2-25-05	
FIELD GEOLOGIST FRED W RAMSER		DEVELOPMENT METHOD BAILER + PUMP
GROUND ELEVATION 5.38	DATUM NAVD 88	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: ~3'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 7.30 / 1.92

TYPE OF SURFACE SEAL: 3' x 3' CONCRETE PAD

I.D. OF SURFACE CASING: 6" x 6" SQ

TYPE OF SURFACE CASING: AL.

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~ 8"

TYPE OF BACKFILL: BENTONITE GROUT

ELEVATION/DEPTH TOP OF SEAL: -8.62/14

TYPE OF SEAL: 3/8" SHUR PLUG BENTONITE

DEPTH TOP OF SAND PACK: 16

ELEVATION/DEPTH TOP OF SCREEN: -12.62/18

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2.

ELEVATION/DEPTH BOTTOM OF SCREEN: -22.62/28

ELEVATION/DEPTH BOTTOM OF SAND PACK: -23.62/29

BACKFILL MATERIAL BELOW SAND: NONE

ELEVATION/DEPTH OF HOLE: -23.62/29

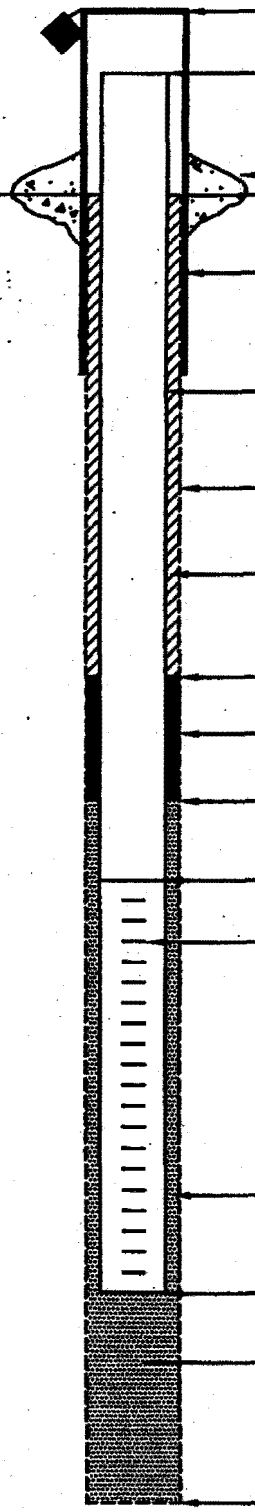
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 17MW13S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NWS CHARLESTON	DRILLER FRANK COOPER
PROJECT NO. 0528	BORING 17MW13S	DRILLING SC. LIC#A00965
DATE BEGUN 2-8-05	DATE COMPLETED 2-28-05	METHOD HSA
FIELD GEOLOGIST FRED W RAMSER		DEVELOPMENT
GROUND ELEVATION 5.39	DATUM NAVD 88	METHOD BAILER + PUMP



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1~3'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 7.56'/2.17'

TYPE OF SURFACE SEAL: 3' x 3' CONCRETE PAD

I.D. OF SURFACE CASING: 6" x 6" SQ

TYPE OF SURFACE CASING: ALUMINUM

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~ 8"

TYPE OF BACKFILL: "SHURGROUT" BENTONITE GROUT

ELEVATION/DEPTH TOP OF SEAL: 3.39'/2'

TYPE OF SEAL: 3/8" SHUR PLUG BENTONITE

DEPTH TOP OF SAND PACK: 3'

ELEVATION/DEPTH TOP OF SCREEN: 1.39'/4'

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2.

ELEVATION/DEPTH BOTTOM OF SCREEN: -8.61/14'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -8.61/14'

BACKFILL MATERIAL BELOW SAND: NONE

ELEVATION/DEPTH OF HOLE: -8.61/14'

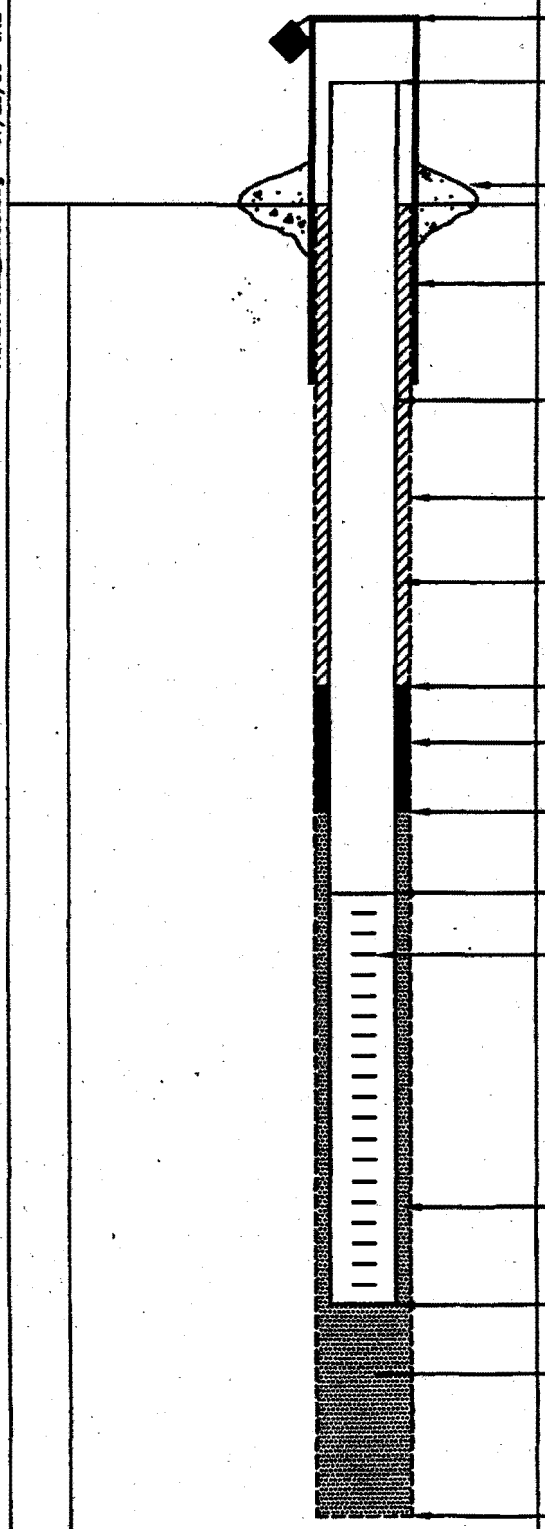
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 17MW14S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NWS CHARLESTON	DRILLER FRANK COOPER
PROJECT NO. 0528	BORING 17MW14S	DRILLING SC. LIC#A00965
DATE BEGUN 1-29-05	DATE COMPLETED 2-26-05	METHOD HSA
FIELD GEOLOGIST FRED W RAMSER		DEVELOPMENT METHOD BAILER+PUMP
GROUND ELEVATION 3.95	DATUM NAVD 88	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1~3'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 6.27'/2.32'

TYPE OF SURFACE SEAL: 3' x 3' CONCRETE PAD

I.D. OF SURFACE CASING: 6" x 6" SQ
TYPE OF SURFACE CASING: ALUMINUM

RISER PIPE I.D.: 2"
TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~ 8"

TYPE OF BACKFILL: NONE
BENTONITE GROUT

ELEVATION/DEPTH TOP OF SEAL: 1.95', 2'

TYPE OF SEAL: 3/8" SHUR PLUG BENTONITE

DEPTH TOP OF SAND PACK: 3'

ELEVATION/DEPTH TOP OF SCREEN: -0.05', 4'

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2.

ELEVATION/DEPTH BOTTOM OF SCREEN: -10.05', 14'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -10.55', 14.5'

BACKFILL MATERIAL BELOW SAND: NONE

ELEVATION/DEPTH OF HOLE: -10.55', 14.5

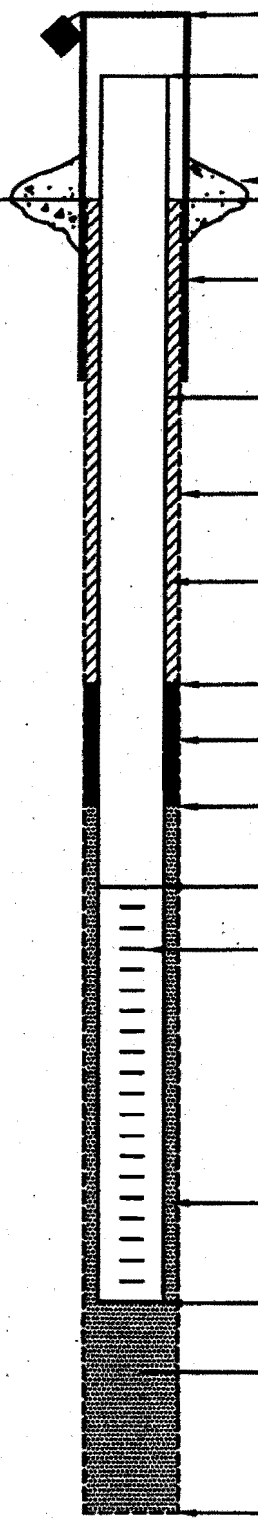
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 17MW14D

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NWS CHARLESTON	DRILLER FRANK COOPER
PROJECT NO. 0528	BORING 17MW14D	DRILLING METHOD SC. LIC #00965 HSA
DATE BEGUN 1-29-05	DATE COMPLETED 2-26-05	
FIELD GEOLOGIST FRED W RAMSER		DEVELOPMENT METHOD BAILER + PUMP
GROUND ELEVATION 4.05	DATUM NAVD 88	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1~3'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 6.66'/2.61'

TYPE OF SURFACE SEAL: 3' x 3' CONCRETE PAD

I.D. OF SURFACE CASING: 6" x 6" SQ

TYPE OF SURFACE CASING: ALUMINUM

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~ 8"

TYPE OF BACKFILL: "SHURGROUT" BENTONITE GROUT

ELEVATION/DEPTH TOP OF SEAL: -6.95'/11'

TYPE OF SEAL: 3/8" SHUR PLUG BENTONITE

DEPTH TOP OF SAND PACK: 12.9'

ELEVATION/DEPTH TOP OF SCREEN: -10.95'/15'

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2.

ELEVATION/DEPTH BOTTOM OF SCREEN: -20.95'/25'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -21.45'/25.5'

BACKFILL MATERIAL BELOW SAND: NONE

ELEVATION/DEPTH OF HOLE: -21.45'/25.5'

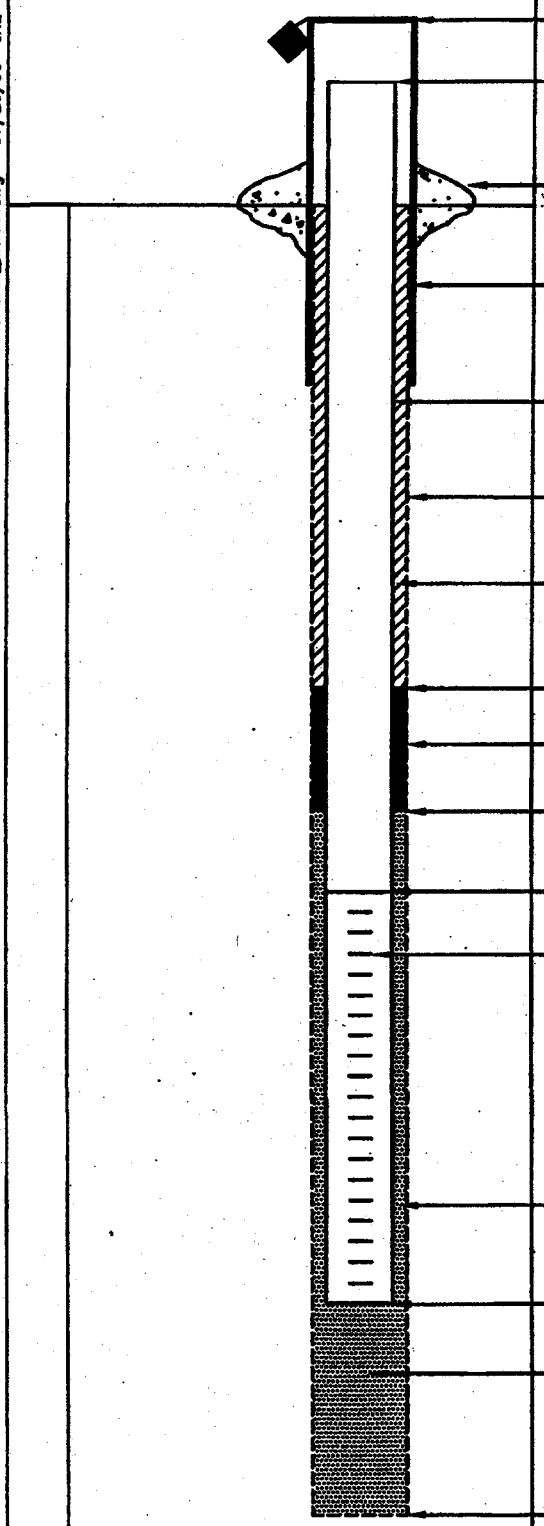
ACAD:FORM_MWSU.dwg 07/20/99 INL

WELL NO.: 17MW15S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NWS CHARLESTON	DRILLER FRANK COOPER
PROJECT NO. 0528	BORING 17MW15S	DRILLING SC. LIC #A00965
DATE BEGUN 1-31-05	DATE COMPLETED 2-26-05	METHOD HSA
FIELD GEOLOGIST FRED W RAMSER		DEVELOPMENT
GROUND ELEVATION 3.76	DATUM NAVD 88	METHOD BAILER + PUMP



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1~3'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 6.01'/2.25'

TYPE OF SURFACE SEAL: 3' x 3' CONCRETE PAD

I.D. OF SURFACE CASING: 6" x 6" SQ

TYPE OF SURFACE CASING: ALUMINUM

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~ 8"

TYPE OF BACKFILL: "SHURGROUT" BENTONITE GROUT

ELEVATION/DEPTH TOP OF SEAL: -2.24/ 6'

TYPE OF SEAL: 3/8" SHUR PLUG BENTONITE

DEPTH TOP OF SAND PACK: 8'

ELEVATION/DEPTH TOP OF SCREEN: -6.24/ 10'

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2.

ELEVATION/DEPTH BOTTOM OF SCREEN: -16.24 20'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -16.24/ 20'

BACKFILL MATERIAL BELOW SAND: NONE

ELEVATION/DEPTH OF HOLE: -16.24/ 20'

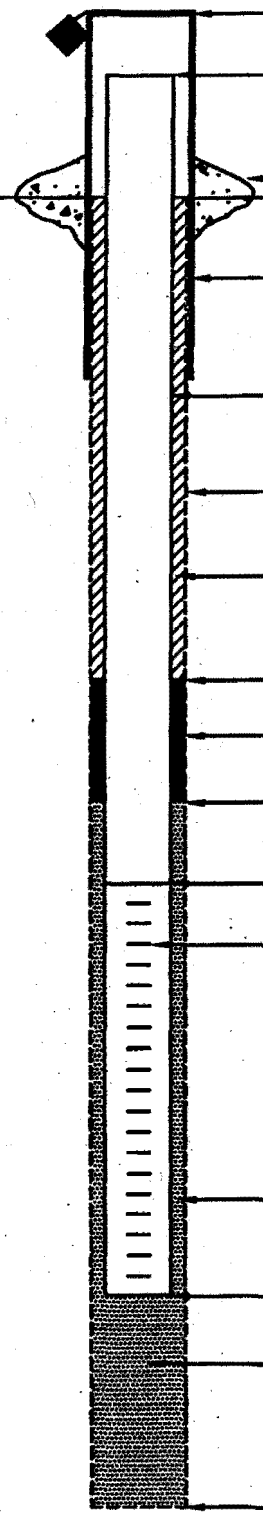
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 17MW15D

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NWS CHARLESTON	DRILLER FRANK COOPER
PROJECT NO. 0528	BORING 17MW15D	DRILLING SC. LIC#A00965
DATE BEGUN 1-31-05	DATE COMPLETED 2-26-05	METHOD HSA
FIELD GEOLOGIST FRED W RAMSER		DEVELOPMENT METHOD BAILER + PUMP
GROUND ELEVATION 3.45'	DATUM NAVD 88	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1~3'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 5.92'/2.47'

TYPE OF SURFACE SEAL: 3' x 3' CONCRETE PAD

I.D. OF SURFACE CASING: 6" x 6" SQ

TYPE OF SURFACE CASING: ALUMINUM

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~ 8"

TYPE OF BACKFILL: BENTONITE GROUT

ELEVATION/DEPTH TOP OF SEAL: -22.05'/25.5'

TYPE OF SEAL: 3/8" SHUR PLUG BENTONITE

DEPTH TOP OF SAND PACK: 27.5'

ELEVATION/DEPTH TOP OF SCREEN: -25.55'/29'

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2.

ELEVATION/DEPTH BOTTOM OF SCREEN: -35.55'/39'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -36.55'/40'

BACKFILL MATERIAL BELOW SAND: NONE

ELEVATION/DEPTH OF HOLE: -36.55'/40'

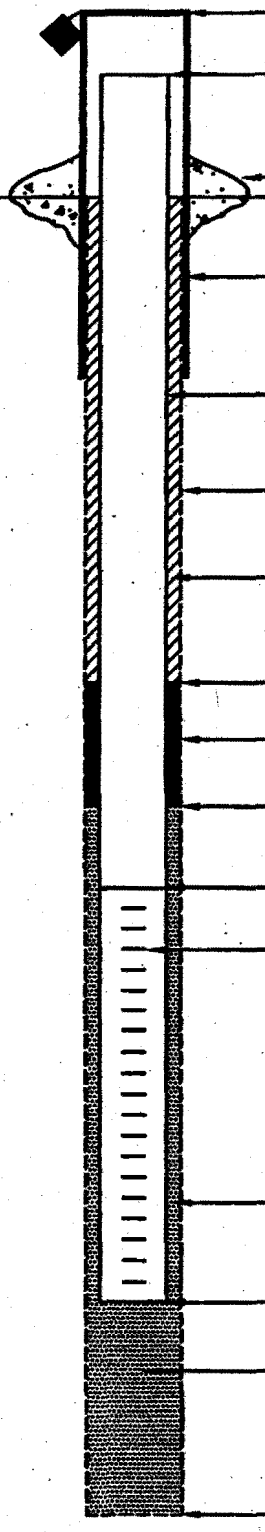
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 17MW16S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NWS CHARLESTON	DRILLER FRANK COOPER
PROJECT NO. 0528	BORING 17MW16S	DRILLING SC. LIC #A00965
DATE BEGUN 2-1-05	DATE COMPLETED 2-27-05	METHOD HSA
FIELD GEOLOGIST FRED W RAMSER		DEVELOPMENT
GROUND ELEVATION 3.52'	DATUM NAVD 88	METHOD BAILER + PUMP



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1~3'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 5.83'/2.31

TYPE OF SURFACE SEAL: 3'x3' CONCRETE PAD

I.D. OF SURFACE CASING: 6" x 6" SQ

TYPE OF SURFACE CASING: ALUMINUM

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~ 8"

TYPE OF BACKFILL: "SHUR GROUT" BENTONITE GROUT

ELEVATION/DEPTH TOP OF SEAL: 2.02'/1.5'

TYPE OF SEAL: 3/8" SHUR PLUG BENTONITE

DEPTH TOP OF SAND PACK: 3.5'

ELEVATION/DEPTH TOP OF SCREEN: -1.48'/5'

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2.

ELEVATION/DEPTH BOTTOM OF SCREEN: -11.48/15'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -11.48/15'

BACKFILL MATERIAL BELOW SAND: NONE

ELEVATION/DEPTH OF HOLE: -11.48/15'

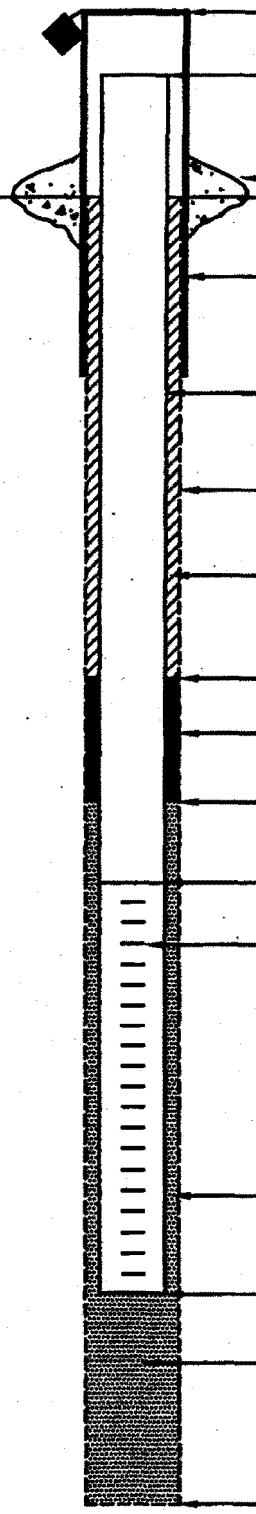
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 17MW16I

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NWS CHARLESTON	DRILLER FRANK COOPER
PROJECT NO. 0528	BORING 17MW16I	DRILLING METHOD SC. LIC# A00965 HSA
DATE BEGUN 2-11-05	DATE COMPLETED 2-27-05	
FIELD GEOLOGIST FRED W RAMSER		DEVELOPMENT METHOD BAILER + PUMP
GROUND ELEVATION 3.66'	DATUM NAVD 88	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: ~3'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 6.05'/2.39'

TYPE OF SURFACE SEAL: 3' x 3' CONCRETE PAD

I.D. OF SURFACE CASING: 6" x 6" SQ

TYPE OF SURFACE CASING: ALUMINUM

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~ 8"

TYPE OF BACKFILL: "SHURGROUT" BENTONITE GROUT

ELEVATION/DEPTH TOP OF SEAL: -6.34/10'

TYPE OF SEAL: 3/8" SHUR PLUG BENTONITE

DEPTH TOP OF SAND PACK: 12.8'

ELEVATION/DEPTH TOP OF SCREEN: -11.34'/15'

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2.

ELEVATION/DEPTH BOTTOM OF SCREEN: -21.34/25'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -21.34/25'

BACKFILL MATERIAL BELOW SAND: NONE

ELEVATION/DEPTH OF HOLE: -21.34/25'

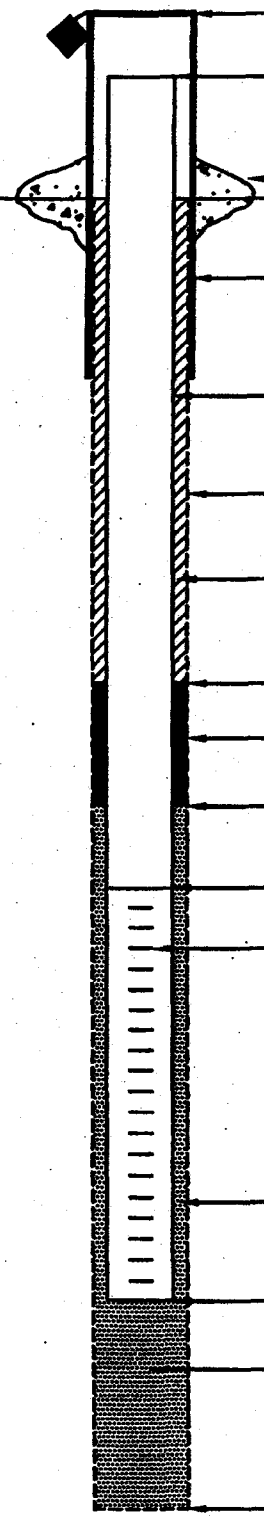
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 17MW16D

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NWS CHARLESTON	DRILLER FRANK COOPER
PROJECT NO. 0528	BORING 17MW16D	DRILLING METHOD SC. LIC#A00965 HSA
DATE BEGUN 2-11-05	DATE COMPLETED 2-27-05	
FIELD GEOLOGIST FRED W RAMSER		DEVELOPMENT METHOD BAILER + PUMP
GROUND ELEVATION 3.48'	DATUM NAVD 88	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: ~3'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 5.92'/2.44'

TYPE OF SURFACE SEAL: 3' x 3' CONCRETE PAD

I.D. OF SURFACE CASING: 6" x 6" SQ

TYPE OF SURFACE CASING: ALUMINUM

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~ 8"

TYPE OF BACKFILL: "SHURGROUT" BENTONITE GROUT

ELEVATION/DEPTH TOP OF SEAL: -23.52/27'

TYPE OF SEAL: 3/8" SHUR PLUG BENTONITE

DEPTH TOP OF SAND PACK: 30'

ELEVATION/DEPTH TOP OF SCREEN: -28.52/32'

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2.

ELEVATION/DEPTH BOTTOM OF SCREEN: 38.52'/42'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -39.02/~~42~~ 42.5'

BACKFILL MATERIAL BELOW SAND: NONE

ELEVATION/DEPTH OF HOLE: -39.02/42.5'

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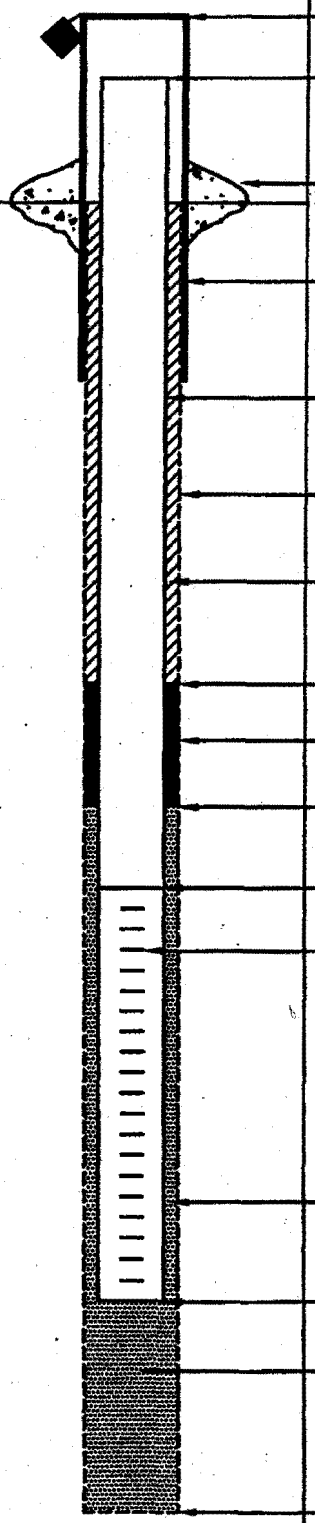
WELL NO.: 17MW17S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NWS CHARLESTON	DRILLER FRANK COOPER
PROJECT NO. 0528	BORING 17MW17S	DRILLING METHOD SC. LIC# A00965 HSA
DATE BEGUN 2-13-05	DATE COMPLETED 2-28-05	
FIELD GEOLOGIST FRED W RAMSER		DEVELOPMENT METHOD BAILER + PUMP
GROUND ELEVATION 3.37	DATUM NAVD 88	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1~3'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 6.19'/2.82'

TYPE OF SURFACE SEAL: 3' x 3' CONCRETE PAD

I.D. OF SURFACE CASING: 6" x 6" SQ
TYPE OF SURFACE CASING: ALUMINUM

RISER PIPE I.D.: 2"
TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~ 8"

TYPE OF BACKFILL: BENTONITE GROUT

ELEVATION/DEPTH TOP OF SEAL: 1.37'/ 2'

TYPE OF SEAL: 3/8" SHUR PLUG BENTONITE

DEPTH TOP OF SAND PACK: 3'

ELEVATION/DEPTH TOP OF SCREEN: -0.63/ 4'

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2.

ELEVATION/DEPTH BOTTOM OF SCREEN: -10.63/ 14'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -10.63/ 14'

BACKFILL MATERIAL BELOW SAND: NONE

ELEVATION/DEPTH OF HOLE: -10.63/ 14'

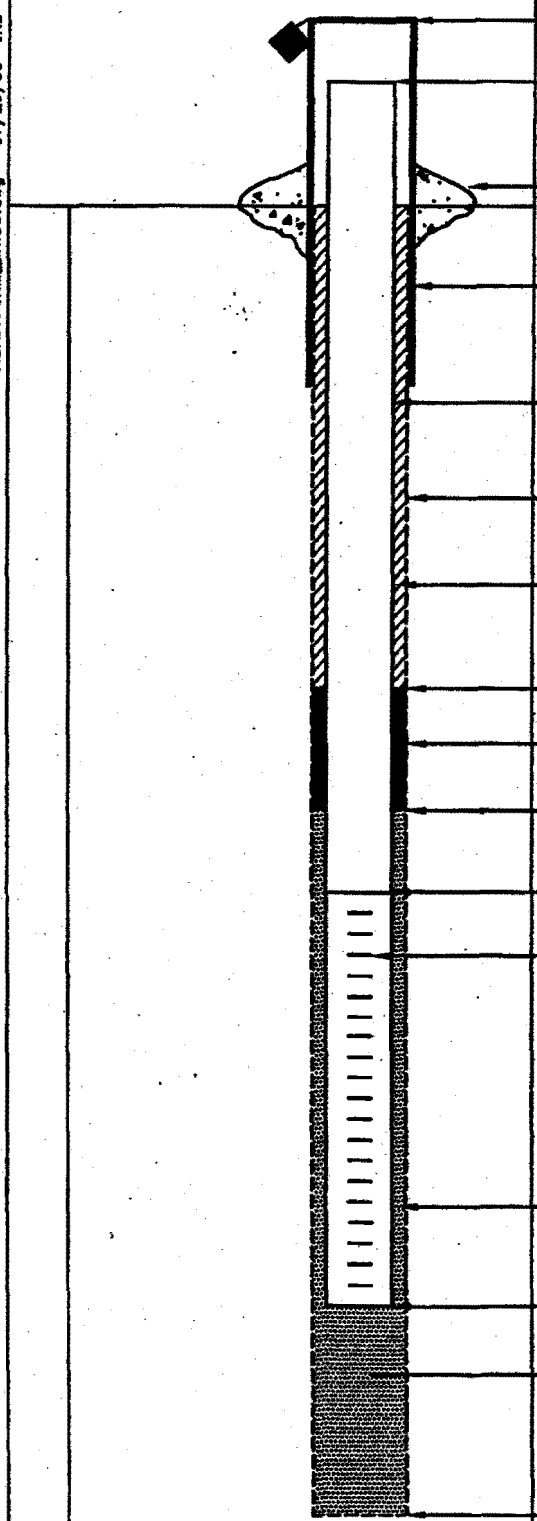
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 17MW17I

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NWS CHARLESTON	DRILLER FRANK COOPER
PROJECT NO. 0528	BORING 17MW17I	DRILLING METHOD SC. LIC# A00965 HSA
DATE BEGUN 2-13-05	DATE COMPLETED 2-28-05	
FIELD GEOLOGIST FRED W RAMSER		DEVELOPMENT METHOD BAILER + PUMP
GROUND ELEVATION 3.42'	DATUM NAVD 88	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1~3'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 6.07/2.65'

TYPE OF SURFACE SEAL: 3' x 3' CONCRETE PAD

I.D. OF SURFACE CASING: 6" x 6" SQ

TYPE OF SURFACE CASING: ALUMINUM

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~ 8"

TYPE OF BACKFILL: "SHURGROUT" BENTONITE GROUT

ELEVATION/DEPTH TOP OF SEAL: -5.58/ 9'

TYPE OF SEAL: 3/8" SHUR PLUG BENTONITE

DEPTH TOP OF SAND PACK: 11'

ELEVATION/DEPTH TOP OF SCREEN: -9.58/13'

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2.

ELEVATION/DEPTH BOTTOM OF SCREEN: -19.58/ 23'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -20.08/23.5'

BACKFILL MATERIAL BELOW SAND: NONE

ELEVATION/DEPTH OF HOLE: -20.08/23.5'

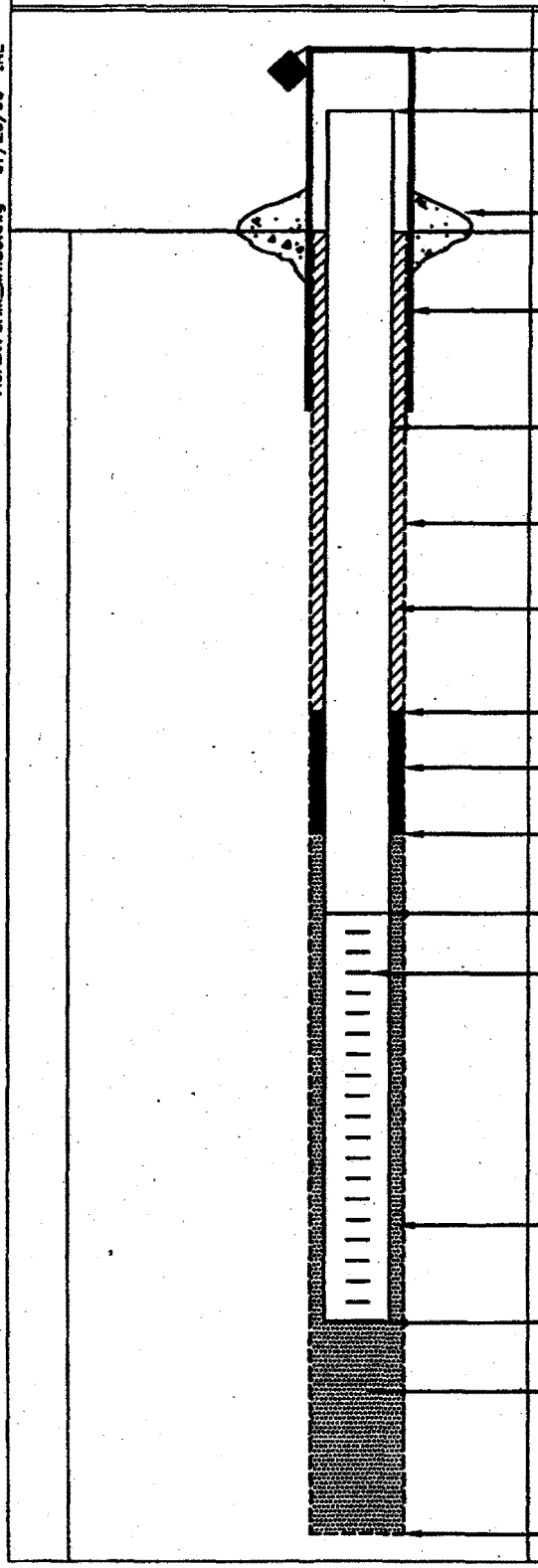
ACAD:FORM_MWSU.dwg 07/20/99 INL

WELL NO.: 17MW17D

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NWS CHARLESTON	DRILLER FRANK COOPER SC. LIC# A00965
PROJECT NO. 0528	BORING 17MW17D	DRILLING METHOD HSA
DATE BEGUN 2-12-05	DATE COMPLETED 2-28-05	
FIELD GEOLOGIST FRED W RAMSER		DEVELOPMENT METHOD BAILER + PUMP
GROUND ELEVATION 3.52	DATUM NAVD 88	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: ~3'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 6.00'/2.48'

TYPE OF SURFACE SEAL: 3'x3' CONCRETE

I.D. OF SURFACE CASING: 6"x6" SQ

TYPE OF SURFACE CASING: ALUMINUM

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~8"

TYPE OF BACKFILL: "SHURGROUT" BENTONITE GROUT

ELEVATION/DEPTH TOP OF SEAL: -19.48'/23'

TYPE OF SEAL: 3/8" SHUR PLUG BENTONITE

DEPTH TOP OF SAND PACK: 25'

ELEVATION/DEPTH TOP OF SCREEN: -23.48'/27'

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2.

ELEVATION/DEPTH BOTTOM OF SCREEN: -33.48/37'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -33.98/37.5'

BACKFILL MATERIAL BELOW SAND: NONE

ELEVATION/DEPTH OF HOLE: -33.98/37.5'

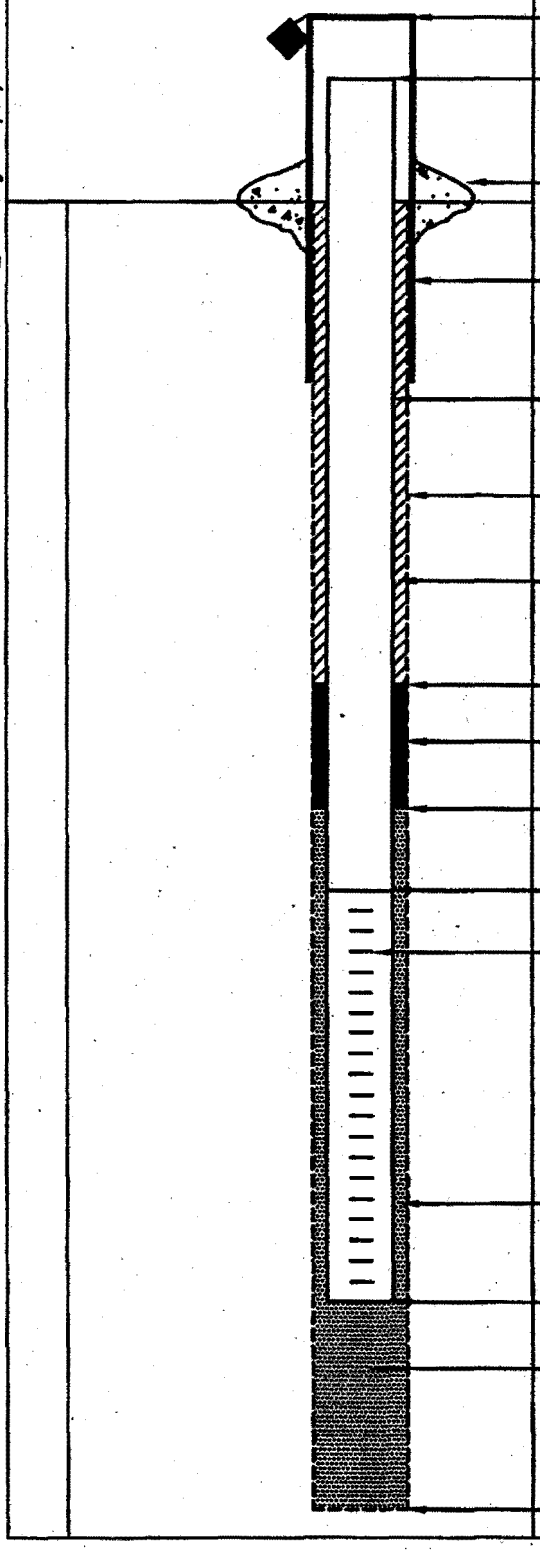
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 17MW18S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NWS CHARLESTON	DRILLER FRANK COOPER
PROJECT NO. 0528	BORING 17MW18S	DRILLING SC. LIC # A00965
DATE BEGUN 2-14-05	DATE COMPLETED 2-28-05	METHOD HSA
FIELD GEOLOGIST FRED W. RAMSER		DEVELOPMENT
GROUND ELEVATION 3.76'	DATUM NAVD 88	METHOD BAILER + PUMP



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1~3'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 5.41 / 1.65'

TYPE OF SURFACE SEAL: 3' x 3' CONCRETE

I.D. OF SURFACE CASING: 6" x 6" SQ

TYPE OF SURFACE CASING: ALUMINUM

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: 8"

TYPE OF BACKFILL: NA

ELEVATION/DEPTH TOP OF SEAL: 1.76' / 2'

TYPE OF SEAL: 3/8" SHUR PLUG

DEPTH TOP OF SAND PACK: 3'

ELEVATION/DEPTH TOP OF SCREEN: -0.24 / 4'

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2

ELEVATION/DEPTH BOTTOM OF SCREEN: -10.24 / 14'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -10.74 / 14.5'

BACKFILL MATERIAL BELOW SAND: NONE

ELEVATION/DEPTH OF HOLE: -10.74 / 14.5

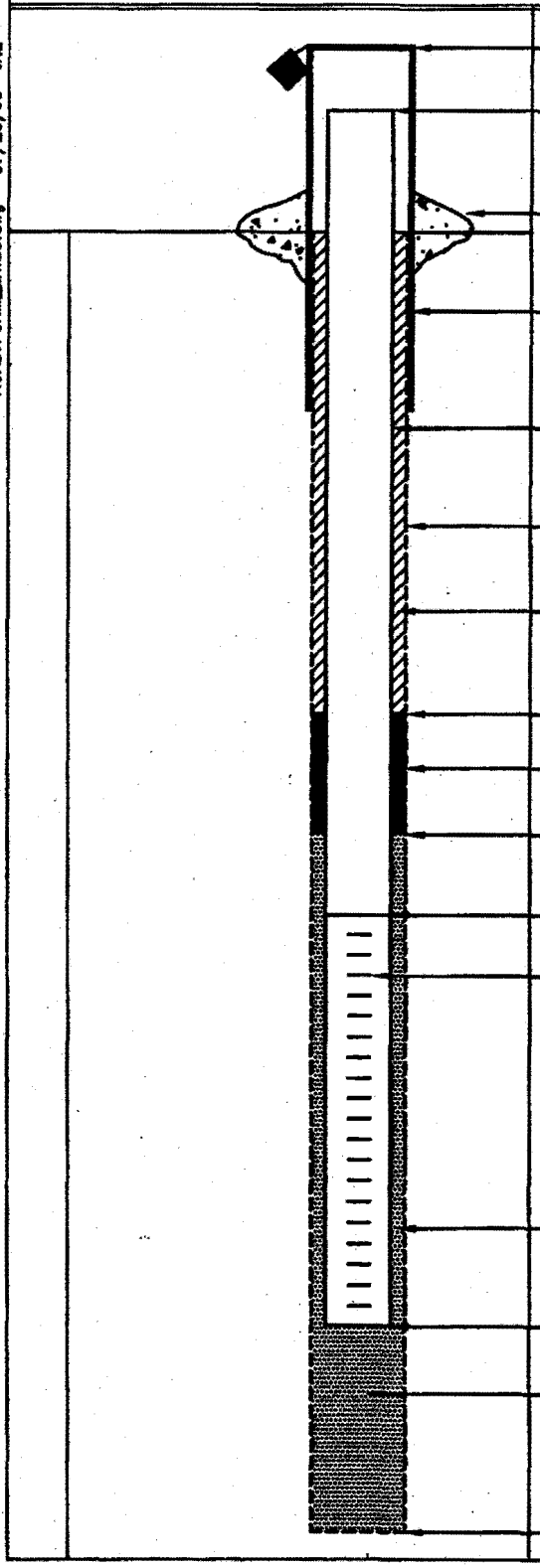
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 17MW18D

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NWS CHARLESTON	DRILLER FRANK COOPER SC. LICENSE A00965
PROJECT NO. 0528	BORING 17MW18D	DRILLING METHOD HSA
DATE BEGUN 2-14-05	DATE COMPLETED 2-28-05	
FIELD GEOLOGIST FRED WILLIAMSON		DEVELOPMENT METHOD BAILER + PUMP
GROUND ELEVATION 3.59'	DATUM NAVD 88	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1~2.5'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 5.48' / 1.89'

TYPE OF SURFACE SEAL: 3' x 3' CONCRETE PAD

I.D. OF SURFACE CASING: 6" x 6" SQ

TYPE OF SURFACE CASING: ALUMINUM

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: 8"

TYPE OF BACKFILL: "SHURGROUT" BENTONITE GROUT

ELEVATION/DEPTH TOP OF SEAL: -7.41 / 11'

TYPE OF SEAL: 3/8" SHUR PLUG BENTONITE

DEPTH TOP OF SAND PACK: 13'

ELEVATION/DEPTH TOP OF SCREEN: -11.41 / 15'

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2

ELEVATION/DEPTH BOTTOM OF SCREEN: -18.41 / 22'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -18.91 / 22.5'

BACKFILL MATERIAL BELOW SAND: NONE

ELEVATION/DEPTH OF HOLE: -18.91 / 22.5'

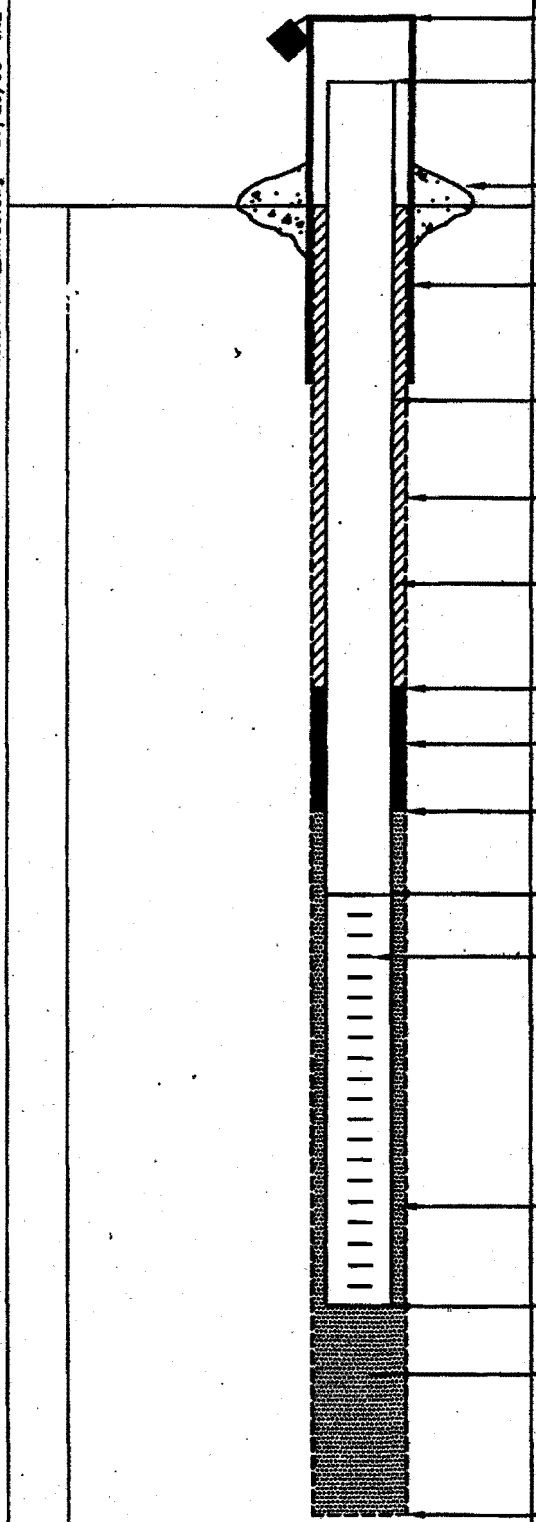
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 17MW19S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NWS CHARLESTON	DRILLER FRANK COOPER
PROJECT NO. 0528	BORING 17MW19S	DRILLING METHOD SC. LIC# A00965 HSA
DATE BEGUN 2-8-05	DATE COMPLETED 2-24-05	
FIELD GEOLOGIST FRED W RAMSER		DEVELOPMENT METHOD BAILER + PUMP
GROUND ELEVATION 5.50'	DATUM NAVD 88	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1~3'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 7.81'/2.31

TYPE OF SURFACE SEAL: 3' x 3' CONCRETE PAD

I.D. OF SURFACE CASING: 6" x 6" SQ

TYPE OF SURFACE CASING: ALUMINUM

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~ 8"

TYPE OF BACKFILL: "SHURGROUT" BENTONITE GROUT

ELEVATION/DEPTH TOP OF SEAL: 1.5', 4'

TYPE OF SEAL: 3/8" SHUR PLUG BENTONITE

DEPTH TOP OF SAND PACK: 6'

ELEVATION/DEPTH TOP OF SCREEN: -2.5', 8'

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2.

ELEVATION/DEPTH BOTTOM OF SCREEN: -12.5, 18'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -12.5, 18'

BACKFILL MATERIAL BELOW SAND: NONE

ELEVATION/DEPTH OF HOLE: -12.5, 18'

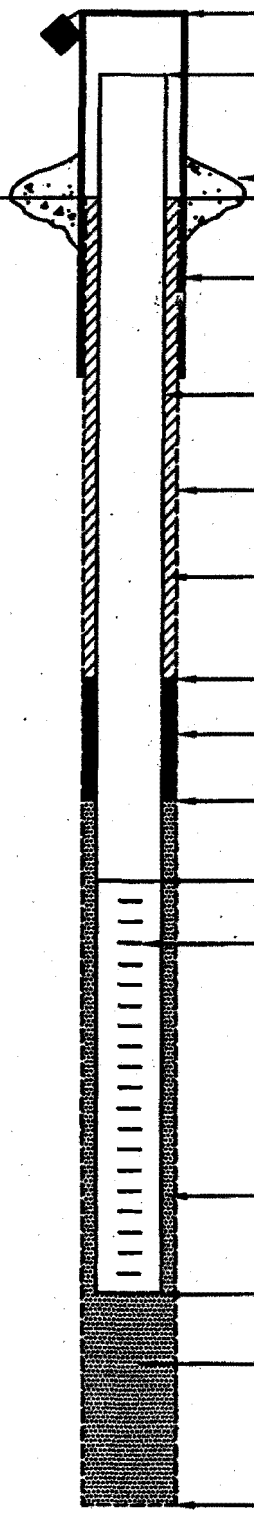
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 17MW20S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NWS CHARLESTON	DRILLER FRANK COOPER
PROJECT NO. 0528	BORING 17MW20S	DRILLING METHOD SC. LIC # A00965 HSA
DATE BEGUN 2-9-05	DATE COMPLETED 2-24-05	
FIELD GEOLOGIST FRED W RAMSER		DEVELOPMENT METHOD BAILER + PUMP
GROUND ELEVATION 4.89'	DATUM NAVD 88	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1 ~ 3'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 7.38'/2.49'

TYPE OF SURFACE SEAL: 3' x 3' CONCRETE PAD

I.D. OF SURFACE CASING: 6" x 6" SQ

TYPE OF SURFACE CASING: ALUMINUM

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~ 8"

TYPE OF BACKFILL: "SHURGROUT" BENTONITE GROUT

ELEVATION/DEPTH TOP OF SEAL: 2.89'/2'

TYPE OF SEAL: 3/8" SHUR PLUG BENTONITE

DEPTH TOP OF SAND PACK: 3'

ELEVATION/DEPTH TOP OF SCREEN: 0.89'/4'

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2.

ELEVATION/DEPTH BOTTOM OF SCREEN: -9.11/14'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -9.11/14'

BACKFILL MATERIAL BELOW SAND: NONE

ELEVATION/DEPTH OF HOLE: -9.11/14'

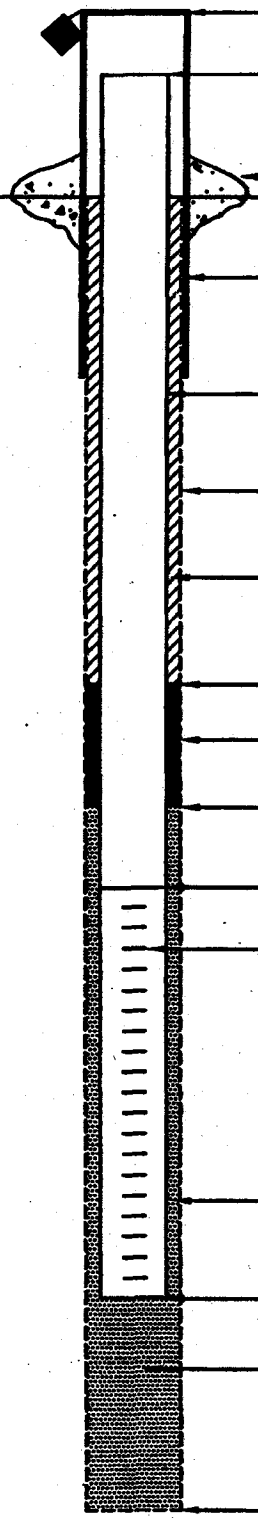
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 17MW21S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NWS CHARLESTON	DRILLER FRANK COOPER SC. LIC# A00965
PROJECT NO. 0528	BORING 17MW21	DRILLING METHOD HSA
DATE BEGUN 1-28-05	DATE COMPLETED 2-23-05	
FIELD GEOLOGIST FRED W RAMSER		DEVELOPMENT METHOD BAILER + PUMP
GROUND ELEVATION 7.99'	DATUM NAVD 88	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: ~3'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 10.47/2.48'

TYPE OF SURFACE SEAL: 3' x 3' CONCRETE PAD

I.D. OF SURFACE CASING: 6" x 6" SQ

TYPE OF SURFACE CASING: ALUMINUM

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~ 8"

TYPE OF BACKFILL: "SHURGROUT" BENTONITE GROUT

ELEVATION/DEPTH TOP OF SEAL: 3.99'/ 4

TYPE OF SEAL: 3/8" SHUR PLUG BENTONITE

DEPTH TOP OF SAND PACK: 5.5

ELEVATION/DEPTH TOP OF SCREEN: -0.01'/ 8

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2.

ELEVATION/DEPTH BOTTOM OF SCREEN: -10.01 / 18

ELEVATION/DEPTH BOTTOM OF SAND PACK: -10.01 / 18

BACKFILL MATERIAL BELOW SAND: NONE

ELEVATION/DEPTH OF HOLE: -10.01 / 18

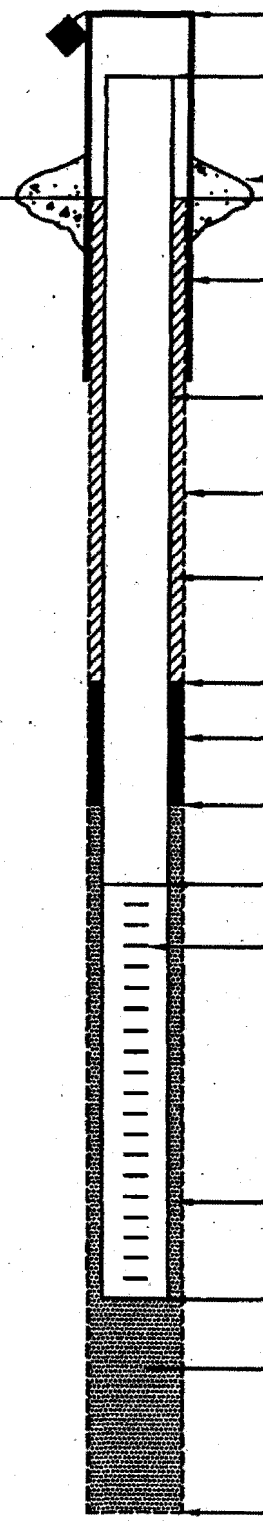
ACAD: FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 17MW22S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NWS CHARLESTON	DRILLER FRANK COOPER
PROJECT NO. 0528	BORING 17MW22	DRILLING SC. LIC #A00965
DATE BEGUN 1-27-05	DATE COMPLETED 2-23-05	METHOD HSA
FIELD GEOLOGIST FRED W RAMSER		DEVELOPMENT METHOD BAILER + PUMP
GROUND ELEVATION 7.77'	DATUM NAVD	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1~3'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 10.28'/2.51'

TYPE OF SURFACE SEAL: 3'x3' CONCRETE PAD

I.D. OF SURFACE CASING: 6"x6" SQ

TYPE OF SURFACE CASING: ALUMINUM

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~8"

TYPE OF BACKFILL: "SHURGROUT" BENTONITE GROUT

ELEVATION/DEPTH TOP OF SEAL: 1.77'/6'

TYPE OF SEAL: 3/8" SHUR PLUG BENTONITE

DEPTH TOP OF SAND PACK: 8'

ELEVATION/DEPTH TOP OF SCREEN: -2.23'/10'

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2.

ELEVATION/DEPTH BOTTOM OF SCREEN: -12.23/20'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -12.23/20'

BACKFILL MATERIAL BELOW SAND: NONE

ELEVATION/DEPTH OF HOLE: -12.23/20'

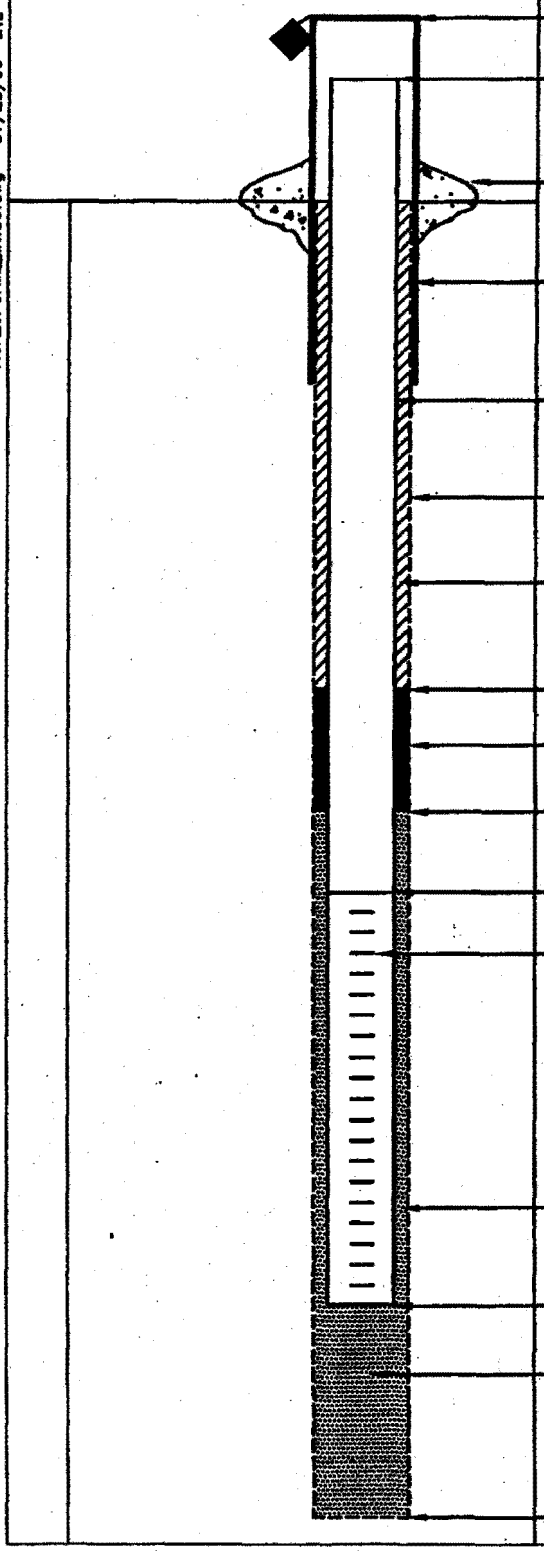
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 17MW23S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT SWMU 16/17 RFI	LOCATION NWS CHARLESTON	DRILLER FRANK COOPER
PROJECT NO. 0528	BORING 17MW23S	DRILLING SC. LIC#A00965
DATE BEGUN 1-27-05	DATE COMPLETED 2-24-05	METHOD HSA
FIELD GEOLOGIST FRED W RAMSER		DEVELOPMENT METHOD BAILER + PUMP
GROUND ELEVATION 4.76	DATUM NAVD 88	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 1~3'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 7.18 / 2.42

TYPE OF SURFACE SEAL: 3' x 3' CONCRETE PAD

I.D. OF SURFACE CASING: 6" x 6" SQ

TYPE OF SURFACE CASING: ALUMINUM

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: ~ 8"

TYPE OF BACKFILL: "SHURGROUT" BENTONITE GROUT

ELEVATION/DEPTH TOP OF SEAL: -0.24 / 5

TYPE OF SEAL: 3/8" SHUR PLUG BENTONITE

DEPTH TOP OF SAND PACK: 7

ELEVATION/DEPTH TOP OF SCREEN: -4.24 / 9

TYPE OF SCREEN: PVC, SCH 40

SLOT SIZE x LENGTH: 0.010 x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: DSI FILTER SILICA SAND #2.

ELEVATION/DEPTH BOTTOM OF SCREEN: -14.24 / 19

ELEVATION/DEPTH BOTTOM OF SAND PACK: -15.24 / 20

BACKFILL MATERIAL BELOW SAND: NONE

ELEVATION/DEPTH OF HOLE: -15.24 / 20

ACAD:FORM_MWSU.dwg 07/28/99 INL

APPENDIX A-4
MONITORING WELL DEVELOPMENT RECORDS

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 16MW01S
Site: NWS CHARLESTON
Date Installed: 6-10-01
Date Developed: 6/12/01 - 6/13/01
Dev. Method: SURGE/PUMP
Pump Type: WHALE

Depth to Bottom (ft.): 17
Static Water Level Before (ft.): 6.63
Static Water Level After (ft.):
Screen Length (ft.): 10
Specific Capacity:
Casing ID (in.): 2

Responsible Personnel: S. NEIL & J. FARNICK
Drilling Co.: CAROLINA
Project Name: NWS CHARLESTON
Project Numbe CTO 137 / 0528

	Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
	1532	—		6.63	—	—	—	—	BEGIN DEVELOPMENT (SURGE FIRST)
	1534	—		—	—	—	—	—	DRY - WILL PUMP WELL DRY THEN LET RECOVER. BROWN
	1539	—		8.50	—	—	—	—	BROWN: RESUME DEW.
	1541	—		—	—	—	—	—	DRY. WILL ALLOW TO RECOVER
	1553	—		8.50	20.1	4.25	0.914	>999	GRAY - BROWN
	1601	—		8.50	19.8	~~4.037~~ 4.34	0.826	>999	GRAY - BROWN
	1623	—		8.50	19.3	4.28	0.785	>999	↓
	1657	—		8.50	19.7	4.30	0.733	>999	↓
	1721	—		8.50	19.5	4.36	0.806	316	CLOUDY / GRAY BRN
	1733	—		8.50	19.2	4.36	0.803	231	
	1739	—		8.50	19.6	4.25	0.741	300	
	1753	—		8.50	19.3	4.34	0.802	210	
	1805	—		8.50	19.3	4.26	0.765	577	
6/13/01	0740	—		6.43	19.8	4.35	0.780	207	
	0748	—		9.00	18.7	4.32	0.782	916	
	0754	—	60	9.00	18.6	4.26	0.758	767	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 16MW025
Site: SWMU 16
Date Installed: 06/11/01
Date Developed: 06/19/01/6/20
Dev. Method: PUMP+SURGE
Pump Type: 12 V. Submersible whale

Depth to Bottom (ft.): 17
Static Water Level Before (ft.): 1.9 ft
Static Water Level After (ft.):
Screen Length (ft.): 10 ft
Specific Capacity:
Casing ID (in.): 2

Responsible Personnel: J Fournier
Drilling Co.: Carolina
Project Name: RFI SWMU 16/17
Project Number: 0137

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units S/cm)	Turbidity (NTU)	Remarks (Odor, color, etc.)
0940		15	1.95	22.4	7.63	15.3	<990	Surge [illegible] Pumping
1200 6/20		20		20.[illegible]	6.87	13.9	620	Pumped Dry
1210		22		19.3	6.98	14.6	8[illegible]	
1700		27						DRY Finish

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 16 MW 035
Site: SWMU 16
Date Installed: 06/12/01
Date Developed: 06/19/01
Dev. Method: PUMP + SURGE
Pump Type: WHALE

Depth to Bottom (ft.): 17'
Static Water Level Before (ft.): -
Static Water Level After (ft.): -
Screen Length (ft.): 10'
Specific Capacity:
Casing ID (in.): 2

Responsible Personnel: J. FOURNIER
Drilling Co.: Carolina Drilling
Project Name: NWS CHARLESTON
Project Numbe CTO 137 / 0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units S/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1540		12		22.1	7.72	20.1	<990	Dark Grey
1600		18		21.6	7.73	19.6	120	
1622		21		20.6	8.01	20.4	220	
1635		25		20.8	7.82	20.1	115	
1650		30		20.7	7.88	20.2	110	
1710		35		21.1	7.84	19.8	48	Finish

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 16MW04S
Site: SWMU 16
Date Installed: 6-12-01
Date Developed: 6-20-01/6-21
Dev. Method: PUMP+SURGE
Pump Type: Whale

Depth to Bottom (ft.): 17
Static Water Level Before (ft.): 2.4'
Static Water Level After (ft.):
Screen Length (ft.): 10
Specific Capacity:
Casing ID (in.): 2

Responsible Personnel: J. FOURNIER
Drilling Co.: CAROLINA DRILLING
Project Name: NWS CHARLESTON
Project Numbe CTO 137 / 0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1600		6						SURGED WELL PUMPED DRY
1010		12		23.2	6.01	13.7	140	PUMPED DRY
1300		17						APPEARS TO MAKE
								WATER
1600		27						
0930		31		19.6	6.99	13.4	44	
0935				19.3	6.84	15.4	29	Finish

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 16MW055
Site: SWMU 16
Date Installed: 6-1-01
Date Developed: 6-19/6-20
Dev. Method: PUMP+SURGE
Pump Type: Whale

Depth to Bottom (ft.):
Static Water Level Before (ft.):
Static Water Level After (ft.):
Screen Length (ft.): 10
Specific Capacity:
Casing ID (in.): 2

Responsible Personnel: F. WUDKWYCH
Drilling Co.: CAROLINA DRILLING
Project Name: NWS CHARLESTON
Project Numbe CTO 137 / 0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mg/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1600		10						DRK GREY
1730		13						GREY
0952				23.5	6.62	20.3	999	START PUMPING
0956		18						DRY
1009		19		20.4	7.06	21.3	999	
1030		21		20.2	7.07	21.1	204	GREY
1052		22		20.8	7.06	21.4	461	PUMPED DRY
1600		28						PUMPED DRY
0915		32		20.1	7.04	20.8	77.8	Pumped Dry

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW015
Site: SWMU17
Date Installed: 6-10-01
Date Developed: 6-12-01
Dev. Method: PUMP+SURGE
Pump Type: WHALE

Depth to Bottom (ft.):
Static Water Level Before (ft.): 9.9
Static Water Level After (ft.):
Screen Length (ft.): 10
Specific Capacity:
Casing ID (in.): 2

Responsible Personnel: F. WUOKWYCH
Drilling Co.: CAROLINA DRILLING
Project Name: NWS CHARLESTON
Project Numbe CTO 137 / 0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units ~~mS/cm~~)	Turbidity (NTU)	Remarks (odor, color, etc.)
1536								SURGED / START PUMPING
1542		5						DRY
1602								WELL RECHARGING SLOWLY
1630		12		19.4	4.67	0.396	320	
1705		20		19.0	5.40	0.303	930	BROWN DIRTY
1740		25		19.2	5.59	0.296	130	
1805		30		19.6	5.62	0.293	220	
6-13-01 0715								BEGIN PUMPING
6-~~13~~ 14-01 0717		33		19.6	5.53	0.255	130	DRY
0740		36		19.4	5.32	0.224	210	
0743		37		18.9	5.30	0.256	98	
0751		39		19.0	5.64	0.280	43	
0758		44		18.9	5.80	0.304	8	
081		47		18.9	5.82	0.292	28	Done

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW02
Site: SWMU 17
Date Installed: 6-7-01
Date Developed: 6-9-01
Dev. Method: PUMP + SURGE
Pump Type: WHALE

Depth to Bottom (ft.): 18.15
Static Water Level Before (ft.): 7.15
Static Water Level After (ft.): 10.18 6/5/01
Screen Length (ft.): 10
Specific Capacity:
Casing ID (in.): 2

Responsible Personnel: F. WUDKWYCH
Drilling Co.: CAROLINA DRILLING
Project Name: NWS CHARLESTON
Project Number: CTO-137 / 0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units ms/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1326								START PUMPING
1335		12	—	19.0	4.98	0.567	999	DRY
1340				19.0	4.26	1.19	999	WELL RECHARGING QUICKLY
1355		22		↓	↓	↓	↓	
1403		26		18.3	5.16	0.411	999	Brown/grey
1420				18.6	4.85	0.677	180	
1431		40		18.3	4.41	0.929	787	
1440		43		18.7	4.72	0.635	607	
6-10-01 0830		47						START PUMPING
0840		60 ~~56~~		18.0	4.53	0.981	350	
0843		60		17.8	4.73	0.887	100	
0844		62		18.0	4.71	0.896	34	
0847		64		18.1	4.58	0.896	0	Finish

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW03
Site: NWS CHARLESTON
Date Installed: 6/7/01
Date Developed: ~~6/6/01~~ 6/10/01
Dev. Method: SURGE / PUMP
Pump Type: WHALE

Depth to Bottom (ft.): ~~18~~ 17.5
Static Water Level Before (ft.): 8.17
Static Water Level After (ft.): 8.50
Screen Length (ft.): 10
Specific Capacity:
Casing ID (in.): 2"

Responsible Personnel: S. NEIL, F. WURMYCH, J. FARNIER
Drilling Co.: CAROLINA DRILLING
Project Name: NWS CHARLESTON
Project Numbe CTO 137 / 0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1207	—	—	8.17	—	—	—	—	BEGIN DEVELOPMENT - BROWN
1208	—	—	—	—	—	—	—	DRY - STOP TO LET RECHARGE
1211	—	—	—	—	—	—	—	RESUME PUMPING - BROWN
1212	—	—	—	—	—	—	—	DRY - STOP TO LET RECHARGE
1217	—		10.55	21.3	5.11	0.367	>990	RESUME PUMPING. - BROWN
1219	—	—	—	—	—	—	—	DRY - STOP TO LET RECHARGE
1222	—		9.10	—	—	—	—	RESUME PUMPING. - BROWN
1224	—		—	—	—	—	—	DRY - STOP TO LET RECHARGE
1228	—		9.10	21.2	5.58	0.263	>990	RESUME PUMPING. - BROWN
1230	—		~~9~~ SUN	—	—	—	—	DRY - LET RECHARGE
1234	—		9.10	—	—	—	—	RESUME PUMPING. - BROWN
1237	—		—	—	—	—	—	DRY - LET RECHARGE
1241	—		9.00	21.4	5.54	0.235	>990	RESUME PUMPING. - BROWN
1243	—		—	—	—	—	—	DRY - LET RECHARGE
1247	—		9.00	—	—	—	—	RESUME PUMPING. - BROWN
1249	—		—	—	—	—	—	DRY - LET RECHARGE
1253	-		9.00	21.6	5.48	0.220	610	RESUME PUMPING - CLOUDY
	—		—	—	—	—	—	DRY - LET RECHARGE / RESUME PUMPING PERIODICALLY.

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW03
Site: NWS CHARLESTON
Date Installed: 6/7/01
Date Developed: ~~6/8/01~~ 6/10/01
Dev. Method: Surge/Pump
Pump Type: WHALE

Depth to Bottom (ft.): 17.5
Static Water Level Before (ft.): 8.17
Static Water Level After (ft.): 8.50
Screen Length (ft.): 10
Specific Capacity:
Casing ID (in.): 2

Responsible Personnel: S. NILL, F. HOOKWYCH, J. PAWLIK
Drilling Co.: CAMLINN
Project Name: NWS CHARLESTON
Project Numbe CTO 137 / 0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1312	—		9.00	21.2	5.53	0.215	>990	V. CLOUDY AFTER SURGING
1345	—		9.00	21.0	5.53	0.216	>990	V. CLOUDY AFTER SURGING
1356	—		9.00	21.1	5.61	0.211	160	CLOUDY - NO SURGING
1401	—		9.00	20.7	5.62	0.211	90	CLEARING.
1406	—		9.00	20.8	5.68	0.216	110	
1411	—		9.00	20.5	5.70	0.214	63	
1423	—		9.00	20.4	5.71	0.214	51	
1427	—		9.00	20.5	5.35	0.199	150	
1434	—		9.00	20.2	5.51	0.212	120	
1440	—		9.00	20.1	5.50	0.209	91	
1445	—	55	9.00	20.2	5.46	0.211	100	END DEVELOPMENT AFTER
								REMOVING 55 GALLONS

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW04
Site: SWMU 17
Date Installed: 6-7-01
Date Developed: 6-10-01
Dev. Method: PUMP + SURGE
Pump Type: WHALE

Depth to Bottom (ft.): 18.1
Static Water Level Before (ft.): 5.1
Static Water Level After (ft.): 9.85
Screen Length (ft.): 10
Specific Capacity:
Casing ID (in.): 2

Responsible Personnel: F. WUOKWYCH
Drilling Co.: CAROLINA DRILLING
Project Name: NWS CHARLESTON
Project Number: CTO-137 / 0588

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
0910		~~10~~						START
0921		18						DRY
0925		19		18.2	5.95	0.584	999	WELL RECHARGES QUICKLY
0932		23		17.9	5.96	0.584	700	GREY
0943		28		17.9	6.14	0.643	840	
0949		37		17.7	6.17	0.659	600	
0952		41		18.0	6.17	0.601	120	Clear / cloudy
1002		48		18.0	6.15	0.601	28	
1005		51		18.0	6.08	0.590	30	
1008		55		17.9	6.09	0.591	69	
1010		58		18.0	6.09	0.594	14	END

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW055
Site: SWMU 17
Date Installed: 3-23-04
Date Developed: 3-23-04
Dev. Method: PUMP+SURGE
Pump Type: WHALE

Depth to Bottom (ft.): 20.2
Static Water Level Before (ft.): 5.45
Static Water Level After (ft.):
Screen Length (ft.): 10
Specific Capacity:
Casing ID (in.): 2

Responsible Personnel: FRANK WUDKWYCH
Drilling Co.: GREGG DRILLING
Project Name: NWS CHARLESTON
Project Number: CTO 137 / 0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units m/cm/-)	Turbidity (NTU)	Remarks (odor, color, etc.)
1115	BEGIN PUMPING							SURGE FOR 5MIN
1125		20	—	16.8	5.33	1.0	999	STOP PUMPING / SURGE
1130		30		16.6	5.26	1.0	556	
1135		40		16.8	5.49	1.0	245	
1138		42		16.6	5.46	0.9	121	
1142		50		16.9	5.50	1.0	50	
1145		55		16.8	5.41	1.0	36	FINISH

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW065
Site: SWMU 17
Date Installed: 3-22-04
Date Developed: 3-23-04
Dev. Method: PUMP + SURGE
Pump Type: WHALE

Depth to Bottom (ft.): 20.2
Static Water Level Before (ft.): 4.6
Static Water Level After (ft.):
Screen Length (ft.): 10
Specific Capacity:
Casing ID (in.): 2

Responsible Personnel: FRANK WUDKWYCH
Drilling Co.: GREGG DRILLING
Project Name: NWS CHARLESTON
Project Number: CTO 137 / 0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1030	BEGIN PUMPING							SURGE FOR 5 MIN
1040								GOING DRY - LETTING
1045		35		16.8	501	1.0	156	RECHARGE - THICK
1055		40		17.5	5.63	0.93	733	DARK BROWN
1100		50		17.2	5.39	0.95	40	
1102		52		17.2	5.41	1.0	29	
1105		55		17.2	5.38	0.95	24	FINISH

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW06D
Site: SWMU 17
Date Installed: 2-9-05
Date Developed: 02/11/2005
Dev. Method: BAILER + PUMP
Pump Type: 12VDC SUB.

Depth to Bottom (ft.): 25.3
Static Water Level Before (ft.): 4.1
Static Water Level After (ft.): ~24.0 (dry)
Screen Length (ft.): 5'
Specific Capacity: —
Casing ID (in.): 2" PVC

Responsible Personnel: B. Cole
Drilling Co.: Gregg
Project Name: NWS Charleston
Project Number: N0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units uS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1100								4 gal removed by
								surge w/ SS bailer.
1120								develop @ 1.0 gpm
1125		5+4						reduce flow 0.5 gpm
1140		12.5+4						well run dry, wait
1340		12.5+4	9.9	21.00	6.49	0.706	70	on recharge - resume
1345		15+4	22.3	20.86	7.09	0.628	1000+	@ 0.5 gpm
1350		17.5+4	~23.5	21.03	7.21	0.588	800	
1400		22.5+4	~24.0	19.85	7.58	0.584	270	
1405		25+4	—	—	—	—	—	well dry

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW07S
Site: ____ SWMU 17
Date Installed: 3-22-04
Date Developed: 3-23-04
Dev. Method: PUMP + SURGE
Pump Type: Whale

Depth to Bottom (ft.): 20.2
Static Water Level Before (ft.): 4.5
Static Water Level After (ft.): ____
Screen Length (ft.): 10
Specific Capacity: ____
Casing ID (in.): 2

Responsible Personnel: FRANK WUDKWYCH
Drilling Co.: GREGG DRILLING
Project Name: NWS CHARLESTON
Project Number: ____ CTO 137 / 0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1020	BEGIN	PUMPING						SURGE FOR 5 MIN
1030		18	–	16.3	5.01	0.85	999	
1050		40		16.6	5.19	0.84	32	
1055		45		17.2	5.45	0.82	314	GOES DRY
~~1100~~		~~50~~		~~17.2~~	~~5.39~~	~~0.95~~	~~40.7~~	
~~1102~~		~~51~~		~~17.2~~	~~5.41~~	~~1.0~~	~~29~~	FEW
~~1105~~		~~53~~		~~17.2~~	~~5.38~~	~~0.95~~	~~24~~	
1105		50		17.0	5.25	0.82	81	CLEAR
1110		55		17.4	5.70	0.81	320	GOING DRY FINISH

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 16PZ01
Site: CHARLESTON NWS
Date Installed: 2-15-05
Date Developed: 3-23-05
Dev. Method: PUMP
Pump Type: PERISTALTIC

Depth to Bottom (ft.): 11.22
Static Water Level Before (ft.):
Static Water Level After (ft.): DRY
Screen Length (ft.): 4'
Specific Capacity: —
Casing ID (in.): 3/4"

Responsible Personnel: FRED WRAMSER
Drilling Co.: GREGG
Project Name: SWMU 16/17 RFI
Project Number: 0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units ____)	Turbidity (NTU)	Remarks (odor, color, etc.)
	3.5'							THICK MUD, PUMPED
								WELL DRY NO
								PARAMETERS MEASURED

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW115
Site: SWMU 17
Date Installed: 1-27-05
Date Developed: 02/08/2005
Dev. Method: BAILER + PUMP
Pump Type: 12VDC SUB.

Depth to Bottom (ft.): 20.35
Static Water Level Before (ft.): 4.35
Static Water Level After (ft.): 9.6
Screen Length (ft.): 10'
Specific Capacity: —
Casing ID (in.): 2" PVC

Responsible Personnel: B. Cole
Drilling Co.: GREGG
Project Name: NWS CHARLESTON
Project Numbe: CTO 137 / ~~0528~~ SWMU 16/17

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units uS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1430								4gal removed by surge
								w/ SS bailer
1450								develop @ 1.0 gpm
						~~330~~ BC		
1525		35+4	10.0	21.90	5.31	0.207	330	
1540		50+4	8.7	22.13	5.36	0.199	65	
1545		55+4	8.5	21.34	5.34	0.190	90	
1550		60+4	8.6	—	—	surge of muddy H_2Os		
1600		70+4	9.3	22.31	5.61	0.199	260	
1605		75+4	9.5	21.40	5.39	0.190	75	
1610		80+4	9.5	21.27	5.37	0.190	35	
1615		85+4	9.6	21.21	5.40	0.188	20	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: MW 17A12 S
Site: SWMU 17
Date Installed: 1-28-05
Date Developed: 02/09/2005
Dev. Method: BAILER + PUMP
Pump Type: 12VDC SUB.

Depth to Bottom (ft.): 15.2
Static Water Level Before (ft.): 2.6
Static Water Level After (ft.): 7.1
Screen Length (ft.): 10
Specific Capacity: —
Casing ID (in.): 2"

Responsible Personnel: B. Cole
Drilling Co.: Gregg
Project Name: NWS CHARLESTON
Project Numbe CTO 137 / 0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units uS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1410								4 gal removed by surge
								w/ SS bailer
1425								dev. @ 1.0 gpm
1455		8.2		20.38	5.72	0.197	130	
1500		7.4		19.37	5.36	0.182	85	
1505		7.2		19.23 ~~14.69~~	5.66	0.179	18	
1510		7.1		19.20	5.34	0.179	9.9	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW12D
Site: SWMU 17
Date Installed: 1-28-05
Date Developed: 02/10/2005
Dev. Method: BAILER + PUMP
Pump Type: 12VDC SUB.

Depth to Bottom (ft.): 30.4
Static Water Level Before (ft.): 3.2
Static Water Level After (ft.): 4.1
Screen Length (ft.): 10
Specific Capacity: —
Casing ID (in.): 2" PVC

Responsible Personnel: B. Cole
Drilling Co.: Gregg
Project Name: NWS Charleston
Project Number: 0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks (odor, color, etc.)
0830								4 gal removed by
								surge w/SS bailer
0900								develp. @ 1.0 gpm
0925		25+4	4.1	20.60	6.32	0.904	15	
0930		30+4	4.1	21.29	7.17	0.859	11	
0935		35+4	4.1	21.49	7.29	0.855	8.8	
0940		40+4	4.1	21.58	7.31	0.857	11	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW135
Site: SWMU 17
Date Installed: 2-8-05
Date Developed: 02/10/2005
Dev. Method: BAILER + PUMP
Pump Type: 12VDC SUB. PUMP

Depth to Bottom (ft.): 15.3
Static Water Level Before (ft.): 2.7
Static Water Level After (ft.): ~14.0
Screen Length (ft.): 10
Specific Capacity: –
Casing ID (in.): 2" PVC

Responsible Personnel: B. Cole
Drilling Co.: Gregg
Project Name: NWS Charleston
Project Number: 0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units uS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1050								4 gal removed by
								surge w/ SS bailer
1105								dump. @ 1.0 gpm
1200		55+4						stop pump, remove dump
								still muddy/cloudy H_2O
1345								restart pump @ 1.0 gpm
1400		70+4	11.7	18.97	6.46	0.181	330	
1410		80+4	~14.0	19.66	6.00	0.136	120	
1415		85+4	~14.0	19.65	5.64	0.171	38	
1420		90+4	~14.0	19.14	5.63	0.170	45	
1425		95+4	~14.0	18.70	5.55	0.140	16	
1430		100+4	–	–	–	–	–	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW145
Site: SWMU 17
Date Installed: 1-29-05
Date Developed: 02/11/2005
Dev. Method: BAILER + PUMP
Pump Type: 12VDC SUB.

Depth to Bottom (ft.): 15.4
Static Water Level Before (ft.): 1.0
Static Water Level After (ft.): 13.7
Screen Length (ft.): 10'
Specific Capacity: —
Casing ID (in.): 2" PVC

Responsible Personnel: B. Cole
Drilling Co.: Gregg
Project Name: NWS Charleston
Project Number: N

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units µS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1500								4 gal Removal bag
								surge w/ SS bailer
1515								develop. @ 1.0 gpm
1545		30+4	~14.0	19.72	5.21	10.9	80	
1550		35+4	~14.0	18.84	4.84	11.3	26	
1555		40+4	13.8	19.26	4.54	11.3	8.3	
1600		45+4	13.7	19.32	4.52	11.3	3.6	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW14D
Site: SWMU 17
Date Installed: 1-29-05
Date Developed: 02/12/2005
Dev. Method: BAILER + PUMP
Pump Type: 12VDC SUB.

Depth to Bottom (ft.): 24.8
Static Water Level Before (ft.): 1.3
Static Water Level After (ft.): 6.6
Screen Length (ft.): 10'
Specific Capacity: –
Casing ID (in.): 2" PVC

Responsible Personnel: B. Cole
Drilling Co.: Gregg
Project Name: NWS Charleston
Project Number: 0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
0900								4gal removed by
								~~surge~~ w/ SS bailer
0920								dev. @ 1.2 gpm
0955		35+4	6.7	18.72	5.88	5.43	28	
1000		40+4	6.4	19.99	6.49	5.42	36	
1005		45+4	6.5	19.97	6.74	5.34	38	
1010		50+4	6.5	20.07	6.68	5.38	33	
1015		55+4	6.6	20.10	6.73	5.40	25	
~~1020~~ BC		~~60+4~~ BC						

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW155
Site: SWMU 17
Date Installed: 1-31-05
Date Developed: 02/12/2005
Dev. Method: BAILER + PUMP
Pump Type: 12VDC SUB PUMP

Depth to Bottom (ft.): 20.3
Static Water Level Before (ft.): 1.0
Static Water Level After (ft.): 12.3
Screen Length (ft.): 10'
Specific Capacity: -
Casing ID (in.): 2" PVC

Responsible Personnel: B. Cole
Drilling Co.: Gregg
Project Name: NWS Charleston
Project Number: 0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units uS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1040								4gal removed by surge
								w/ SS bailer
1055								dev. @ 1.0gpm
1130		35+4						pumping dry; reduce to 0.5gpm
1140		40+4	12.5	18.65	5.81	11.6	6.8	
1145		42.5+4	12.0	19.90	5.63	11.5	6.5	
1150		45+4	12.3	19.64	5.93	11.5	6.6	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW15D
Site: SWMU 17
Date Installed: 1-31-05
Date Developed: 02/12/2005
Dev. Method: BAILER+PUMP
Pump Type: 12VDC SUB PUMP

Depth to Bottom (ft.): 38.7
Static Water Level Before (ft.): 2.0
Static Water Level After (ft.): 2.7
Screen Length (ft.): 10'
Specific Capacity: –
Casing ID (in.): 2" PVC

Responsible Personnel: B. Cole
Drilling Co.: Gregg
Project Name: NWS Charleston
Project Number: 0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units uS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1315								4gal removed by
								~~Surge~~ surge w/SS bailer
1335								dev. @ 1.0 gpm
1400		25+4	2.8	19.82	6.52	1.28	110	
1405		30+4	2.9	19.92	6.90	1.10	50	
1410		35+4	2.8	19.88	7.07	1.07	11	
1415		40+4	2.7	20.04	7.15	0.970	3.9	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW165
Site: CHARLESTON NWS
Date Installed: 2-1-05
Date Developed: 02/12/2005
Dev. Method: BAILER+PUMP
Pump Type: 12VDC SUB PUMP

Depth to Bottom (ft.): 17.9
Static Water Level Before (ft.): 3.2
Static Water Level After (ft.): 9.2
Screen Length (ft.): 10'
Specific Capacity: –
Casing ID (in.): 2" PVC

Responsible Personnel: B. Cole
Drilling Co.: Gregg
Project Name: NWS Charleston
Project Number: 0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units uS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1440								4gal removed by surge
								w/ SS bailer
1455								develop @ 1.0gpm
1525		30+4	10.1	19.11	4.60	12.5	950	
1535		40+4	9.4	19.04	4.12	16.1	~~950~~ 39	
1540		45+4	8.9	18.96	4.16	16.4	10	
1545		50+4	9.2	19.02	4.13	16.4	5.2	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW16 I
Site: CHARLESTON NWS
Date Installed: 2-11-05
Date Developed: 02/13/2005
Dev. Method: 12VDC SUB. PUMP
Pump Type: + BAILER SURGE

Depth to Bottom (ft.): 25.0
Static Water Level Before (ft.): 0.9
Static Water Level After (ft.): 4.1
Screen Length (ft.): 10'
Specific Capacity: -
Casing ID (in.): 2" PVC

Responsible Personnel: B. Cole
Drilling Co.: Gregg
Project Name: NWS Charleston
Project Number: 0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units uS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1425								4 gal removed by
								surge & w / SS bailer
1440								devel. @ 1.0 gpm
1510		30+4	4.0	20.41	6.82	3.66	28	
1515		35+4	4.1	20.42	6.94	3.67	13	
1520		40+4	4.0	20.56	6.95	3.58	4.6	
1525		45+4	4.1	20.39	6.98	3.36	2.5	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW16D
Site: CHARLESTON NWS
Date Installed: 2-11-05
Date Developed: 02/13/2005
Dev. Method: BAILER + PUMP
Pump Type: 12VDC 2" SUB. PUMP

Depth to Bottom (ft.): 44.2
Static Water Level Before (ft.): 4.1
Static Water Level After (ft.): 4.5
Screen Length (ft.): 10'
Specific Capacity: –
Casing ID (in.): 2" PVC

Responsible Personnel: B. Cole
Drilling Co.: Gregg
Project Name: NWS Charlesto
Project Number: 0528 N

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units uS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1255								4 gal removed by
								surge w/ SS bailer
1320								develop. @ 1.0 gpm
1405		45+4	4.5	20.36	6.20	1.67	12	
1410		50+4	4.4	20.72	6.93	1.58	8.7	
1415		55+4	4.5	20.78	7.11	1.58	5.3	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW175
Site: SWMU 17
Date Installed: 2-3-05
Date Developed: 02/14/2005
Dev. Method: Bailer + Pump
Pump Type: 12VDC Sub. Pump

Depth to Bottom (ft.): 15.3
Static Water Level Before (ft.): 1.6
Static Water Level After (ft.): 10.6
Screen Length (ft.): 10
Specific Capacity: —
Casing ID (in.): 2" PVC

Responsible Personnel: B. Cole
Drilling Co.: Gregg
Project Name: NWS Charleston
Project Number: N0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units µS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
0945								4 gal removed by
								surge w/ SS bailer
1000								develop. @ 1.0 gpm
1040		40+4	10.5	19.22	4.55	14.9	25	reduce rate 0.5 gpm
1045		45+4	10.7	19.45	4.48	15.0	13	~~water running dry~~
1050		50+4	10.5	19.49	4.62	15.0	9	
1055		55+4	10.6	19.54	4.67	15.1	13	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW17I
Site: SWMU 17
Date Installed: 2-13-05
Date Developed: 02/15/2005
Dev. Method: BAILER + PUMP
Pump Type: 12VDC SUB PUMP

Depth to Bottom (ft.): 25.9
Static Water Level Before (ft.): 3.4
Static Water Level After (ft.): 14.3
Screen Length (ft.): 10'
Specific Capacity: —
Casing ID (in.): 2" PVC

Responsible Personnel: B. Cole
Drilling Co.: Gregg
Project Name: NWS Charleston
Project Number: N0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units uS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1345								4gal removed by
								surge w/ SS bailer
1400								dev. @ 1.0 gpm
1430		30+4	14.2 ~~15.2~~ BC	21.26	6.22	2.98	110	
1435		35+4	14.3	20.95	6.89	3.36	29	
1440		40+4	14.4	20.91	6.97	3.55	9.4	
1445		45+4	14.3	20.88	7.08	3.62	6.1	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW17D
Site: SWMU 17
Date Installed: 2-12-05
Date Developed: 02/14/2005
Dev. Method: BAILER + PUMP
Pump Type: 12VDC SUB.

Depth to Bottom (ft.): 39.5
Static Water Level Before (ft.): 4.0
Static Water Level After (ft.): 4.9
Screen Length (ft.): 10
Specific Capacity: —
Casing ID (in.): 2" PVC

Responsible Personnel: B. Cole
Drilling Co.: Gregg
Project Name: NWS Charleston
Project Number: N0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units uS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1150								4gal removal by
								surge w/ SS bailer
1205								develop @ 1.0 gpm
1235		30+4	4.9	20.74	6.38	1.13	75	
1240		35+4	4.8	20.54	6.24	0.846	15	
1245		40+4	4.9	20.48	7.10	0.831	5.4	
1250		45+4	4.9	20.66	7.09	0.826	5.2	
1255		50+4	4.9	20.57	7.15	0.823	6.3	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW18S
Site: SWMU 17
Date Installed: 2-14-05
Date Developed: 02/15/2005
Dev. Method: BAILER + PUMP
Pump Type: 12VDC SUB. PUMP

Depth to Bottom (ft.): 15.9
Static Water Level Before (ft.): 2.5
Static Water Level After (ft.): 8.3
Screen Length (ft.): 10
Specific Capacity: —
Casing ID (in.): 2" PVC

Responsible Personnel: B. Cole
Drilling Co.: Gregg
Project Name: NWS Charleston
Project Number: N0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units uS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1500								4gal removed by
								surge w/ SS bailer
1515								dump. @ 1.0 gpm
1530		15+4						reduce flow 0.5 gpm - well
								running dry
1545		22.5+4	8.2	19.49	5.87	15.1	500	
1550		25+4	8.4	19.15	5.21	15.7	150	
1555		27.5+4	8.1	19.19	5.20	15.7	110	
1605		32.5+4	8.2	19.04	5.39	15.7	100	
1615		37.5+4	8.4	19.03	5.38	15.6	650	
1620		40+4	8.4	19.15	5.21	15.7	210	
1625		42.5+4	8.3	19.14	5.25	15.7	95	
1630		45+4	8.3	19.12	5.30	15.7	55	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW 18 D
Site: SWMU 17
Date Installed: 2-14-05
Date Developed: 02/15/2005
Dev. Method: BAILER+PUMP
Pump Type: 12VDC SUB. PUMP

Depth to Bottom (ft.): 24.8
Static Water Level Before (ft.): 2.9
Static Water Level After (ft.): 8.4
Screen Length (ft.): 7'
Specific Capacity: —
Casing ID (in.): 2" PVC

Responsible Personnel: B. Cole
Drilling Co.: Gregg
Project Name: NWS Charleston
Project Number: N0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units uS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1530								4gal removed by
								surge w/ SS bailer
1635								develop @ 1.0 gpm
1650		15+4	8.4	20.68	6.75	1.41	26	
1655		20+4	8.5	20.92	7.27	1.46	10	
1700		25+4	8.4	20.98	7.35	1.48	5.5	
1705		30+4	8.4	21.03	7.41	1.47	3.6	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW19S
Site: SWMU 17
Date Installed: 2-8-05
Date Developed: 02/10/2005
Dev. Method: BAILER + PUMP
Pump Type: 12VDC SUB.

Depth to Bottom (ft.): 20.3
Static Water Level Before (ft.): 3.8
Static Water Level After (ft.): 7.8
Screen Length (ft.): 10'
Specific Capacity: —
Casing ID (in.): 2" PVC

Responsible Personnel: B. Cole
Drilling Co.: Gregg
Project Name: NWS Charleston
Project Number: 0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units uS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1500								4 gal removed by
								surge w/ SS bailer
~~1515~~								
1515								dewat. @ 1.0 gpm
1550		35+4	10.7	18.74	5.59	0.216	350	
1555		40+4	8.1	18.32	5.70	0.214	95	
1600		45+4	7.9	18.13	5.67	0.214	65	
1605		50+4	7.9	18.01	5.69	0.214	35	
1610		55+4	7.8	18.13	5.61	0.214	17	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW205
Site: SWMU 17
Date Installed: 2-9-05
Date Developed: 02/11/2005
Dev. Method: BAILER + PUMP
Pump Type: 12VDC SUB.

Depth to Bottom (ft.): 15.3
Static Water Level Before (ft.): 2.7
Static Water Level After (ft.): 7.2
Screen Length (ft.): 10'
Specific Capacity: —
Casing ID (in.): 2" PVC

Responsible Personnel: B. Cole
Drilling Co.: Gregg
Project Name: NWS Charleston
Project Number: N0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units µS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
0915								4 gal removed by surge
								w/ SS bailer
0930								develop @ 1.0 gpm
0935		5 + 4						reduce flow to 0.5 gpm
1010		20 + 4	7.3	16.80	5.74	4.40	24	
1015		22.5 + 4	7.2	17.20	5.51	4.45	9.7	
1020		25 + 4	7.2	17.42	5.45	4.43	14	
1030		30 + 4	—	—	—	—	—	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW21S
Site: SWMU 17
Date Installed: 1-28-05
Date Developed: 02/09/2005
Dev. Method: BAILER + PUMP
Pump Type: 12 VDC SUB.

Depth to Bottom (ft.): 20.3
Static Water Level Before (ft.): 6.7
Static Water Level After (ft.): 12.8
Screen Length (ft.): 10
Specific Capacity: —
Casing ID (in.): 2"

Responsible Personnel: ~~F. WUDKWICH~~ B. Cole
Drilling Co.: GREGG DRILLING
Project Name: NWS CHARLESTON
Project Number: CTO 137/0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units uS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1110								4 gal removed by surge
								w/ SS bailer
1125								develop @ 1.0 gpm
1205		40+4	13.6	21.61	5.71	0.301	50	
1210		45+4	12.9	21.23	5.69	0.325	13	
1215		50+4	12.8	21.08	5.71	0.324	8.8	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17MW22S
Site: SWMU 17
Date Installed: 1-27-05
Date Developed: 02/09/2005
Dev. Method: BAILER + PUMP
Pump Type: 12VDC SUB.

Depth to Bottom (ft.): 20.2
Static Water Level Before (ft.): 5.1
Static Water Level After (ft.): 8.1
Screen Length (ft.): 10'
Specific Capacity: —
Casing ID (in.): 2" PVC

Responsible Personnel: ~~F. WUDKWICH~~ B. Cole
Drilling Co.: GREGG DRILLING
Project Name: NWS CHARLESTON
Project Number: CTO 137/0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units uS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
0825								4 gal removed by surge
								w/ SS bailers
0845								begin pump @ 1 gpm
0900		15 + 4						reduce flow to ~ 0.5 gpm
0910		20 + 4	9.35	20.52	5.72	0.335	70	well pumping dry
0920		25 + 4	8.1	21.71	5.98	0.257	16	
0925		27.5 + 4	8.1	21.40	5.92	0.257	7.8	
0930		30 + 4	8.1	21.68	5.90	0.259	6.3	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 17 MW 23S
Site: SWMU 17
Date Installed: 1-27-05
Date Developed: 02/08/2005
Dev. Method: BAILER + PUMP
Pump Type: 12VDC SUB.

Depth to Bottom (ft.): 20.3
Static Water Level Before (ft.): 2.20
Static Water Level After (ft.): 7.5
Screen Length (ft.): 10
Specific Capacity: —
Casing ID (in.): 2" PVC

Responsible Personnel: F. Roman ; B. Cole
Drilling Co.: GREGG
Project Name: NWS Charleston SWMU 16/17
Project Number: 0528

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units uS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1130								4gal removed by
								surge w/ SS bailer
1205		BC						develop @ ~~1.5 gpm~~ BC
1230	25+4	~~37.5+4~~ BC	7.3	21.02	5.41	0.321	390	1.0 gpm
1245	40+4	~~60+4~~ BC	7.5	20.94	3.72	0.312	31	
1250	45+4		7.1	20.98	5.68	0.305	13	
1255	50+4		7.3	21.42	5.52	0.302	6.1	
1300	55+4		7.5	21.30	5.63	0.298	4.5	
	59gal	total						

APPENDIX A-5
LOW-FLOW PURGE SHEETS

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS CHARLESTON
PROJECT NUMBER: CTO - 137 / 0528

WELL ID.: 16MW015
DATE: 10-16-01

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Sal. (%)	Comments
0756	8.59									START
0806	8.83	100	4.21	0.749	38	4.89	18.3	277	0	
0814	8.93	115	4.04	0.94	17	4.52	18.8	301	0	
0822	8.99	115	3.80	0.74	14	3.69	19.0	324	0	
0832	8.95	100	3.81	0.73	10	4.28	19.0	339	0	
0841	8.96	120	3.72	0.73	8	3.99	19.1	344	0	
0849	8.98	125	3.86	0.73	4	4.17	19.2	346	0	
0857	8.99	120	3.73	0.72	1	4.17	19.3	350	0	
0905	9.0	120	3.73	0.72	0	3.89	19.4	355	0	
0913	8.96	110	3.76	0.72	0	4.05	19.2	345	0	SAMPLE
1019										END

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

LOW TIDE @ 5:26 PM (1726)

PROJECT SITE NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/ 0528

WELL ID.: 16MW025
DATE: 10.19.01

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Sal.	Comments
(Hr:Min)	(ft below TOC)	(mL/Min)	(S.U.)	(mS/cm)	(NTU)	(mg/L)	(Celsius)	(mV)	(%)	
1601	3.25	130								START PURGE
1610	4.01		7.70	27.6	28	11.80	22.2	-349	1.7	LT. GREEN W/BLACK FINES
1620	4.41		7.92	27.5	13	11.27	22.0	-352		HIGH SULFUR ODOR
1630	4.65		7.76	27.0	24	*14.2	21.8	-348		*HIGH DO METER OFF SCALE
1640	4.85		7.81	26.2	24	8.15	21.7	-334	1.6	
1645	4.90		7.89	26.0	25	7.31	21.8	-321		CLEARING
1650			7.89	25.9	17	6.65	21.6	-318		END PURGE
1746	6.35	130								END SAMPLING

SIGNATURE(S): [illegible]

COULD NOT START PURGE ANY SOONER
PAD COVERED WITH WATER UNTIL 1610

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/ 0528
WELL ID.: 16MW03S
DATE: 10.20.01

Time (Hrs)	Water Level (Ft Below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Sal. (%)	Comments
1603	2.78	130	—	—	—	—	—	—	—	START PURGE
1610	3.08	↓	7.66	32.2	13	3.53	23.4	-376	2.0	LT GREEN HIGH SULFUR ODOR
1620	3.28		7.66	31.0	34	2.87	22.6	-374	1.9	WITH SOME WHITE FLOCKING
1630	3.35		7.67	29.4	31	2.84	22.4	-369	1.8	
1640	3.46		7.60	27.8	11	2.48	22.5	-366	1.7	
1650	3.48		7.69	26.8	13	2.55	22.2	-353	1.7	
1700	3.55		7.64	26.5	9.6	3.04	22.0	-350	1.6	
1705	3.59		7.67	26.6	7.6	2.51	22.2	-351	1.6	
1710	3.63		7.68	26.3	2.9	2.45	22.1	-348	1.6	
1715	3.65		7.69	26.4	2.5	2.41	22.2	-349	1.6	
1815	3.65	130	—	—	—	—	—	—	—	END SAMPLING

SIGNATURE(S): [illegible]

TOP OF SCREEN = 6.45' TOC

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/ 0528
WELL ID.: 16MW04S
DATE: 10-19-01

Time (Hrs)	Water Level (ft. below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Sal. (%)	Comments
1516	2.72									START
1521	2.84		6.87	27.9	0	1.53	22.3	-363	1.8	GREEN COLOR
1527	2.87	180	6.90	27.5	0	1.42	21.1	-371	1.9	
1532	2.88		6.91	26.9	0	0.68	21.5	-380	1.8	
1538	2.87		6.91	25.6	0	1.00	21.6	-376	1.7	
1543	2.88		6.91	24.0	3	0.96	21.4	-376	1.6	
1549	2.89	180	6.91	23.0	0	1.04	21.5	-374	1.5	
1554	2.91		6.92	21.8	0	0.97	21.6	-364	1.4	
1559	2.92		6.93	21.1	0	1.22	21.5	-361	1.4	
1604	2.93		6.91	20.7	0	1.32	21.4	-359	1.3	
1609	2.92	180	6.91	20.6	0	1.69	21.5	-359	1.3	
1614	2.94		6.90	20.3	0	1.86	21.4	-361	1.3	
1620	2.93		6.90	20.1	0	2.07	21.3	-359	1.3	
1623										SAMPLE
1830										END

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/ 0528
WELL ID.: 16MW055
DATE: 10-20-01

Time (Hrs)	Water Level (ft below TOC)	Flow (ml/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Sal. (%)	Comments
1611	~~16.5~~ 2.92									START
1618	3.50		6.93	27.1	0	1.08	23.0	-399	1.7	
1624	3.91	140	6.97	25.8	0	1.40	22.7	-388	1.7	
1633	4.11		7.00	23.4	0	1.08	23.0	-382	1.5	
1639	4.46		6.99	21.8	0	1.17	22.5	-382	1.4	
1644	4.77		6.99	20.4	0	1.14	22.3	-370	1.3	
1650	5.10		6.98	19.6	6	0.97	22.0	-381	1.3	
1655	5.40		6.99	19.3	9	1.18	21.8	-379	1.2	
1700	5.71		6.98	19.2	11	0.60	21.7	-379	1.2	
1706	5.95		6.97	19.2	10	0.97	21.9	-372	1.2	
1710	6.21		6.97	19.1	4	0.97	21.9	-373	1.2	
1715	6.30		6.96	19.2	0	1.09	22.0	-373	1.2	SAMPLE
1800										END

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/ 0528
WELL ID.: 17 MW01 S
DATE: 10-16-01

Time (Hrs)	Water Level (ft below TOC)	Flow (ml/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Sal. (%)	Comments
0752	11.94	80	—	—	—	—	—	—	—	START PURGE
0805	12.22	↓	5.19	0.317	7.6	3.72	19.3	148	0	CLEAR, NO ODOR
0810	12.25	↓	5.22	0.315	4.4	3.74	19.6	139	0	
0820	12.23	↓	5.31	0.303	3.0	2.86	19.3	141	↓	
0830	12.25	↓	5.52	0.308	2.6	2.65	19.2	128	↓	
0840	12.33	↓	5.70	0.307	2.6	2.61	19.7	121	↓	
0850	12.30	↓	5.89	0.292	3.0	2.87	19.7	108	↓	
0900	12.30	↓	5.88	0.297	3.0	3.84	20.0	118	↓	
0910	12.30	↓	5.80	0.307	2.7	3.16	20.0	121	↓	
0915	↓	↓	5.82	0.298	2.6	3.18	20.1	125	↓	
0920	↓	↓	5.83	0.301	2.7	3.14	20.0	121	↓	END PURGE

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/ 0528
WELL ID.: 17 MW02S
DATE: 10.17.01

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Sal. (%)	Comments
1543	8.11	120								START PURGE
1555	8.27		5.65	0.819	9.9	2.80	19.3	2	0	WORKING ON PUMP RATE
1605	8.41		5.55	0.510	22	2.72	18.9	38		CLEAR, NO ODOR
1615	8.42		5.66	0.464	12	2.26	19.3	6		
1625	8.51		5.80	0.412	6	2.32	19.5	7		
1635	8.53		5.67	0.443	4	1.69	19.4	11		
1645	8.58		5.67	0.569	3	2.32	19.5	15		
1650	8.56		5.68	0.589	3	3.42	19.4	15		
1655	8.56		5.64	0.590	3	3.30	19.4	15		END PURGE

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/ 0528

WELL ID.: 17 MW03S
DATE: 10-17-01

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Sal.	Comments
(Hr:Min)	(ft below TOC)	(ml/Min)	(S.U.)	(mS/cm)	(NTU)	(mg/L)	(Celsius)	(mV)	(%)	
0815	9.34	130								START PURGE
0820	9.55		6.05	0.316	22	7.49	17.7	78	0	CLEAR, NO ODOR
0830	9.56		5.75	0.177	10	4.59	20.1	140		
0840	9.60		5.32	0.178	8.7	5.40	20.2	157		
0850	9.55		5.30	0.183	15	5.68	20.4	147		
0900	9.55		5.17	0.179	18	5.50	20.4	149		
0910	9.55		5.14	0.183	17	5.55	20.4	148		
0915			5.18	0.182	18	5.56	20.4	143		
0920			5.20	0.183	18	5.60	20.4	141		
0925			5.21	0.181	17	5.53	20.4	142		END PURGE

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/ 0528
WELL ID.: 17MW04S
DATE: 10-17-01

Time (Hrs)	Water Level (Ft Below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Sal. (%)	Comments
0819	6.87									START PURGING
0826	7.20	160	6.33	0.925	3	1.30	18.4	-87	0	
0832	7.18		6.47	0.918	3	1.95	18.3	-88	0	
0838	7.21	160	6.42	0.901	3	1.20	18.5	-78	0	
0845	7.22		6.45	0.876	2	0.58	19.0	-73	0	
0851	7.24		6.39	0.846	3	0.67	19.3	-63	0	
0858	7.17	125	6.42	0.817	6	1.37	19.2	-59	0	
0904	7.17		6.35	0.796	6	1.14	18.9	-52	0	
0911	7.18	135	6.36	0.776	6	1.02	19.0	-47	0	
0918	7.17		6.36	0.770	7	1.09	19.2	-45	0	
0925	7.17	135	6.38	0.775	6	1.32	19.2	-45	0	SAMPLE
1015										END

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 16MW01S
DATE: 10 Mar 05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1350	4.30	150	—	—	—	—	—	—	
1420	4.90	150	4.69	0.610	6.61	5.02	17.71	389	slow flow rate
1430	4.80	150	4.28	0.604	4.10	3.07	17.91	~~0.0~~	392
1440	4.75	150	4.26	0.604	3.95	2.68	17.88	387	
1450	4.75	150	4.33	0.603	2.56	2.47	17.89	378	
1500	4.75	150	4.34	0.603	2.92	2.30	17.56	373	
1510	4.9	150	4.32	0.603	1.75	2.27	17.56	369	
1515	4.9	150	4.33	0.603	1.20	2.32	17.51	369	

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 16MW02S
DATE: 02/25/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1445	4.19	150	–	–	–	–	–	–	initial gauge
1515	6.44	150	6.90	25.9	16	3.53	18.64	-341	
1525	7.22	150	6.88	25.7	25	1.13	18.39	-374	
1535	7.74	150	6.89	25.7	28	0.92	18.05	-372	
1545	8.22	150	6.92	25.7	28	0.82	18.40	-372	
1555	8.78	150	6.94	25.7	26	0.79	18.38	-371	
1605	9.13	150	6.97	25.7	27	0.78	18.39	-368	
1615	9.51	150	6.99	25.7	24	0.80	18.64	-371	
1620	9.75	150	6.98	25.7	23	0.79	18.59	-370	

SIGNATURE(S): Ben Cole

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI

PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 16MW03S

DATE: 02/23/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1445	2.91	150	–	–	–	–	–	–	initial pump
1515	3.36	150	7.23	23.9	130	8.59	21.44	-376	
1525	3.40	150	7.20	23.2	122	3.64	20.76	-386	
1535	3.42	150	7.20	23.2	123	1.43	20.79	-400	
1545	3.40	150	7.21	23.3	103.4	1.02	20.22	-401	
1555	3.40	150	7.22	23.3	93.8	0.89	20.28	-395	
1605	3.42	150	7.19	23.0	73.5	0.87	19.92	-397	
1610	3.41	150	7.17	22.9	68.1	0.85	19.89	-399	

SIGNATURE(S): [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 16-G-045-0205 (16MW05)
DATE: 25 Feb 05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1440	3.15	150	—	—	—	—	—	—	Sulphur odor present
1510	3.30	150	6.82	34.0	58.7	0.00	16.41	-364	
1520	3.30	150	6.81	32.8	53.9	0.00	16.44	-366	
1530	3.34	150	6.79	32.3	48.7	0.00	16.52	-366	
1540	3.34	150	6.76	31.6	37.2	0.00	16.31	-365	
1550	3.34	150	6.75	31.5	37.3	0.00	16.36	-364	
1600	3.40	150	6.74	31.2	33.6	0.00	16.54	-363	

SIGNATURE(S): [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 16-G-055-0205 (16MW055)
DATE: 23 Feb 05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1450	3.18'	150	—	—	—	—	—	—	
1520 ~~1525~~	3.31'	150	6.88	33.4	31.2	7.15	19.73	-370	sulphur order from well
1530	3.6'	150	6.89	33.5	18.6	5.40	19.52	-376	
1540	3.45'	150	6.88	33.5	8.51	3.91	19.22	-376	
1550	3.72	150	6.88	33.2	4.55	2.96	19.02	-376	
1600	3.82	150	6.89	33.4	4.44	2.25	19.03	-374	tide is coming in
1610	3.65	150	6.90	33.8	4.05	0.00	18.96	-371	
1620	3.91	150	6.92	33.6	2.95	0.40	18.70	-368	
1630	4.23	150	6.93	33.5	2.32	0.47	18.56	-366	
~~1640~~									

SIGNATURE(S): [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528

WELL ID.: 17-G-015-0205 (17MW015)
DATE: 24 Feb 05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Sal. (%)	Comments
1505	7.4	150	—	—	—	—	—	—	—	
1535	7.55	150	5.09	0.330	5.48	2.23	17.02	93		
1545	7.55	150	5.07	0.303	5.37	0.31	16.80	77		
1555	7.55	150	5.05	0.297	4.02	0.28	16.89	70		
1605	7.55	150	5.01	0.296	3.28	0.33	16.69	65		
1615	7.55	150	5.00	0.271	3.00	0.20	16.54	65		
1625	7.55	150	5.00	0.270	2.30	0.22	16.57	65		

SIGNATURE(S): [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/ 0528

WELL ID.: 17MW02S
DATE: 02/27/2005

Time (Hrs)	Water Level (Ft below TOC)	Flow (ml/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Sal. (%)	Comments
0955	3.74	150	–	–	–	–	–	–	–	initial purge
1025	4.03	150	3.97	3.35	13	4.77	16.57	363	–	
1035	4.01	150	4.01	3.36	8.3	1.84	17.00	370	–	
1045	3.99	150	4.01	3.36	7.2	1.72	17.13	366	–	
1055	4.02	150	4.00	3.37	5.1	1.55	17.19	364	–	
1105	4.01	150	4.02	3.38	4.4	1.90	17.20	360	–	
1115	4.01	150	4.05	3.40	3.5	2.12	17.24	353	–	
1120	4.02	150	4.05	3.40	3.4	1.94	17.25	353	–	

SIGNATURE(S): B Cole

10 screen
1.6 gal
3.2 gal

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17 MW03S
DATE: 02/14/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Sal %	Comments
1520	5.4	150	—	—	—	—	—	—	—	begin purge
1610	5.8	150	5.22	0.201	8.9	4.15	18.37	212	0.01	7.5L purged
1620	5.9	150	5.00	0.201	5.6	1.96	18.36	202	0.01	
1625	5.8	150	5.02	0.201	4.5	1.79	18.32	198	0.01	
1630	5.7	150	5.04	0.201	6.3	1.66	18.31	195	0.01	
1635	5.8	150	5.06	0.201	3.0	1.59	18.34	193	0.01	
1640	5.8	150	5.07	0.201	5.7	1.54	18.35	191	0.01	12.0L purged
1645	5.7	150	5.09	0.201	5.4	1.48	18.34	189	0.01	12.75 "

SIGNATURE(S): Brian Cole

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17-6-045-0205 (17MW045)
DATE: 27 Feb 05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0950	3.5	160	—	—	—	—	—	—	rust colored particles in H_2O
1020	3.75	160	4.57	2.35	25.4	0.80	16.19	203	
1030	3.75	160	4.77	2.39	15.6	0.00	16.39	159	
1040	3.75	160	4.89	2.61	12.4	0.00	16.55	126	
1050	3.75	160	4.93	2.65	9.94	0.00	16.57	116	
1100	3.70	160	4.97	2.73	6.96	0.00	16.60	106	
1110	3.70	160	5.02	2.77	6.73	0.00	16.67	95	
1120	3.75	160	5.04	2.92	7.22	0.00	16.69	90	

SIGNATURE(S): [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17MW055
DATE: 02/25/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0905	3.77	150	–	–	–	–	–	–	initial range
0935	3.90	150	5.35	0.825	45	3.87	16.24	91	
0945	3.92	150	5.40	0.822	38	1.35	16.80	72	
0955	3.90	150	5.43	0.831	32	1.10	16.66	61	
1005	3.90	150	5.45	0.843	29	1.01	16.69	58	
1015	3.91	150	5.47	0.847	24	0.92	16.63	58	
1025	3.90	150	5.46	0.852	19	0.87	16.74	61	
1030	3.90	150	5.45	0.849	16	0.85	16.78	61	

SIGNATURE(S): Brian Cole

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528

WELL ID.: 17MW06D
DATE: 02/24/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Sal. (%)	Comments
0930	3.82	150	–	–	–	–	–	–	–	initial purge
1000	7.62	150	6.53	0.670	1.84	7.76	19.19	41	–	
1010	8.75	150	6.79	0.646	1.09	5.06	19.46	46	–	reduced flow
1020	9.05	100	6.86	0.647	0.63	4.81	19.59	50	–	reduced flow
1025	9.15	75	6.88	0.644	0.54	4.75	19.66	53	–	
1030	8.91	75	6.89	0.651	0.49	4.71	19.59	57	–	

6000
1000
750
~~1000~~
750

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO D137

WELL ID.: 17MW075
DATE: 02/28/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1015	3.41	150	-	-	-	-	-	-	initial purge
1045	3.64	150	5.05	0.884	34	6.12	17.17	170	
1055	3.66	150	5.22	0.857	26	1.83	17.88	129	
1105	3.67	150	5.27	0.860	21	1.78	17.92	104	
1115	3.69	150	5.33	0.861	17	1.46	17.93	72	
1125	3.70	150	5.36	0.863	12	1.39	18.01	50	
1135	3.71	150	5.39	0.866	12	1.36	17.98	40	
1140	3.71	150	5.40	0.868	11	1.24	17.98	34	

SIGNATURE(S): B Cole

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17-G-115-0205 (17MW115)
DATE: 23 Feb 05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0945	5.6"	150	—	—	—	—	—	—	
1020	5.8"	150	4.82	0.265	4.9	4.10	19.28	239	
1030	5.8"	150	4.80	0.257	3.26	0.40	19.02	231	
1040	5.8'	150	4.82	0.242	3.44	0.07	19.29	225	
1050	5.8'	150	4.84	0.235	5.32	0.11	19.41	222	
1100	5.82'	150	5.00	0.228	7.08	7.03	20.52	222	
1110	5.84'	150	5.00	0.230	6.47	6.12	20.88	221	
1120	5.85'	150	4.98	0.229	4.28	3.86	20.92	213	

SIGNATURE(S): Stella L. Engh

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17-G-125-0205 (17MW125)
DATE: 25 Feb 05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0900	3.3	150	—	—	—	—	—	—	
0930									
0940	3.65	150	4.81	0.240	3.58	3.44	15.79	224	
0950	3.63	150	4.86	0.215	2.15	1.05	16.16	215	
1000	3.64	150	4.93	0.187	2.04	0.38	16.38	203	
1000	3.55	150	4.92	0.182	2.28	0.23	16.05	200	Slow flow
1020	3.55	150	4.92	0.183	1.83	0.35	15.60	199	
1030	3.55	150	4.92	0.181	2.95	0.20	15.93	199	

SIGNATURE(S): [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17-G-BD-0205 (17MW12D)
DATE: 28 Feb 05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1025	3.65	150	—	—	—	—	—	—	
1055	3.60	150	6.18	0.478	13.7	2.01	18.19	-65	
1105	3.60	150	6.46	0.502	13.4	0.00	18.11	-85	
1115	3.60	150	6.61	0.478	13.6	0.00	18.23	-95	
1125	3.55	150	6.66	0.475	12.3	0.00	17.88	-99	
1135	3.55	150	6.68	0.474	10.84	0.00	17.99	-100	
1145	3.55	150	6.69	0.476	10.05	0.00	17.83	-101	
1155	3.5	150	6.68	0.477	10.01	0.00	18.67	-102	

SIGNATURE(S): Linda L. [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/ 0528

WELL ID.: 17MW13S
DATE: 2/27/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Sal. (%)	Comments
1350	3.41	150	-	-	-	-	-	-	-	initial purge
1420	3.69	150	4.94	0.150	5.7	4.07	16.68	293	-	
1430	3.70	150	4.76	0.118	6.1	2.48	16.28	302	-	
1440	3.64	150	4.73	0.114	3.1	2.04	16.24	302	-	
1450	3.64	150	4.77	0.108	2.8	1.82	16.21	302	-	
1500	3.65	150	4.73	0.112	2.5	1.70	16.15	303	-	
1510	3.64	150	4.78	0.106	2.9	1.59	16.12	303	-	
1515	3.64	150	4.77	0.105	2.6	1.58	16.16	303	-	

SIGNATURE(S): B Cole

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI

PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17MW145

DATE: 03/09/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1205	3.07	150	-	-	-	-	-	-	initial purge
1235	3.49	150	3.90	11.1	7.1	5.28	16.03	252	
1245	3.52	150	3.95	11.3	3.7	2.33	16.20	259	
1255	3.53	150	3.84	11.5	3.9	2.02	16.33	261	
1305	3.50	150	3.84	11.5	2.7	1.94	16.42	262	
1315	3.49	150	3.84	11.5	3.6	1.83	16.43	263	
1325	3.49	150	3.84	11.6	2.4	1.79	16.30	263	
1330	3.50	150	3.84	11.6	2.9	1.74	16.38	263	

SIGNATURE(S): Ben Cole

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17MW14D
DATE: 03/09/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0945	5.08	150	—	—	—	—	—	—	initial purge
BC ~~1015~~	~~3.92~~	~~150~~	~~5.55~~	~~10.3~~		~~11.10~~	~~16.11~~	~~28~~	BC
1015	3.92	150	5.76	10.7	22	5.84	16.11	-15	
1025	3.94	150	5.98	10.7	21	2.16	16.13	-57	
1035	3.95	150	6.10	10.4	20	1.85	16.64	-75	
1045	3.94	150	6.17	10.1	18	1.83	16.77	-83	
1055	3.94	150	6.20	9.9	18	1.79	16.72	-87	
1105	3.95	150	6.24	9.7	19	1.75	16.59	-91	
1110	3.95	150	6.25	9.7	18	1.72	16.57	-93	

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17MW15S
DATE: 9 Mar 05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1155	3.15	160	—	—	—	—	—	—	
1225	3.5	160	5.64	22.7	33.0	3.29	14.79	35	
1235	3.5	160	5.21	17.9	30.3	0.00	15.22	70	"ERR 3" reading on Horiba
1245	3.5	160	5.16	18.2	26.3	0.00	15.35	83	
1255	3.5	160	5.13	18.2	21.4	0.00	15.48	93	
1305	3.45	160	5.11	18.2	16.8	0.00	15.47	103	
1315	3.45	160	5.10	18.1	13.9	0.00	15.49	110	
1320	3.45	160	5.09	18.1	12.8	0.00	15.52	111	

SIGNATURE(S): [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17MW15D
DATE: 9 Mar 05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0930	3.00	160	—	—	—	—	—	—	
1000	3.00	160	6.07	0.91	11.2	4.16	14.26	167	
1010	3.00	160	6.89	0.762	12.5	0.00	16.01	102	
1020	3.00	160	7.06	0.761	8.82	0.03	16.19	54	"err 3" reading on Horiba
1030	3.00	160	7.09	0.760	8.17	0.00	16.05	29	
1040	3.00	160	7.11	0.753	8.05	0.00	16.14	-31	
1050	3.00	160	7.12	0.749	7.22	0.00	16.36	-54	
1100	3.00	160	7.13	0.747	6.47	0.00	16.33	-67	

SIGNATURE(S): [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI

PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17MW165

DATE: 8 Mar 05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0910	[illegible]6	160	—	—	—	—	—	—	
0940	3.00	160	3.74	26.0	6.00	1.61	16.63	256	
0950	3.00	160	3.74	2.78	5.592	0.08	16.39	257	
1000	3.00	160	3.76	2.59	5.30	0.00	16.87	257	
1010	3.00	160	3.77	24.4	5.68	0.00	16.92	256	
1020	3.00	160	3.78	24.3	5.45	0.00	16.81	255	
[illegible]0	3.00	160	3.79	24.2	5.53	0.00	17.26	255	

SIGNATURE(S): [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17MW16I
DATE: 03/08/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1415	3.02	150	–	–	–	–	–	–	initial purge
1445	3.25	150	6.32	14.4	14	5.10	18.78	-92	
1455	3.24	150	6.28	14.3	14	2.16	18.64	-98	
1505	3.25	150	6.30	14.3	15	1.63	18.66	-100	
1515	3.26	150	6.32	14.3	14	1.40	18.73	-101	
1525	3.26	150	6.34	14.3	10	1.33	18.83	-103	
1535	3.27	150	6.36	14.3	10	1.30	18.87	-106	
1540	3.27	150	6.38	14.3	11	1.28	18.90	-107	

SIGNATURE(S): B Cole

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17 MW 16 D
DATE: 8 Mar 05

Time (Hrs.)	Water Level (ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
~~8~~ 1410	3.3	150	—	—	—	—	—	—	
1440	3.00	150	5.72	0.280	12.1	12.98	18.66	-30	
1450	3.00	150	6.78	1.17	9.60	0.00	18.30	-44	
1500	3.00	150	6.96	1.12	9.14	0.00	18.31	-38	
1510	3.00	150	7.03	1.10	8.84	0.00	18.31	-34	
1520	3.05	150	7.06	1.09	7.81	0.00	18.43	-39	
1530	3.00	150	7.07	1.09	5.98	0.00	18.57	-49	

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17MW17S
DATE: 02/26/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0925	2.7	150	-	-	-	-	-	-	initial purge
0955	3.18	150	3.89	15.7	26	3.73	16.61	237	
1005	3.22	150	3.89	15.8	20	1.80	17.00	237	
1015	3.26	150	3.96	15.8	14	1.11	17.48	237	
1025	3.24	150	3.99	16.0	12	1.00	17.41	236	
1035	3.21	150	3.99	15.9	9.3	0.95	17.21	236	
1045	3.15	150	3.96	15.9	7.8	0.87	17.02	236	
1050	3.18	150	3.96	15.9	7.3	0.86	17.03	236	

SIGNATURE(S): Brian Cole

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17MW17 I
DATE: 02/26/2005

Time (Hrs)	Water Level (Ft. below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1415	3.02	150	–	–	–	–	–	–	initial purge
1445	3.20	150	5.96	11.6	18	3.71	18.69	-101	
1455	3.25	150	6.09	11.6	12	1.96	18.53	-126	
1505	3.24	150	6.14	11.5	11	1.72	18.52	-135	
1515	3.25	150	6.16	11.5	12	1.53	18.31	-139	
1525	3.25	150	6.20	11.5	11	1.46	18.24	-139	
1535	3.24	150	6.22	11.5	10	1.41	18.38	-141	
1540	3.25	150	6.23	11.5	13	1.39	18.39	-143	

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17MW17D
DATE: 03/08/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0905	2.91	150	—	—	—	—	—	—	initial Purge
0935	2.93	150	6.76	0.831	29	4.59	17.19	-18	
0945	2.95	150	6.94	0.782	17	2.06	17.07	-65	
0955	2.94	150	7.03	0.766	14	1.63	17.20	-92	
1005	2.92	150	7.09	0.769	16	1.56	17.20	-111	
1015	2.92	150	7.13	0.771	13.2	1.58	17.08	-136	
1025	2.93	150	7.16	0.770	9.4	1.29	17.16	-136	
1030	2.95	150	7.15	0.771	9.62	1.28	17.23	-132	

SIGNATURE(S): [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17-G-185-0205 (17MW185)
DATE: 26 Feb 05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0900	2.3	150	—	—	—	—	—	—	Sulphur order at well head
0930	2.34	160	4.14	21.8	12.2	0.99	15.13	209	
0940	2.4	160	4.14	21.6	9.72	0.00	15.15	208	
0950	2.5	160	4.13	22.0	7.60	0.00	14.36	206	the slowest rate the pump
1000	2.5	160	4.15	22.0	5.56	0.00	15.36	199	will maintain w/o stopping
1010	2.5	160	4.19	22.2	6.19	0.00	15.29	196	
1020	2.51	160	4.21	22.3	5.40	0.00	15.08	194	
1030	2.53	160	4.24	22.1	4.26	0.00	15.43	189	

SIGNATURE(S): [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17-G-18D-0205 (17MW18D)
DATE: 26 Feb 05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1420	2.3	160	—	—	—	—	—	—	
1450	~~4.7~~ 2.55	160	5.96	13.7	4.76	1.03	17.94	-101	
1500	2.55	160	6.32	13.4	4.38	0.00	17.93	-128	
1510	2.55	160	6.40	13.1	4.40	0.00	17.79	-132	
1520	2.55	160	6.44	12.5	3.48	0.00	17.73	-133	
1530	2.57	160	6.48	12.2	3.32	0.00	17.80	-134	
1540	2.58	160	6.49	11.9	3.06	0.00	17.91	-134	
1550	2.59	160	6.50	11.7	3.01	0.00	17.78	-134	

SIGNATURE(S): [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528
WELL ID.: 17 MW 19 S
DATE: 02/24/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Sal. (%)	Comments
1450	3.49	150	–	–	–	–	–	–	–	initial purge
1520	3.80	150	6.15	0.266	17.7	3.57	18.86	52	–	
1530	3.79	150	5.72	0.250	11.5	2.02	18.31	61	–	
1540	3.80	150	5.64	0.239	6.67	1.50	18.18	55	–	
1550	3.80	150	5.63	0.237	6.02	1.34	18.10	55	–	
1600	3.80	150	5.61	0.236	4.42	1.22	18.00	54	–	
1610	3.79	150	5.62	0.232	3.40	1.16	17.99	53	–	
1620	3.80	150	5.63	0.230	2.40	1.13	18.04	53	–	
1625	3.80	150	5.65	0.230	2.38	1.12	18.07	53	–	

SIGNATURE(S): Brian Cole

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/ 0528

WELL ID.: 17-G-205-0205 (17MW205)
DATE: 27 Feb 05

Time (Hrs)	Water Level (Ft. below TOC)	Flow (ml/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Sal. (%)	Comments
1350	4.5	160	—	—	—	—	—	—	—	
1420	4.9	160	3.55	4.00	4.44	0.54	15.64	377		
1430	4.85	160	3.59	4.01	3.09	0.00	15.79	379		
1440	4.9	160	3.64	3.93	2.29	0.00	15.76	369		
1450	4.9	160	3.72	3.91	1.71	0.00	15.67	355		
1500	4.9	160	3.79	3.96	2.00	0.00	15.41	341		
1510	4.8	160	3.88	3.98	0.88	0.00	15.36	326		
1520	4.8	160	3.92	4.00	0.37	0.00	15.31	318		

SIGNATURE(S): [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17MW21 S
DATE: 02/15/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Sal	Comments
0910	7.2	150	—	—	—	—	—	—		begin purge
0945	7.5	150	5.52	0.409	3.8	7.01	19.11	217	0.02	
1000	7.5	150	5.49	0.410	3.5	5.74	19.27	215	0.02	
1010	7.6	150	5.45	0.418	3.3	5.09	19.36	215	0.02	
1015	7.6	150	5.44	0.419	3.0	4.96	19.39	214	0.02	
1020	7.5	150	5.41	0.422	2.8	4.85	19.26	214	0.02	
1025	7.5	150	5.40	0.423	2.9	4.64	19.25	213	0.02	
1030	7.5	150	5.40	0.425	2.8	4.50	19.27	212	0.02	

SIGNATURE(S): Brian Cole

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17 MW 225
DATE: 02/23/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Sal %	Comments
0940	6.19	150	–	–	–	–	–	–		initial purge
1010	6.75	150	6.12	0.374	3.82	10.56	20.10	182	0.02	
1020	6.69	150	6.22	0.298	2.59	2.38	20.27	171	0.01	
1030	6.71	150	6.17	0.282	2.12	1.95	20.30	163	0.01	
1040	6.67	150	6.17	0.280	1.89	1.85	20.42	156	0.01	
1050	6.70	150	6.20	0.283	1.80	1.83	20.41	151	0.01	
1100	6.68	150	6.23	0.287	1.75	1.89	20.48	153	0.01	
~~1110~~ BC		~~150~~ BC								
~~1120~~ BC		~~150~~ BC								

SIGNATURE(S): B Cole

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137/0528

WELL ID.: 17-G-235-0205 (17MW235)
DATE: 24 Feb 05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Sal. (%)	Comments
0940	2.81	150	—	—	—	—	—	—	—	
1010	2.95	150	4.92	0.592	6.47	7.71	18.68	180		
1020	3.00	150	5.01	0.482	6.31	0.00	18.57	138		
1030	3.00	150	5.01	0.470	6.19	0.00	18.44	126		
1040	3.00	150	5.03	0.447	4.98	0.00	18.69	119		
1050	3.00	150	5.01	0.456	6.86	0.00	18.68	117		
1100	3.00	150	5.02	0.448	5.25	0.00	18.94	112		
1110	3.00	150	5.00	0.451	4.25	0.00	18.67	112		

SIGNATURE(S): [illegible]

TD - 13.0
Static - 4.0

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17 TW 32
DATE: 01/15/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments	
0830	4.0	150	–	–	–	–	–	–	development	Sal
0900	5.5	150	5.1	1.5	65	2.00	15.43	12	pumping	0.1
0915	5.8	150	5.5	1.5	35	2.27	15.98	-23		0.1
0920	5.6	150	5.7	1.4	20	2.63	15.92	-33		0.1
0925	5.8	150	5.8	1.4	15	2.46	16.13	-36		0.1
0930	5.7	150	5.9	1.4	14	2.47	16.29	-40		0.1
0935	5.7	150	5.8	1.3	16	2.45	16.11	-42		

SIGNATURE(S): Ben Cole

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17 TW 33
DATE: 01/17/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments	
1355	3.0	200	—	—	—	—	—	—	development	Sal
1415	4.0	200	5.6	1.3	170	9.61	14.85	130	purging	0.1
1420	4.0	200	5.2	1.3	160	3.41	14.54	126		0.1
1425	4.0	200	5.3	1.2	150	1.26	15.15	108		0.1
1430	4.0	200	5.7	1.2	100	1.29	15.10	103		0.1
1435	4.0	200	6.0	1.2	80	0	15.26	82		0.1
1440	4.0	200	6.1	1.2	93.1	0	14.97	68		0.1
1445	4.0	200	6.1	1.2	71.0	0	15.01	26		0.1
1450	4.0	200	6.0	1.2	43.1	0	15.46	-10		0.1
1455	4.0	200	6.1	1.2	52.0	0	15.86	-40		0.1

SIGNATURE(S): B Cole

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137
WELL ID.: 17TW 34
DATE: 01/15/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments	
1130	3.75	150	—	—	—	—	—	—	development	Sal
1200	5.3	150	6.7	7.8	22.4	0	14.66	-94	purging	0.4
12105	5.5	150	6.8	7.8	21.0	0	14.62	-100		0.4
1220	5.5	150	6.8	7.5	8.43	0	15.26	-107		0.4
1225	5.5	150	6.8	7.4	8.14	0	15.38	-108		0.4
1230	5.4	150	6.8	7.3	3.13	0	15.49	-112		0.4
1235	5.5	150	6.8	7.2	4.78	0	15.44	-115		0.4

SIGNATURE(S): B. Cole

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17 TW35
DATE: 01/17/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments	
1130	3.8	200	—	—	—	—	—	—	development	Sal
1150	6.2	200	6.6	4.5	750	2.29	17.99	-63	pumping	0.2
1155	6.3	200	6.5	4.4	750	0.66	17.40	-62		0.2
1200	6.2	200	6.6	4.3	310	2.12	17.29	-47		0.2
1205	6.2	200	6.7	4.3	210	0.83	17.42	-48		0.2
1210	6.2	200	6.8	4.3	120	0.17	17.53	-52		0.2
1215	6.3	200	6.7	4.2	80	0.03	17.52	-53		0.2
1220	6.2	200	6.8	4.1	43	0	17.64	-55		0.2

SIGNATURE(S): Ben Cole

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17 TW 36
DATE: 01/17/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments	
0830	4.4	200	—	—	—	—	—	—	development	Sal
0850	9.3	200	5.9	3.7	120	13.26	9.35	-19	purging	0.2
0900	10.4	200	5.6	3.6	340	5.83	11.95	-14		0.2
0905	9.8	200	5.8	3.6	400	6.51	12.21	-10		0.2
0910	9.5	200	6.6	3.6	170	7.54	12.32	-4		0.2
0915	10.3	200	6.6	3.6	163	7.91	12.76	-2		0.2
0920	9.9	200	6.8	3.6	85	8.34	13.22	-2		0.2
0925	10.1	200	7.3	3.6	59	8.75	13.59	-2		0.2
0930	9.8	200	7.4	3.6	46	9.46	12.97	-0		0.2

SIGNATURE(S): B Cole

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17TW37
DATE: 1-16-05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (SU.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments SAL
0855	5.52	200	5.78	0.23	165	0.10	17.4	94	0.0
0900	5.52	200	5.88	0.23	138	0.00	17.3	65	0.0
0909	5.51	200	5.86	0.24	140	0.00	16.3	57	0.0
0910	5.50	200	5.84	0.23	140	0.00	17.1	54	0.0
0915	5.51	200	5.80	0.23	139	0.00	17.1	55	0.0
0920	5.51	200	5.79	0.23	138	0.00	17.2	55	0.0 COMPLETE PURGE
									BEGIN TO FILL CONT.

SIGNATURE(S): Fred Wanser

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17TW38
DATE: 1-16-05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments SAL
1045	0915	100	5.32	0.24	27	0.59	16.3	103	0.0
1050	0945	90	5.35	0.24	23	0.00	16.6	94	
1055	0925	90	5.32	0.25	5	0.00	16.2	95	
1100	0923	90	5.30	0.24	5	0.00	16.3	96	
1105	0922	90	5.30	0.24	7	0.00	16.3	98	FINNISH PURGE
									BEGIN TO FILL
									CONT.

SIGNATURE(S): Fred [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17 TW 39
DATE: 01/16/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH * (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments	
0845	4.15	200	—	—	—	—	—	—	development	Sal
0900	5.6	200	5.9	0.25	360	1.18	14.73	-428	pumping	0.0
0910	5.7	200	5.9	0.22	210	0.24	14.92	-436		0.0
0915	5.7	200	6.0	0.22	233	0	14.93	-427		0.0
0920	5.7	200	6.0	0.22	320	0	14.85	-421		0.0
0925	5.8	200	6.1	0.22	308	0	14.76	-434		0.0
0930	5.8	200	6.1	0.21	300	0	14.88	-422		0.0

SIGNATURE(S): B. Cole

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17 TW 40
DATE: 01/16/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments	
1140	3.49	200	—	—	—	—	—	—	development	Sal
1210	7.3	200	5.6	0.35	1100	2.10	15.90	-388	pumping	0.0
1225	7.7	200	6.2	0.35	900	0	16.32	-411		0.0
1230	7.6	200	6.1	0.35	650	1.92	16.20	-419		0.0
1235	7.7	200	6.3	0.35	350	0.85	16.23	-362		0.0
1240	7.6	200	6.3	0.35	200	0	16.25	-358		0.0
1245	7.6	200	6.3	0.35	169	0	16.32	-323		0.0

SIGNATURE(S): Brian Cole

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17TW41
DATE: 1-17-05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments SAL
1045	7.98	250	4.85	0.26	60	1.30	15.9	181	0.0
1050	7.86	200	4.68	0.27	49	0.00	16.1	201	0.0
1055	8.00	200	4.66	0.28	45	0.00	16.2	209	0.0
1100	7.99	200	4.66	0.28	20	0.00	16.2	215	0.0
1105	7.99	200	4.69	0.28	22	0.00	16.3	219	0.0
1110	7.99	200	4.70	0.28	22	0.00	16.3	220	0.0 COMPLETED PURGE
									BEGIN TO FILL CONT.

SIGNATURE(S): Fred W Kanner

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17 TW 42
DATE: 01/17/2005

Time (Hrs)	Water Level (Ft. below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments	
1605	3.8	200	—	—	—	—	—	—	development	Sal
1625	6.0	200	7.6	0.33	440	2.97	15.36	70	pumping	0.0
1630	6.0	200	6.9	0.32	765	3.45	15.85	50		0.0
1635	6.0	200	6.6	0.32	500	1.74	15.69	37		0.0
1640	5.9	200	6.2	0.32	676	0	15.60	-5		0.0
1650	6.0	200	6.5	0.30	500	4.50	15.67	116		0.0
1655	6.0	200	6.8	0.32	448	0.40	15.78	57		0.0
1700	6.0	200	6.9	0.32	497	0	15.95	19		0.0
1705	6.0	200	7.0	0.32	400	0	15.76	13		0.0

SIGNATURE(S):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17TW43
DATE: 1-16-05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (SU.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mv)	Comments SML
1150	13.8	100	6.59	0.89	125	0.00	17.6	-50	0.0
1155	12.2	150	6.59	0.89	100	0.00	17.1	-50	0.0
1200	12.0	200	6.58	0.88	55	0.00	17.3	-50	0.0
1205	11.8	200	6.71	0.89	40	0.00	17.8	-48	0.0
1210	11.8	200	6.42	0.88	20	0.00	18.0	-49	0.0
1215	11.9	200	6.43	0.89	10	0.00	18.2	-50	0.0
1220	12.0	200	643	0.88	8.0	0.00	18.2	-49	0.0
1225									FINISH PURGE BEGIN TO SAMPLE

SIGNATURE(S): Fred U Ramser

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17TW44
DATE: 1-17-05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments SAL
1240	6.63	220	3.92	3.1	6.0	3.31	14.4	271	0.2
1245	6.65	220	4.01	3.2	4.0	0.00	16.0	267	0.2
1250	6.61	200	4.04	3.3	2.0	0.00	16.5	264	0.2
1255	6.61	200	4.05	3.3	2.0	0.00	16.6	263	0.2
1300	6.61	200	4.05	3.3	2.0	0.00	16.6	263	0.2 COMPLETED
									PURGE BEGIN TO FILL
									CONT.

SIGNATURE(S): [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17TW45
DATE: 1-17-05

Time (Hrs)	Water Level (Ft. below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0850	4.43	250	7.38	0.52	5	0.00	16.8	-69	0.0
0855	4.42	250	7.47	0.52	5	0.00	16.9	-78	0.0
0900	4.43	250	7.60	0.53	2	0.00	17.0	-101	0.0
0905	4.43	250	7.62	0.52	2	0.00	17.0	-105	0.0
									FINISH PURGE
									BEGIN TO FILL
									CONT.

SIGNATURE(S): [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17TW46
DATE: 1-16-05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments SAL
1430	6.30	250	5.80	6.4	10	0.00	17.6	25	0.3
1435	6.29	250	5.85	6.4	8	0.00	17.8	10	0.3
1440	6.30	250	5.86	6.4	5	0.00	18.1	-0	0.3 SUN
1445	6.30	250	5.84	6.3	4	0.00	18.1	-0	0.3
									BEGIN TO FILL
									CONTAINERS

SIGNATURE(S): Fred L. Ramar

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI

PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17TW47

DATE: 01/13/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. ~~(mS/cm)~~ S/m	Turb. (NTU)	DO* (mg/L)	Temp. (Celsius)	ORP (mV)	Comments	
0740	4.3	150	—	—	—	—	—	—	development	Sal
0850	5.2	150	5.8	1.2	8.46	1.06	19.2	-78	pumping	0.7
0855	5.19	150	6.3	1.2	8.14	0.0	19.2	-166		0.7
0900	5.2	150	6.4	1.2	7.41	0	19.2	-179		0.7
0905	5.18	150	6.5	1.2	7.03	0	19.1	-179		0.7
0910	5.18	150	6.5	1.2	6.8	0	19.1	-176		0.7
0915	5.19	150	6.5	1.2	6.7	0	19.1	-174		0.7

SIGNATURE(S): [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17 TW 48
DATE: 01/13/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. ~~(mS/cm)~~ S/M	Turb. (NTU)	DO* (mg/L)	Temp. (Celsius)	ORP (mV)	Comments	
1000	2.95	150	—	—	—	—	—	—	development	Sal
1030	4.1	150	7.3	1.2	21	0	19.4	-6	~~pumping~~	0.7
1040	4.5	150	7.4	1.2	10	0	19.3	-74		0.7
1045	4.6	150	7.4	1.2	11	0	19.3	-84		0.7
1050	4.6	150	7.5	1.2	6.55	0	19.2	-100		0.7
1055	4.7	150	7.4	1.2	5.88	0	19.2	-114		0.7

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17TW49
DATE: 01/13/2005
01/13/2005

Time (Hrs)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1135	2.8	150	—	—	—	—	—	—	development 3.1
1205	15.5	150	7.4	0.51	[illegible]	[illegible]	19.7	-92	purge 0.3
1215	15.0	150	7.4	0.50	[illegible]	[illegible]	[illegible]	[illegible]	0.3
1220	14.9	150	7.5	0.50	[illegible]	[illegible]	[illegible]	-106	0.3
1225	14.8	150	7.5	0.51	26.1	[illegible]	19.5	-106	0.3
1230	14.9	150	7.5	0.51	20.8	0	19.5	-112	0.3

SIGNATURE(S): Brian Cole

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17 TW 50
DATE: 11/13/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. S/m (mS/cm)	Turb. (NTU)	DO* (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1350	2.45	150	—	—	—	—	—	—	Development
1425	2.6	150	8.3	76	248	0	19.2	-475	purging
1440	2.6	150	8.9	73	134	0	[illegible]	-300	
1450	2.6	150	8.[illegible]	77	49.1	0	[illegible]	-202	
1500	2.6	150	8.9	72	14.1	0	[illegible]	-201	

See 0.0
0.0
0.0
0.0

SIGNATURE(S): [illegible]

PAGE 1 OF 1

TD static 11.45 2.6 #57

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17TW51
DATE: 01/13/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. S/m (mS/cm)	Turb. (NTU)	DO* (mg/L)	Temp. (Celsius)	ORP (mV)	Comments	Sal
1545	~~150~~ 2.6	150	—	—	—	—	—	—	Development	
1615	3.0	150	6.3	1.8	148	0	18.4	5	~~purging~~	1.1
1625	3.0	150	6.5	1.8	141	0.32	18.3	-98		1.1
1630	3.1	150	6.6	1.8	123	0.22	18.3	-129		1.1
1635	3.1	150	6.7	1.8	61	0.14	18.3	-137		1.0
1640	3.0	150	6.7	1.8	27	0.18	18.3	-145		1.0
1645	3.1	150	6.7	1.8	29	0.12	18.3	-144		1.0

SIGNATURE(S): [illegible] Cole

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17TW52
DATE: 1-15-05

Time (Hrs.)	Water Level (Ft.below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments S/N
1445	5.18	200	5.67	28	21	0.00	16.2	82	0.0
1450	5.18	200	5.66	26	13	0.00	17.0	76	0.0
1455	5.19	200	5.66	25	12	0.00	17.6	73	0.0
1500	5.19	200	5.66	25	10	0.00	17.7	72	0.0
1505	5.19	200	5.66	25	10	0.00	17.8	71	0.0
									COMPLETED PURGE
									BEGIN TO FILL CONT.

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137
WELL ID.: 17TW53
DATE: 1-15-05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments SAL
0855	5.18	300	5.17	0.53	36	0.00	14.8	81	0.3
0900	5.18	200	5.23	0.52	26	0.00	15.8	66	0.3
0905	5.18	200	5.24	0.51	26	0.00	16.3	51	0.3
0910	5.19	200	5.24	0.51	26	0.00	16.4	48	0.3
0915	5.20	200	5.24	0.51	26	0.00	16.5	46	0.3
									COMPLETED PURGE
									BEGIN TO FILL CONTAINERS

SIGNATURE(S): [illegible]

PAGE 1 **OF** 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137
WELL ID.: 17TW54
DATE: 1-15-05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments SAL
1320	5.75	200	5.02	0.12	27	0.00	16.8	114	0.1
1325	5.75	200	5.12	0.12	21	0.00	17.7	105	0.1
1330	5.74	200	5.10	0.12	16	0.00	17.7	103	0.1
1335	5.72	200	5.11	0.12	15	0.00	17.8	98	0.1
1340	5.71	200	5.12	0.12	15	0.00	18.0	96	0.1
									END PURGE BEGIN
									TO FILL CONT.

SIGNATURE(S): Fred M Rauner

PAGE ___ **OF** ___

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17TW55
DATE: 1-17-05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments SAL
1650	4.40	220	5.70	11	0	0.00	16.6	27	0.6
1655	4.40	220	5.69	11	4	0.00	17.0	14	0.6
1700	4.40	220	5.69	11	1	0.00	17.1	9	0.6
1705	4.40	220	5.70	11	1	0.00	17.1	4	0.6
1710	4.40	220	5.69	11	1	0.00	17.1	3	0.6 COMPLETED PURGE FILL CONTAINERS

SIGNATURE(S): Fred W Ramsey

PAGE___OF___

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137
WELL ID.: 17TW56
DATE: 01/15/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments	
1510	~~200~~ 5.15	200	—	—	—	—	—	—	development	Sal
1600	5.9	200	7.1	0.63	564	0	17.61	86	purging	0.0
1605	5.9	200	7.0	0.64	573	0	17.17	72		0.0
1610	5.9	200	7.0	0.64	540	0	17.30	64		0.0
1615	5.9	200	7.0	0.64	480	0	17.54	49		0.0
1620	5.9	200	7.0	0.64	377	0	17.54	33		0.0
1625	5.8	200	7.1	0.64	363	0	17.41	12		0.0
1630	5.8	200	7.1	0.63	330	0	17.48	10		0.0

SIGNATURE(S): Ben Cole

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137
WELL ID.: 17 TW 57
DATE: 01/16/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH * (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments	
1435	4.0	200	—	—	—	—	—	—	development	Sal
1500	8.55	200	6.4	5.6	363	4.19	17.30	-191	pumping	0.3
1510	9.2	200	6.2	5.5	49.6	0.07	17.48	-281		0.3
1515	9.2	200	6.7	5.6	26.0	0	17.07	-158		0.3
1520	9.2	200	6.7	5.6	11.3	0	17.09	-72		0.3
1525	9.1	200	6.7	5.6	7.78	0	17.00	-46		0.3
1530	9.2	200	6.7	5.6	7.8	0	16.89	-35		0.3
1535	9.2	200	6.7	5.6	7.42	0	16.94	-31		0.3

SIGNATURE(S): [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17 TW58
DATE: 01/16/2005

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH * (SU)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments	
1610	3.6	200	—	—	—	—	—	—	development	Sal
1630	4.3	200	6.9	1.8	110	0.61	16.78	6	pumping	0.1
1635	4.4	200	6.5	1.8	105.3	0	17.16	-55		0.1
1640	4.4	200	6.3	1.8	76.4	0	17.53	-84		0.1
1645	4.3	200	6.3	1.8	80.0	0	17.59	-78		0.1
1650	4.3	200	6.2	1.8	75.	0	17.61	-73		0.1
1655	4.3	200	6.4	1.8	90	0	17.68	-67		0.1

SIGNATURE(S): [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17TW59
DATE: 1-15-05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1655	9.62	100	5.04	23	160	9.12	15.3	122	0.8
1700	13.81	100	5.11	24	160	5.96	16.3	112	0.0 * WELL RUN DRY
1715									WILL ALLOW TO RECOVER
									THEN COLLECT SAMPLE
									@ 1715

SIGNATURE(S): [signature]

PAGE___OF___

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17TW60
DATE: 1-17-05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments SAL
1550	6.56	220	4.68	2.9	101	0.00	16.3	128	0.1
1555	6.57	220	4.69	3.1	77.5	0.00	16.4	122	0.2
1600	6.57	220	4.65	3.1	54	0.00	16.4	117	0.2
1605	6.57	220	4.63	3.1	37	0.00	16.4	115	0.2
1610	6.57	220	4.62	3.1	35	0.00	16.4	116	0.2
									COMPLETED PURGE
									BEGIN TO FILL CONT.

SIGNATURE(S): Fred U Romero

PAGE___OF___

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17TW61
DATE: 1-17-05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments SAL
1455	4.80	220	4.21	3.4	13	0.00	15.5	224	0.2
1500	4.80	220	4.24	3.4	11	0.00	16.0	217	0.2
1505	4.80	220	4.26	3.4	8	0.00	16.3	207	0.2
1510	4.80	220	4.24	3.4	8	0.00	16.3	208	0.2
1515	4.80	220	4.24	3.4	7	0.00	16.3	210	0.2 COMPLETED
									PURGE FILL CONTAINERS

SIGNATURE(S): Fred Ullmann

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17TW62
DATE: 1-16-05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments SHL
1345	5.18	200	3.95	7.5	278	0.00	17.2	207	0.4
1350	4.89	200	3.96	7.4	280	0.00	17.3	211	0.4
1355	4.90	200	3.99	7.4	265	0.00	17.4	210	0.4
1400	4.90	200	3.99	7.4	265	0.00	17.5	210	0.4
									END PURGE FILL CONT.

SIGNATURE(S): Fred M Ramsey

PAGE 1 OF 1

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWS Charleston SWMU 16/17 RFI
PROJECT NUMBER: Job # 0528 CTO 0137

WELL ID.: 17TW63
DATE: 1-16-05

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1535	5.80	250	4.44	13	12	0.00	17.2	132	0.7
1540	5.85	250	4.43	13	11	0.00	17.2	134	0.7
1545	5.86	250	4.43	13	10	0.00	17.2	135	0.7
1550	5.87	250	4.45	13	8	0.00	17.2	134	0.7
									COMPLETED PURGE
									BEGIN TO FILL CONT.

SIGNATURE(S): Fred M Ramser

PAGE 1 OF 1

APPENDIX A-6
GROUNDWATER SAMPLE LOG SHEETS

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[✓] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 16-G-015-1001
Sample Location: 16MW015
Sampled By: FCW
C.O.C. No.: 16-101601
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Date: 10-16-01	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Time: 0913								
Method: LOW FLOW	CLEAR	3.76	0.72	19.2	0	4.05	0	345

PURGE DATA:

Date: 10-16-01	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: LOW FLOW								
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): 17.25								
Static Water Level (WL): 8.59								
One Casing Volume(gal/L): 1.4								
Start Purge (hrs): 0756								
End Purge (hrs): 0913								
Total Purge Time (min): 77								
Total Vol. Purged (gal/L): 2.9								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	2 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	✓
TCL PESTICIDES/ PCBS		4 C	2 X 1L AMBER	✓
TAL METALS	HNO3	4 C	1 L POLY	✓
CYANIDE	NAOH	4 C	250 ML POLY	✓
EXPLOSIVES		4 C	2 X 1L AMBER	✓
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): FCW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 16G025 1001
Sample Location: 16MW025
Sampled By: KEITH SIMPSON
C.O.C. No.: 16-101901
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Date: 10.19.01	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Time: 1650								
Method: PERISTALTIC	CLEAR	7.89	25.9	21.6	17	6.65	1.6	-318

PURGE DATA:

Date: 10.19.01	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: PERISTALTIC								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC								
* Total Well Depth (TD): 18.30								
Static Water Level (WL): 3.25								
One Casing Volume(gal/l): 2.4								
Start Purge (hrs): 1601								
End Purge (hrs): 1650								
Total Purge Time (min): 49								
Total Vol. Purged (gal/l):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	2 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	✓
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	✓
TAL METALS	HNO3	4 C	1 L POLY	✓
CYANIDE	NAOH	4 C	250 ML POLY	✓
EXPLOSIVES		4 C	2 X 1L AMBER	✓
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	—
APP. IX SVOCS		4 C	2 X 1L AMBER	—
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	—
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	—
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	—

OBSERVATIONS / NOTES:

* 2" PVC RISER ADDED TO WELL, TO PREVENT HIGH TIDE WATER FROM RUNNING INTO EXISTING RISER. ADDED 1.95' FEET TO MW, SURVEY ELEV. IS WITH ADDITION ON. EXTENION WAS NOT ON FOR TIDAL STUDY

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [signature]

TBD: To Be Determined

PUMP IN-LET (TUBING) SET 1' OFF BTM

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 16 G 035 1001
Sample Location: 16MW035
Sampled By: KEITH SIMPSON
C.O.C. No.: 16-102001
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Date: 10-20-01	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Time: 1715								
Method: PERISTALTIC	LT GREEN	7.69	26.4	22.2	2.5	2.41	1.6	-349

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Date: 10.20.01								
Method: PERISTALTIC								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 16.45								
Static Water Level (WL): 2.78								
One Casing Volume(gal/L): 2.2								
Start Purge (hrs): 1603								
End Purge (hrs): 1715								
Total Purge Time (min): 72								
Total Vol. Purged (gal/L): 2.3								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	2 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	✓
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	✓
TAL METALS	HNO3	4 C	1 L POLY	✓
CYANIDE	NAOH	4 C	250 ML POLY	✓
EXPLOSIVES		4 C	2 X 1L AMBER	✓
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	—
APP. IX SVOCS		4 C	2 X 1L AMBER	—
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	—
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	—
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	—

OBSERVATIONS / NOTES:

LOW TIDE @ 1814

EFFERVESCE IN HCL, VOC VIALS

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [illegible]

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[✓] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 16-G-045-1001
Sample Location: 16MW045
Sampled By: FW
C.O.C. No.: 1 ~~10-190~~ 16-102001
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10-19-01	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 1623	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method: LOW FLOW	GR./CLEAR	6.90	20.1	21.3	0	2.07	1.3	-359

PURGE DATA:

Date: 10-19-01	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: LOW FLOW								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 16.5								
Static Water Level (WL): 2.92								
One Casing Volume(gal/L): 2.2								
Start Purge (hrs): 1516								
End Purge (hrs): 1623								
Total Purge Time (min): 67								
Total Vol. Purged (gal/L): 3.1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements		Collected
TCL VOC	HCL	4 C	(8)	2 X 40 ML VIAL	✓
TCL SVOC		4 C	(8)	2 X 1L AMBER	✓
TCL PESTICDES/ PCBS		4 C	(6)	2 X 1L AMBER	✓
TAL METALS	HNO3	4 C	(3)	1 L POLY	✓
CYANIDE	NAOH	4 C	(3)	250 ML POLY	✓
EXPLOSIVES		4 C	(6)	2 X 1L AMBER	✓
APP. IX VOCS	HCL	4 C		2 X 40 ML VIAL	
APP. IX SVOCS		4 C		2 X 1L AMBER	
ORGANOCHLOR HERB		4 C		2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C		2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C		2 X 1L AMBER	

OBSERVATIONS / NOTES:

LOW TIDE @ 1723

Circle if Applicable:

MS/MSD

Duplicate ID No.: 16-G-045-1001-D

Signature(s): FW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[✓] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 16-6-055-1001
Sample Location: 16MW055
Sampled By: FC
C.O.C. No.: 16-102001
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Date: 10-20-01	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Time: 1715								
Method: LOW FLOW	CLEAR	6.96	19.2	22.0	0	1.09	1.2	-373

PURGE DATA:

Date: 10-20-01	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: LOW FLOW								
Monitor Reading (ppm): –								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): 16.5								
Static Water Level (WL): 2.92								
One Casing Volume(~~gal~~/L): 2.2								
Start Purge (hrs): 1611								
End Purge (hrs): 1715								
Total Purge Time (min): 64								
Total Vol. Purged (~~gal~~/L): 2.6								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	2 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	✓
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	✓
TAL METALS	HNO3	4 C	1 L POLY	✓
CYANIDE	NAOH	4 C	250 ML POLY	✓
EXPLOSIVES		4 C	2 X 1L AMBER	✓
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

LOW TIDE @ 1815

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [illegible]

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17G01S1001
Sample Location: 17MW01S
Sampled By: KS
C.O.C. No.: 16-101601
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Date: 10·16·01	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Time: 0920								
Method: PERISTALTIC	CLEAR	5.83	0.301	20.0	2.7	3.14	0	121

PURGE DATA:

Date: 10·16·01	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: PERISTALTIC								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 17.40								
Static Water Level (WL): 11.94								
One Casing Volume(gal/L): 0.9								
Start Purge (hrs): 0752								
End Purge (hrs): 0920								
Total Purge Time (min): 88								
Total Vol. Purged (gal/L): 2.4								

SEE PG 2

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	2 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	✓
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	✓
TAL METALS	HNO3	4 C	1 L POLY	✓
CYANIDE	NAOH	4 C	250 ML POLY	✓
EXPLOSIVES		4 C	2 X 1L AMBER	✓
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	—
APP. IX SVOCS		4 C	2 X 1L AMBER	—
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	—
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	—
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	—

OBSERVATIONS / NOTES:

PUMP INLET TUBING SET 1' OFF BTM.

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [illegible]

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17 ~~D~~ FW 025 1001
Sample Location: 17 MW025
Sampled By: KS / FW
C.O.C. No.: 17-101701
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	Sal %	ORP mv
Date: 10-17-01								
Time: 1655								
Method: PERISTALTIC	CLEAR	5.64	0.590	19.4	3	3.30	0	15

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Date: 10.17.01								
Method: PERISTALTIC								
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): 18.10								
Static Water Level (WL): 8.11								
One Casing Volume(gal/L): 1.6								
Start Purge (hrs): 1543								
End Purge (hrs): 1655								
Total Purge Time (min): 72								
Total Vol. Purged (gal/L): 2.3								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	2 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	✓
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	✓
TAL METALS	HNO3	4 C	1 L POLY	✓
CYANIDE	NAOH	4 C	250 ML POLY	✓
EXPLOSIVES		4 C	2 X 1L AMBER	✓
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	—
APP. IX SVOCS		4 C	2 X 1L AMBER	—
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	—
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	—
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	—

OBSERVATIONS / NOTES:

PUMP INLET (TUBING) SET 1' OFF BTM

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): KS / EL

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17G03S1001
Sample Location: 17MW03
Sampled By: RS
C.O.C. No.: 17-101701
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10.17.01	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 0925	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method: PERISTALIC	CLEAR	5.21	0.181	20.4	17	5.53	0	142

PURGE DATA:

Date: 10.17.01	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: PERISTALTIC								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 18.30								
Static Water Level (WL): 9.34								
One Casing Volume(gal): 1.5								
Start Purge (hrs): 0815								
End Purge (hrs): 0925								
Total Purge Time (min): 70								
Total Vol. Purged (gal): 2.4								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	2 X 40 ML VIAL	—
TCL SVOC		4 C	2 X 1L AMBER	—
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	—
TAL METALS	HNO3	4 C	1 L POLY	✓
CYANIDE	NAOH	4 C	250 ML POLY	✓
EXPLOSIVES		4 C	2 X 1L AMBER	✓
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	✓
APP. IX SVOCS		4 C	2 X 1L AMBER	✓
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	✓
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	✓
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	✓

OBSERVATIONS / NOTES:

APX. IX PUMP INLET TUBING SET 1' OFF BTM

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [illegible]

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[✓] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-6-045-1001
Sample Location: 17A W045
Sampled By: FW
C.O.C. No.: 17-101701
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Date: 10-17-01	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Time: 0925								
Method: LOW FLOW	CLEAR	6.38	0.775	19.2	6	1.32	0	-45

PURGE DATA:

Date: 10-17-01	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: LOW FLOW								
Monitor Reading (ppm): -								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 18.05								
Static Water Level (WL): 6.87								
One Casing Volume(gal/L): 1.8								
Start Purge (hrs): 0819								
End Purge (hrs): 0925								
Total Purge Time (min): 66								
Total Vol. Purged (gal/L): 3.2								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	2 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	✓
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	✓
TAL METALS	HNO3	4 C	1 L POLY	✓
CYANIDE	NAOH	4 C	250 ML POLY	✓
EXPLOSIVES		4 C	2 X 1L AMBER	✓
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): FW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[] Monitoring Well Data
[✓] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-01-0302
Sample Location: 17TW015
Sampled By: FCW
C.O.C. No.: 17030702
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3-7-02	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 1210	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method: LOW FLOW	TAN	5.24	0.27	17.9	999	6.60	0	55

PURGE DATA:

Date: 3-7-02	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: LOW FLOW	1	5.11	0.33	18.6	999	4.46	0.0	128
Monitor Reading (ppm): -	2	5.24	0.27	17.9	999	6.60	0.0	55
Well Casing Diameter & Material								
Type: 1" PVC								
Total Well Depth (TD): 11								
Static Water Level (WL): 7.5								
One Casing Volume(gal/L):								
Start Purge (hrs): 11.56								
End Purge (hrs): 1210								
Total Purge Time (min): 16								
Total Vol. Purged (gal/L): 0.8								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	3 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	
TAL METALS	HNO3	4 C	1 L POLY	
CYANIDE	NAOH	4 C	250 ML POLY	
EXPLOSIVES		4 C	2 X 1L AMBER	
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): FCW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[] Monitoring Well Data
[✓] Other Well Type: DPT
[] QA Sample Type:

Sample ID No.: 17-Q-02-0302
Sample Location: 17TW02
Sampled By: FCL
C.O.C. No.: 17-030702
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	Sal %	ORP mv
Date: 3-7-02								
Time: 1302								
Method: LOW FLOW	GREY	4.92	0.16	18.6	999	7.48	0	202

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Date: 3-7-02								
Method: LOW FLOW	1	4.92	0.17	20.0	999	5.66	0	229
Monitor Reading (ppm):	2	4.92	0.16	18.6	999	7.48	0	202
Well Casing Diameter & Material								
Type: 1" PVC								
Total Well Depth (TD): 11								
Static Water Level (WL): 6								
One Casing Volume(gal/L): –								
Start Purge (hrs): 12:51								
End Purge (hrs): 1302								
Total Purge Time (min): 11								
Total Vol. Purged (gal/L): –								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	3 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	
TAL METALS	HNO3	4 C	1 L POLY	
CYANIDE	NAOH	4 C	250 ML POLY	
EXPLOSIVES		4 C	2 X 1L AMBER	
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
–	–

Signature(s): [signature]

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[] Monitoring Well Data
[✓] Other Well Type: DPT
[] QA Sample Type:

Sample ID No.: 17-Q-03-0302
Sample Location: 17TW03
Sampled By: FCW
C.O.C. No.: 17-030702
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Date: 3-7-02	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Time: 1332								
Method: LOW FLOW	GREY	5.00	0.31	18.5	538	5.38	0	152

PURGE DATA:

Date: 3-7-02	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: LOW FLOW	1	5.13	0.31	20.6	999	5.56	0	206
Monitor Reading (ppm): –	2	5.00	0.31	18.5	538	5.38	0	152
Well Casing Diameter & Material								
Type: 1" PVC								
Total Well Depth (TD): 11								
Static Water Level (WL): 6								
One Casing Volume(gal/L): –								
Start Purge (hrs): 1319								
End Purge (hrs): 1332								
Total Purge Time (min): 13								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	3 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	
TAL METALS	HNO3	4 C	1 L POLY	
CYANIDE	NAOH	4 C	250 ML POLY	
EXPLOSIVES		4 C	2 X 1L AMBER	
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

GOING DRY WHILE SAMPLING

Circle if Applicable:

MS/MSD — Duplicate ID No.:

Signature(s): FCW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[] Monitoring Well Data
[✓] Other Well Type: DPT
[] QA Sample Type:

Sample ID No.: 17-Q-04-0302
Sample Location: 17TW04
Sampled By: FCW
C.O.C. No.: 17030702
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	Sal %	ORP mv
Date: 3-7-02								
Time: 1412								
Method: LOW FLOW	GREY	4.69	0.14	18.1	999	3.56	0	155

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Date: 3-7-02								
Method: LOW FLOW	1	4.92	0.14	18.6	999	5.06	0	184
Monitor Reading (ppm): –	2	4.69	0.14	18.1	999	3.56	0	155
Well Casing Diameter & Material								
Type: 1" PVC								
Total Well Depth (TD): 11								
Static Water Level (WL): 5								
One Casing Volume(gal/L): –								
Start Purge (hrs): 1356								
End Purge (hrs): 1412								
Total Purge Time (min): 16								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	3 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	
TAL METALS	HNO3	4 C	1 L POLY	
CYANIDE	NAOH	4 C	250 ML POLY	
EXPLOSIVES		4 C	2 X 1L AMBER	
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
–	

Signature(s): FCW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[] Monitoring Well Data
[✓] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-Q-05-0302
Sample Location: 17 TW05
Sampled By: FCW
C.O.C. No.: 17-030802
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Date: 3-8-02	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Time: 1430								
Method: LOW FLOW	BROWN	5.01	0.23	19.5	999	6.53	0.0	137

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Date: 3-8-02								
Method: LOW FLOW	1	5.01	0.23	19.5	999	6.53	0.0	137
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 1" PVC								
Total Well Depth (TD): 11								
Static Water Level (WL): 7								
One Casing Volume(gal/L): —								
Start Purge (hrs): 1418								
End Purge (hrs): 1430								
Total Purge Time (min): 6								
Total Vol. Purged (gal/L): —								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	3 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	
TAL METALS	HNO3	4 C	1 L POLY	
CYANIDE	NAOH	4 C	250 ML POLY	
EXPLOSIVES		4 C	2 X 1L AMBER	
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

WELL GOING DRY WILL RECHARGE THEN SAMPLE

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [signature]

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[] Monitoring Well Data
[✓] Other Well Type: DPT
[] QA Sample Type:

Sample ID No.: 17-Q-065-0302
Sample Location: 17TW065
Sampled By: FW
C.O.C. No.: 17-030802
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Date: 3-8-02	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Time: 1100								
Method: LOW FLOW	TAN	5.33	14.0	17.8	536	4.75	0.8	43

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Date: 3-8-02								
Method: LOW FLOW	1	5.56	13.5	18.2	999	5.55	0.8	44
Monitor Reading (ppm): –	2	5.36	14.0	17.6	999	4.75	0.8	36
Well Casing Diameter & Material	3	5.33	14.0	17.8	536	4.75	0.8	43
Type: 1" PV								
Total Well Depth (TD): 11								
Static Water Level (WL): 7								
One Casing Volume(gal/L): 1								
Start Purge (hrs): 1051								
End Purge (hrs): 1100								
Total Purge Time (min): 19								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	3 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	
TAL METALS	HNO3	4 C	1 L POLY	
CYANIDE	NAOH	4 C	250 ML POLY	
EXPLOSIVES		4 C	2 X 1L AMBER	
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

Circle If Applicable:

MS/MSD — Duplicate ID No.: —

Signature(s): FW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[] Monitoring Well Data
[✓] Other Well Type: DPT
[] QA Sample Type:

Sample ID No.: 17-Q-060-0302
Sample Location: 17TW060
Sampled By: FW
C.O.C. No.: 17-030802
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3-8-02	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 1050	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method: Low Flow	CLEAR	7.50	1.10	18.7	95	3.94	0.0	-34

PURGE DATA:

Date: 3-8-02	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: Low Flow	1	7.77	1.20	19.3	999	2.95	0.1	-211
Monitor Reading (ppm): -	2	7.56	1.07	18.9	422	7.30	0.0	-35
Well Casing Diameter & Material	3	7.50	1.10	18.7	95	3.94	0.0	-34
Type: 1" PVC								
Total Well Depth (TD): 30								
Static Water Level (WL): 20								
One Casing Volume(gal/L): 1								
Start Purge (hrs): 1030								
End Purge (hrs): 1050								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 1.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	3 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	
TAL METALS	HNO3	4 C	1 L POLY	
CYANIDE	NAOH	4 C	250 ML POLY	
EXPLOSIVES		4 C	2 X 1L AMBER	
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): FW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[] Monitoring Well Data
[✓] Other Well Type: DPT
[] QA Sample Type:

Sample ID No.: 17-Q-0750302
Sample Location: 17TW075
Sampled By: FW
C.O.C. No.: 17030702
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	Sal %	ORP mv
Date: 3-7-02								
Time: 1641								
Method: LOW FLOW	BROWN	3.80	17.4	16.95	999	7.91	1.0	178

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Date: 3-7-02								
Method: LOW FLOW	1	3.83	17.3	17.11	999	4.36	1.0	214
Monitor Reading (ppm): –	2	3.80	17.0	16.91	999	5.64	1.0	205
Well Casing Diameter & Material	3	3.80	17.4	16.95	999	7.91	1.0	198
Type: 1" PVC								
Total Well Depth (TD): 11								
Static Water Level (WL): 3								
One Casing Volume(gal/L):								
Start Purge (hrs): 1624								
End Purge (hrs): 1641								
Total Purge Time (min): 17								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	2 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	
TAL METALS	HNO3	4 C	1 L POLY	
CYANIDE	NAOH	4 C	250 ML POLY	
EXPLOSIVES		4 C	2 X 1L AMBER	
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
–	–

Signature(s): FW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[] Monitoring Well Data
[✓] Other Well Type: DPT
[] QA Sample Type:

Sample ID No.: 17-Q-07D0302
Sample Location: 17TW07D
Sampled By: FCW
C.O.C. No.: 17030702
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Date: 3-8-02	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Time: 0904								
Method: LOW FLOW	BROWN	7.12	4.11	18.2	565	5.19	0.2	-65

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Date: 3-8-02								
Method: LOW-FLOW	1	6.82	4.21	18.3	999	4.29	0.2	-115
Monitor Reading (ppm): –	2	7.06	3.99	18.5	999	5.84	0.2	-69
Well Casing Diameter & Material	3	7.12	4.11	18.2	565	5.19	0.2	-65
Type: 1" PVC								
Total Well Depth (TD): 42								
Static Water Level (WL): 5								
One Casing Volume(gal/L): 1								
Start Purge (hrs): 0850								
End Purge (hrs): 0904								
Total Purge Time (min): 14								
Total Vol. Purged (gal/L): 1.2								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	3 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	
TAL METALS	HNO3	4 C	1 L POLY	
CYANIDE	NAOH	4 C	250 ML POLY	
EXPLOSIVES		4 C	2 X 1L AMBER	
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
–	–

Signature(s): FCW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[] Monitoring Well Data
[✓] Other Well Type: DPT
[] QA Sample Type:

Sample ID No.: 17-Q-08S-0302
Sample Location: 17TW08S
Sampled By: FG
C.O.C. No.: 17030802
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Date: 3-8-02	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Time: 1825								
Method: LOW FLOW	BROWN	4.46	12.4	16.38	999	4.7	0.7	162

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Date: 3-8-02								
Method: LOW FLOW	1	4.47	13.2	16.6	999	4.14	0.8	153
Monitor Reading (ppm): –	2	4.44	13.1	16.51	999	4.43	.7	152
Well Casing Diameter & Material	3	4.46	12.4	16.38	999	4.7	.7	162
Type: 1" PVC								
Total Well Depth (TD): 11								
Static Water Level (WL): –								
One Casing Volume(gal/L): –								
Start Purge (hrs): 1808								
End Purge (hrs): 1825								
Total Purge Time (min): 17								
Total Vol. Purged (gal/L): –								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	3 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	
TAL METALS	HNO3	4 C	1 L POLY	
CYANIDE	NAOH	4 C	250 ML POLY	
EXPLOSIVES		4 C	2 X 1L AMBER	
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

Circle If Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): FG

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[] Monitoring Well Data
[✓] Other Well Type: DPT
[] QA Sample Type:

Sample ID No.: 17-Q-09D-0302
Sample Location: MW08D
Sampled By: FCW
C.O.C. No.: 17030802
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3-8-02	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 1800	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method: LOW FLOW	CLEAR	6.51	9.11	18.2	144	5.2	0.5	-31

PURGE DATA:

Date: 3-8-02	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: LOW FLOW	1	6.48	8.57	18.6	611	4.94	0.5	-5
Monitor Reading (ppm): —	2	6.51	9.11	18.27	144	5.2	0.5	-31
Well Casing Diameter & Material								
Type: 1" PVC								
Total Well Depth (TD): 20								
Static Water Level (WL): —								
One Casing Volume(gal/L): —								
Start Purge (hrs): 1744								
End Purge (hrs): 1800								
Total Purge Time (min): 16								
Total Vol. Purged (gal/L): —								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	3X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	
TAL METALS	HNO3	4 C	1 L POLY	
CYANIDE	NAOH	4 C	250 ML POLY	
EXPLOSIVES		4 C	2 X 1L AMBER	
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[] Monitoring Well Data
[✓] Other Well Type: DPT
[] QA Sample Type:

Sample ID No.: 17-Q-095-0302
Sample Location: 17TW095
Sampled By: FOW
C.O.C. No.: 17030902
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	Sal %	ORP mv
Date: 3-9-02								
Time: 0705								
Method: LOW FLOW	BROWN	4.32	7.8	16.3	381	6.46	0.4	174

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Date: 3-9-02								
Method: LOW FLOW	~~1~~	~~6.44~~	~~6.47~~	~~16.9~~	~~999~~	~~5.17~~	~~0.3~~	~~57~~ FOW
Monitor Reading (ppm): —	1	4.72	7.92	15.5	999	7.32	0.4	177
Well Casing Diameter & Material	2	4.49	8.0	16.1	338	6.02	0.4	156
Type: 1" PVC	3	4.32	7.8	16.3	381	6.46	0.4	174
Total Well Depth (TD): 11								
Static Water Level (WL): —								
One Casing Volume(gal/L): —								
Start Purge (hrs): 0650								
End Purge (hrs): 0705								
Total Purge Time (min): 15								
Total Vol. Purged (gal/L): —								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	3 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	
TAL METALS	HNO3	4 C	1 L POLY	
CYANIDE	NAOH	4 C	250 ML POLY	
EXPLOSIVES		4 C	2 X 1L AMBER	
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [signature]

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT
[] QA Sample Type:

Sample ID No.: 17-Q-09D-0302
Sample Location: 17TW09D
Sampled By: FCW
C.O.C. No.: 17030902
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Date: 3-9-02	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Time: 0650								
Method: LOW FLOW	CLEAR	6.23	6.39	17.5	44	6.31	0.3	-3

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Date: 3-9-02								
Method: LOW FLOW	1	6.44	6.47	16.9	999	5.17	0.3	59
Monitor Reading (ppm): ~	2	6.19	6.31	17.3	78	6.46	0.3	14
Well Casing Diameter & Material	3	6.23	6.39	17.5	44	6.31	0.3	-3
Type: 1" PVC								
Total Well Depth (TD): 30								
Static Water Level (WL): ~								
One Casing Volume(gal/L):								
Start Purge (hrs): 0635								
End Purge (hrs): 0650								
Total Purge Time (min): 15								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	3X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	
TAL METALS	HNO3	4 C	1 L POLY	
CYANIDE	NAOH	4 C	250 ML POLY	
EXPLOSIVES		4 C	2 X 1L AMBER	
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s): FCW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[] Monitoring Well Data
[✓] Other Well Type: DPT
[] QA Sample Type:

Sample ID No.: 17-Q-105-0302
Sample Location: 17TW105
Sampled By: FCW
C.O.C. No.: 17-030802
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3-8-02	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 1342	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method: LOW FLOW	BROWN	5.28	13.6	19.5	999	5.49	0.8	99

PURGE DATA:

Date: 3-8-02	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: LOW FLOW	1	5.47	13.3	22.2	999	4.17	.8	91
Monitor Reading (ppm): –	2	5.28	13.6	19.5	999	5.49	.8	99
Well Casing Diameter & Material								
Type: 1" PVC								
Total Well Depth (TD): 11								
Static Water Level (WL): 5								
One Casing Volume(gal/L): –								
Start Purge (hrs): 1330								
End Purge (hrs): 1342								
Total Purge Time (min):								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	3 X 40 ML VIAL	3
TCL SVOC		4 C	2 X 1L AMBER	
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	
TAL METALS	HNO3	4 C	1 L POLY	
CYANIDE	NAOH	4 C	250 ML POLY	
EXPLOSIVES		4 C	2 X 1L AMBER	
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): FCW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[] Monitoring Well Data
[✓] Other Well Type: DPT
[] QA Sample Type:

Sample ID No.: 17-Q-100-0302
Sample Location: 17TW10D
Sampled By: FCW
C.O.C. No.: 17030902
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Date: 3-8-02	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Time: 1440								
Method: Low Flow								

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Date: 3-8-02								
Method: Low Flow								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 1" PVC								
Total Well Depth (TD): 20								
Static Water Level (WL): —								
One Casing Volume(gal/L): —								
Start Purge (hrs): 1320								
End Purge (hrs): —								
Total Purge Time (min): —								
Total Vol. Purged (gal/L): —								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	3 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	
TAL METALS	HNO3	4 C	1 L POLY	
CYANIDE	NAOH	4 C	250 ML POLY	
EXPLOSIVES		4 C	2 X 1L AMBER	
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

GOES DRY, WILL NOT BE ABLE TO COLLECT READINGS

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): FCW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-11-0403
Sample Location: 17MIP11/TW11
Sampled By: FCW
C.O.C. No.: 17042603
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	Sal %	ORP mv
Date: 4-26-03								
Time: 0955								
Method: PERISTALTIC								

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Date: 4-26-03								
Method: PERISTALTIC								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 1" /SS								
Total Well Depth (TD): 7								
Static Water Level (WL): -								
One Casing Volume(gal/L): -								
Start Purge (hrs): 0905								
End Purge (hrs): —								
Total Purge Time (min): —								
Total Vol. Purged (gal/L): 500 mL								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	✓

OBSERVATIONS / NOTES:

0707- DRY
WILL LET SIT
WILL NOT BE ABLE TO
COLLECT READINGS

COLOR-TEC = NA

Circle if Applicable:

MS/MSD —
Duplicate ID No.: —

Signature(s): FCW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-12-0403
Sample Location: 17/11D2 / TW62
Sampled By: FCW
C.O.C. No.: 17042603
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	Sal %	ORP mv
Date: 4-26-03								
Time: 1010								
Method: PERISTALTIC	GREY	5.06	0.24	16.9	990	5.89	0	

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Date: 4-26-03								
Method: PERISTALTIC	1	5.66	0.34	~~8.42~~ 17.2	999	8.18	0.0	—
Monitor Reading (ppm): —	2	5.44	0.25	17.0	999	7.89	0.0	—
Well Casing Diameter & Material	3	5.06	0.24	16.9	990	5.89	0.0	
Type: 1" /SS								
Total Well Depth (TD): 9								
Static Water Level (WL): 4								
One Casing Volume(gal/L):								
Start Purge (hrs): 0950								
End Purge (hrs): 1010								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	✓

OBSERVATIONS / NOTES:

SCREEN - 5'-9'

COLOR-TEC = NA

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): FCW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-13-0503
Sample Location: 17MIP21 / TW13
Sampled By: FCW
C.O.C. No.: 17042603
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4-26-03	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 1050	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method: PERISTALTIC	CLOUDY	4.73	4.2	17.0	500	4.38	0.2	

PURGE DATA:

Date: 4-26-03	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: PERISTALTIC	1	5.15	4.7	17.3	999	6.54	0.2	—
Monitor Reading (ppm): —	2	5.12	4.5	17.1	999	5.20	0.2	—
Well Casing Diameter & Material	3	4.73	4.2	17.0	500	4.38	0.2	—
Type: 1" /SS								
Total Well Depth (TD): 9								
Static Water Level (WL): 4								
One Casing Volume(gal/L): —								
Start Purge (hrs): 1030								
End Purge (hrs): 1050								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	X

OBSERVATIONS / NOTES:

SCREEN 5'-9' COLOR-TEC – YES
3.0 <

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [illegible]

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-14-0403
Sample Location: 17MW16/TW14
Sampled By: ECW
C.O.C. No.: 17042603
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4-26-03	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 1140	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method: PERISTALTIC	BROWN	4.71	0.47	17.5	999	4.44	0.0	

PURGE DATA:

Date: 4-26-03	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: PERISTALTIC	1	4.83	0.51	17.9	999	5.52	0.0	
Monitor Reading (ppm): —	2	4.75	0.48	17.6	999	4.13	0.0	
Well Casing Diameter & Material	3	4.71	0.47	17.5	999	4.44	0.0	
Type: 1" /SS								
Total Well Depth (TD): 10								
Static Water Level (WL): 4								
One Casing Volume(gal/L): —								
Start Purge (hrs): 1120								
End Purge (hrs): 1140								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	✓

OBSERVATIONS / NOTES:

SCREEN 5.5' - 9.5' COLOR-TEC = YES >3.0

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-15-0403
Sample Location: 17MIP 15/TW15
Sampled By: FCW
C.O.C. No.: 17042603
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4-26-03	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 1220	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method: PERISTALTIC	BROWN	4.61	0.28	17.6	999	6.55	0.0	—

PURGE DATA:

Date: 4-26-03	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: PERISTALTIC	1	5.04	0.29	18.6	999	5.76	0.0	—
Monitor Reading (ppm): —	2	4.65	0.28	18.0	999	6.53	0.0	—
Well Casing Diameter & Material		4.61	0.28	17.6	999	6.55	0.0	—
Type: 1" /SS								
Total Well Depth (TD): 11								
Static Water Level (WL): 4								
One Casing Volume(gal/L): —								
Start Purge (hrs): 1200								
End Purge (hrs): 1220								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	✓

OBSERVATIONS / NOTES:

SCREEN 6.5'-10.5 COLOR-TEC - YES 1.5~2.0

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	17-Q-15-0403-D

Signature(s): [illegible]

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-16-0403
Sample Location: 17MIP13 / TW16
Sampled By: FCW
C.O.C. No.: 17042603
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4-26-03	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 1405	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method: PERISTALTIC	CLOUDY	5.15	0.32	17.1	370	6.42	0.0	—

PURGE DATA:

Date: 4-26-03	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: PERISTALTIC	1	6.17	0.57	18.5	999	5.47	0.0	—
Monitor Reading (ppm): —	2	5.58	0.41	17.2	999	6.46	0.0	—
Well Casing Diameter & Material	3	5.15	0.32	17.1	370	6.42	0.0	—
Type: 1" /SS								
Total Well Depth (TD): 9								
Static Water Level (WL): 4								
One Casing Volume(gal/L):								
Start Purge (hrs): 1345								
End Purge (hrs): 1405								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	✓

OBSERVATIONS / NOTES:

SCREEN 5'-9'

COLOR-TEC = NA

Circle If Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-17-0403
Sample Location: MIP18 / TW17
Sampled By: FCW
C.O.C. No.: 17 042603
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	Sal %	ORP mv
Date: 4-26-03								
Time: 1335								
Method: PERISTALTIC								—

PURGE DATA:

Date: 4-26-03	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: PERISTALTIC								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 1" /SS								
Total Well Depth (TD): 9								
Static Water Level (WL): 4								
One Casing Volume(gal/L): —								
Start Purge (hrs): 1310								
End Purge (hrs): —								
Total Purge Time (min): —								
Total Vol. Purged (gal/L): —								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	✓

OBSERVATIONS / NOTES:

1315 - DRY SCREEN - 4.5-8.5 COLOR-TEC = YES
WILL NOT BE >3.0
ABLE TO GET
READINGS

Circle If Applicable:

MS/MSD — Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-18-0403
Sample Location: 17M1P19 / TW18
Sampled By: FCW
C.O.C. No.: 17042603
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Date: 4-26-03	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Time: 1430								
Method: PERISTALTIC	CLOUDY	4.60	0.48	18.0	800	6.36	0.0	

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Date: 4-26-03								
Method: PERISTALTIC	1	5.09	0.68	18.7	999	5.53	0.0	–
Monitor Reading (ppm): –	2	5.04	0.60	18.0	999	6.49	0.0	–
Well Casing Diameter & Material	3	4.60	0.48	18.0	800	6.36	0.0	–
Type: 1" /SS								
Total Well Depth (TD): 10								
Static Water Level (WL): 4								
One Casing Volume(gal/L): –								
Start Purge (hrs): 1410								
End Purge (hrs): 1430								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	✓

OBSERVATIONS / NOTES:

SCREEN 6'-10' COLOR-TEC = YES > 3.0

Circle if Applicable:

MS/MSD Duplicate ID No.:

Signature(s): FCW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-19-0403
Sample Location: 17MIP20 / TW19
Sampled By: FCW
C.O.C. No.: 17042703
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4-27-03	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 0810	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method: PERISTALTIC	CLOUDY	4.73	0.46	16.8	900	3.82	0	

PURGE DATA:

Date: 4-27-03	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: PERISTALTIC	1	5.04	0.52	16.9	999	5.08	0.0	—
Monitor Reading (ppm): —	2	4.80	0.46	16.8	999	5.98	0.0	—
Well Casing Diameter & Material	3	4.73	0.46	16.8	900	3.82	0.0	
Type: 1" /SS								
Total Well Depth (TD): 13								
Static Water Level (WL): 9								
One Casing Volume(gal/L):								
Start Purge (hrs): 0750								
End Purge (hrs): 0810								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	✓

OBSERVATIONS / NOTES:

SCREEN 9'-13'

COLOR-TEC = YES
>30

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): FCW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-20-0403
Sample Location: 17M1017 / TW20
Sampled By: FCW
C.O.C. No.: 17042703
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4-27-03	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 0835	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method: PERISTALTIC	BROWN	4.72	0.25	16.6	750	5.38	0	

PURGE DATA:

Date: 4-27-03	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: PERISTALTIC	1	5.14	0.30	16.5	999	6.59	0	
Monitor Reading (ppm): -	2	4.78	0.26	16.6	999	4.83	0	
Well Casing Diameter & Material	3	4.72	0.25	16.6	750	5.38	0	
Type: 1" /SS								
Total Well Depth (TD): 13								
Static Water Level (WL): 4								
One Casing Volume(gal/L):								
Start Purge (hrs): 0815								
End Purge (hrs): 0835								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	✓

OBSERVATIONS / NOTES:

SCREEN 9-13

COLOR-TEC = YES
>30

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): [illegible]

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-21-0403
Sample Location: 17MIP09 / TW21
Sampled By: FCW
C.O.C. No.: 17042703
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4-27-03	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 0915	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method: PERISTALTIC	CLOUDY	4.94	0.15	17.3	999	3.76	0	—

PURGE DATA:

Date: 4-27-03	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: PERISTALTIC	1	4.86	0.14	17.3	999	6.00	0	—
Monitor Reading (ppm): —	2	4.94	0.15	17.3	999	3.76	0	—
Well Casing Diameter & Material	3	-DRY						
Type: 1" /SS								
Total Well Depth (TD): 8								
Static Water Level (WL): 3								
One Casing Volume(gal/L):								
Start Purge (hrs): 0850								
End Purge (hrs): 0915								
Total Purge Time (min): —								
Total Vol. Purged (gal/L): —								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	✓

OBSERVATIONS / NOTES:

WENT DRY SCREEN 4'-8' COLOR-TEC - NA
WILL RECHARGE
+ SAMPLE

Circle if Applicable:
MS/MSD Duplicate ID No.:

Signature(s): FCW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-22-0403
Sample Location: 17A1P14/TW22
Sampled By: FCW
C.O.C. No.: 17042703
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4-27-03	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	Sal %	ORP mv
Time: 0945								
Method: PERISTALTIC								

PURGE DATA:

Date: 4-27-03	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: PERISTALTIC		NO	READ	INGS				
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 1" /SS								
Total Well Depth (TD): 8								
Static Water Level (WL): 3								
One Casing Volume(gal/L): –								
Start Purge (hrs): 0930								
End Purge (hrs):								
Total Purge Time (min): –								
Total Vol. Purged (gal/L): –								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	✓

OBSERVATIONS / NOTES:

DRY AFTER 200 mL
WILL SAMPLE AFTER RECHARGES
SCREEN 4'-8'
COLOR-TEC = YES 0.5

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s): FCW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-23-0402
Sample Location: 17MIP08/TW23
Sampled By: FCW
C.O.C. No.: 17042703
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4-27-03	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 1020	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method: PERISTALTIC	BROWN	5.92	0.38	17.8	650	3.97	0	

PURGE DATA:

Date: 4-27-03	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: PERISTALTIC	1	5.85	0.40	17.9	999	5.12	0	—
Monitor Reading (ppm): —	2	5.90	0.38	17.8	999	4.26	0	—
Well Casing Diameter & Material	3	5.92	0.38	17.8	650	3.97	0	—
Type: 1" /SS								
Total Well Depth (TD): 4								
Static Water Level (WL): 17								
One Casing Volume(gal/L):								
Start Purge (hrs): 1000								
End Purge (hrs): 1020								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	✓

OBSERVATIONS / NOTES:

SCREEN -13'-17' COLOR-TEC = YES 0.2

Circle if Applicable:

MS/MSD — Duplicate ID No.: —

Signature(s): FCW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-24-0403
Sample Location: 17MIP07/TW24
Sampled By: FCW
C.O.C. No.: 17042703
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4-27-03	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 1055	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method: PERISTALTIC	CLOUDY	6.29	0.43	18.8	170	3.96	0	—

PURGE DATA:

Date: 4-27-03	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: PERISTALTIC	1	6.33	0.43	19.3	596	5.15	0	—
Monitor Reading (ppm): —	2	6.31	0.43	18.8	230	5.86	0	—
Well Casing Diameter & Material	3	6.29	0.43	18.8	170	3.96	0	—
Type: 1" /SS								
Total Well Depth (TD): 3								
Static Water Level (WL): 20								
One Casing Volume(gal/L): —								
Start Purge (hrs): 1035								
End Purge (hrs): 1055								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	✓

OBSERVATIONS / NOTES:

SCREEN 15.5' - 19.5' COLOR-TEC - YES
3.0

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [illegible]

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-255-0403
Sample Location: MIP 10 / TW255
Sampled By: FCW
C.O.C. No.: 17042703
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4-27-03	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 1155	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method: PERISTALTIC	BROWN	7.59	0.10	17.3	999	6.25	0	—

PURGE DATA:

Date: 4-27-03	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: PERISTALTIC	1	4.86	0.11	18.1	999	7.23	0	—
Monitor Reading (ppm): —	2	4.75	0.11	17.6	999	6.79	0	—
Well Casing Diameter & Material	3	4.59	0.10	17.3	999	6.25	0	—
Type: 1" /SS								
Total Well Depth (TD): 8								
Static Water Level (WL): 4								
One Casing Volume(gal/L): —								
Start Purge (hrs): 1135								
End Purge (hrs): 1155								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	✓

OBSERVATIONS / NOTES:

SCREEN 4-8' COLOR-TEC = NA

Circle If Applicable:

MS/MSD —

Duplicate ID No.:

Signature(s): FCW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-25D-0403
Sample Location: 17MIP10/TW25D
Sampled By: FCW
C.O.C. No.: 17042703
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4-27-03	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	Sal %	ORP mv
Time: 1125								
Method: PERISTALTIC	GREY	5.87	0.34	17.5	999	3.46	0	—

PURGE DATA:

Date: 4-27-03	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: PERISTALTIC	1	5.97	0.33	18.0	999	6.03	0	—
Monitor Reading (ppm): —	2	5.87	0.34	17.5	999	3.46	0	—
Well Casing Diameter & Material	DRY							
Type: 1" /SS								
Total Well Depth (TD): 19								
Static Water Level (WL): 4								
One Casing Volume(gal/L): —								
Start Purge (hrs): 1105								
End Purge (hrs): 1125								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	✓

OBSERVATIONS / NOTES:

DRY
LET RECHARGE
THEN SAMPLE

SCREEN 15'-19'

COLOR-TEC = YES
1.5

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): [illegible]

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-26-0403
Sample Location: MIDOS/TW26
Sampled By: FCW
C.O.C. No.: 17042703
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4-27-03	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 1305	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method: PERISTALTIC	BROWN	5.38	0.30	19.8	999	4.23	0	—

PURGE DATA:

Date: 4-27-03	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: PERISTALTIC	1	6.07	0.37	21.6	999	3.02	0	—
Monitor Reading (ppm): —	2	5.63	0.31	20.1	999	4.31	0	—
Well Casing Diameter & Material	3	5.38	0.30	19.8	999	4.23	0	—
Type: 1" /SS								
Total Well Depth (TD): 19.5								
Static Water Level (WL): 4								
One Casing Volume(gal/L):								
Start Purge (hrs): 1245								
End Purge (hrs): 1305								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	✓

OBSERVATIONS / NOTES:

SCREEN 15.5' - 19.5' COLOR- TEC -~~YES~~ 1.0

17-Q-26-0403-D

Circle If Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): [signature]

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-27-0403
Sample Location: 17MIP05 17W27
Sampled By: FCW
C.O.C. No.: 17042703
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	Sal %	ORP mv
Date: 4-27-03								
Time: 1410								
Method: PERISTALTIC	BROWN	5.69	0.33	19.5	999	5.65	0	–

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Date: 4-27-03								
Method: PERISTALTIC	1	6.31	0.38	21.0	999	10.4	0	–
Monitor Reading (ppm): –	2	6.13	0.34	20.1	999	5.92	0	–
Well Casing Diameter & Material	3	5.69	0.33	19.5	999	5.65	0	
Type: 1" /SS								
Total Well Depth (TD): 19								
Static Water Level (WL): 4'								
One Casing Volume(gal/L): –								
Start Purge (hrs): 1350								
End Purge (hrs): 1410								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	✓

OBSERVATIONS / NOTES:

SCREEN 15'-19'

COLOR-TEC = YES
1.0

Circle if Applicable:

MS/MSD	Duplicate ID No.:
–	–

Signature(s): FCW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-28-0403
Sample Location: 17MP04 / TW28
Sampled By: FCW
C.O.C. No.: 17042703
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	Sal %	ORP mv
Date: 4-27-03								
Time: 1435								
Method: PERISTALTIC	BROWN	5.55	0.28	19.5	999	6.43	0	–

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Date: 4-27-03								
Method: PERISTALTIC	1	5.86	0.41	21.5	999	4.75	0	–
Monitor Reading (ppm): –	2	5.67	0.31	20.0	999	6.37	0	–
Well Casing Diameter & Material	3	5.55	0.28	19.5	999	6.43	0	–
Type: 1" /SS								
Total Well Depth (TD): 18								
Static Water Level (WL): 4								
One Casing Volume(gal/L):								
Start Purge (hrs): 1415								
End Purge (hrs): 1435								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	✓

OBSERVATIONS / NOTES:

SCREEN 14'-18' COLOR-TEC = YES

Circle If Applicable:

MS/MSD — Duplicate ID No.: —

Signature(s): [signature]

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-29-0403
Sample Location: 17MIP03/TW29
Sampled By: FCW
C.O.C. No.: 17042703
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4-27-03	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	Sal %	ORP mv
Time: 1500								
Method: PERISTALTIC	BROWN	5.70	0.33	20.2	999	4.50	0	–

PURGE DATA:

Date: 4-27-03	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: PERISTALTIC	1	5.73	0.34	21.1	999	5.81	0	–
Monitor Reading (ppm): –	2	5.73	0.33	20.3	999	6.14	0	–
Well Casing Diameter & Material	3	5.70	0.33	20.2	999	4.30	0	–
Type: 1" /SS								
Total Well Depth (TD): 18								
Static Water Level (WL): 4								
One Casing Volume(gal/L): –								
Start Purge (hrs): 1440								
End Purge (hrs): 1500								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	✓

OBSERVATIONS / NOTES:

SCREEN 14'-18' COLOR- TEC = YES

Circle if Applicable:

MS/MSD	Duplicate ID No.:
–	–

Signature(s): FCW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-30-0403
Sample Location: 17MIP02 / TW30
Sampled By: FCW
C.O.C. No.: 17042703
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4-27-03	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 1525	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method: PERISTALTIC	BROWN	5.69	0.31	20.5	999	3.93	0	—

PURGE DATA:

Date: 4-27-03	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: PERISTALTIC	1	5.78	0.32	21.4	999	5.32	0	—
Monitor Reading (ppm): —	2	5.69	0.31	20.5	999	4.29	0	—
Well Casing Diameter & Material	3	5.69	0.31	20.5	999	3.93	0	—
Type: 1" /SS								
Total Well Depth (TD): 18								
Static Water Level (WL): 4								
One Casing Volume(gal/L): —								
Start Purge (hrs): 1505								
End Purge (hrs): 1525								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	✓

OBSERVATIONS / NOTES:

SCREEN 14'-18' COLOR TEC = YES

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	17-Q-30-0403-D

Signature(s): [signature]

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/0528

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT TEMP WELL
[] QA Sample Type:

Sample ID No.: 17-Q-31-0403
Sample Location: 17MIP01 / TW31
Sampled By: FCW
C.O.C. No.: 17042103
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	Sal %	ORP mv
Date: 4-27-03								
Time: 1555								
Method: PERISTALTIC	GREY	5.89	0.40	20.0	660	6.04	0	—

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Date: 4-27-03								
Method: PERISTALTIC	1	5.95	0.41	20.6	999	5.62	0	—
Monitor Reading (ppm): —	2	5.91	0.41	20.2	999	4.48	0	—
Well Casing Diameter & Material	3	5.88	0.40	20.0	660	6.04	0	—
Type: 1" /SS								
Total Well Depth (TD): 18								
Static Water Level (WL): 4								
One Casing Volume(gal/L): —								
Start Purge (hrs): 1535								
End Purge (hrs): 1555								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL 4 C	3 X 40 ML VIAL	✓

OBSERVATIONS / NOTES:

SCREEN 14'-18' COLOR-TEC = YES
2.5

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [signature]

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q- 32-0105
Sample Location: 17MHP TW 32
Sampled By: BC
C.O.C. No.: 4356
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 01/15/2005 LEK	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~ Sal
Time: 0735 ~~0995~~ 0735	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic	Clear	5.8	1.3	16.11	16	2.45	-42	0.1

PURGE DATA:

Date: 01/15/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 13.0								
Static Water Level (WL): 4.0								
One ~~Casing~~ Volume(gal/L): ~.3								
Start Purge (hrs): 0830								
End Purge (hrs): 0935								
Total Purge Time (min): 65								
Total Vol. Purged (gal/L): 9.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	6
TCL SVOC	4°	(2) 1 L Glass amber glass	4
TAL Metals	HNO3 4°	HDPE plastic container	2
Cyanide	NaOH 4°	HDPE plastic container	2
Pest/PCBs	4°	(2) 1 L Glass amber glass	4
Explosives	4°	(2) 1 L Glass amber glass	4
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: 17-Q-32-0105-D

Signature(s): Brian Cole

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q- 33 - 0105
Sample Location: ~~17MIP~~ TW 33
Sampled By: BC
C.O.C. No.: 4336, 4357
Type of Sample:
[x] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 01/17/2005	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~
Time: 1455	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	Sal
Method: Peristaltic	Cloudy	6.1	1.2	15.86	52.0	0	-40	0.1

PURGE DATA:

Date: 01/17/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 12.7								
Static Water Level (WL): 3.0								
One ~~Casing~~ Volume(gal/L): ~3								
Start Purge (hrs): 1355								
End Purge (hrs): 1455								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): 12								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4°	(3) 40-ml vial	3
TCL SVOC		4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3	4°	HDPE plastic container	1
Cyanide	NaOH	4°	HDPE plastic container	1
Pest/PCBs		4°	(2) 1 L Glass amber glass	2
Explosives		4°	(2) 1 L Glass amber glass	2
Organochlor Herb		4°	(2) 1 L Glass amber glass	—
Organophos Pest		4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL	4°	(3) 40-ml vial	—
APP 9 SVOC		4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs		4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Bm Cole

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q-34-0105
Sample Location: 17~~MHP~~ TW 34
Sampled By: BC
C.O.C. No.: 4356,
Type of Sample:
[x] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~
Date: 01/15/2005	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	Sal
Time: 1235								
Method: Peristaltic	Clear	6.8	7.2	15.44	4.78	0	-115	0.4

PURGE DATA:

Date: 01/15/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 3/4 PVC								
Total Well Depth (TD): 12.9								
Static Water Level (WL): 3.75								
One ~~Casing~~ Volume(gal/L): ~3 l								
Start Purge (hrs): 1130								
End Purge (hrs): 1235								
Total Purge Time (min): 65								
Total Vol. Purged (gal/L): 9.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4°	(3) 40-ml vial	3
TCL SVOC		4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3	4°	HDPE plastic container	1
Cyanide	NaOH	4°	HDPE plastic container	1
Pest/PCBs		4°	(2) 1 L Glass amber glass	2
Explosives		4°	(2) 1 L Glass amber glass	2
Organochlor Herb		4°	(2) 1 L Glass amber glass	—
Organophos Pest		4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL	4°	(3) 40-ml vial	—
APP 9 SVOC		4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs		4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Rxn in CN⁻ container: sample color turned blue/green; suspended solids observed

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Brian Cole

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: ~~16-Q~~ 17-35-0105
Sample Location: ~~16MW~~ 17TW35
Sampled By: BC
C.O.C. No.: 4336, 4357
Type of Sample:
[x] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 01/17/2005	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	~~TDS~~ Sal
Time: 1220								
Method: Peristaltic	Clear	6.8	4.1	17.64	43	0	-55	0.2

PURGE DATA:

Date: 01/17/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 13.2								
Static Water Level (WL): 3.8								
One ~~Casing~~ Volume(gal/L): ~.6L								
Start Purge (hrs): 1130								
End Purge (hrs): 1220								
Total Purge Time (min): 50								
Total Vol. Purged (gal/L): 10								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	3
TCL SVOC	4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3 4°	HDPE plastic container	1
Cyanide	NaOH 4°	HDPE plastic container	1
Pest/PCBs	4°	(2) 1 L Glass amber glass	2
Explosives	4°	(2) 1 L Glass amber glass	2
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

- Turbidity dropped to 23 NTU @ time of metals sample collectio
- Sample turned light green color w/ mixed w/ NaOH for CN⁻ sample

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Brian Cole

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: ~~16~~ 17-Q-36-0105
Sample Location: ~~16MIP~~ 17TW36
Sampled By: BC
C.O.C. No.: 4355
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~
Date: 01/17/2005	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	Sal
Time: 0930								
Method: Peristaltic	Clear	7.4	3.6	12.97	46	9.46	0	0.2

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Date: 01/17/2005								
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 3/4" PVC								
Total Well Depth (TD): 12.2								
Static Water Level (WL): 4.4								
One ~~Casing~~ Volume(gal): ~.3 l								
Start Purge (hrs): 0830								
End Purge (hrs): 0930								
Total Purge Time (min): 60								
Total Vol. Purged (gal): 12								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4°	(3) 40-ml vial	3
TCL SVOC		4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3	4°	HDPE plastic container	1
Cyanide	NaOH	4°	HDPE plastic container	1
Pest/PCBs		4°	(2) 1 L Glass amber glass	2
Explosives		4°	(2) 1 L Glass amber glass	2
Organochlor Herb		4°	(2) 1 L Glass amber glass	—
Organophos Pest		4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL	4°	(3) 40-ml vial	—
APP 9 SVOC		4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs		4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Brian Cole

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q-37-0105
Sample Location: 17~~MP~~ TW37
Sampled By: PWR
C.O.C. No.: 4355
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 1-16-05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~
Time: 0920	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	SPL
Method: Peristaltic	CLOUDY	5.79	0.23	17.2	138	0.00	55	0.0

PURGE DATA:

Date: 1-16-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 18								
Static Water Level (WL): 4.83								
One ~~Casing~~ Volume(gal/L): ~.3l								
Start Purge (hrs): 0850								
End Purge (hrs): 0920								
Total Purge Time (min): 30								
Total Vol. Purged (gal/L): 6 l								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4°	(3) 40-ml vial	✓
TCL SVOC		4°	(2) 1 L Glass amber glass	✓
TAL Metals	HNO3	4°	HDPE plastic container	✓
Cyanide	NaOH	4°	HDPE plastic container	✓
Pest/PCBs		4°	(2) 1 L Glass amber glass	✓
Explosives		4°	(2) 1 L Glass amber glass	✓
Organochlor Herb		4°	(2) 1 L Glass amber glass	—
Organophos Pest		4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL	4°	(3) 40-ml vial	—
APP 9 SVOC		4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs		4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

BEGIN Development at 0830 @ 500ml WL @ 6.3 @ 500ml BEGIN TO PURGE @ 200ml @ 0850
WITHDREW ~1.5GAL FOR DEVELOPMENT

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred M. Rau

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q-38-0105
Sample Location: 17MP TW 38
Sampled By: FRED W RAMSER
C.O.C. No.: 4355
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	~~TDS~~ SAL %
Date: 1-16-05								
Time: 1105								
Method: Peristaltic	CLR	5.30	0.24	16.3	7	0.00	98	0.0

PURGE DATA:

Date: 1-16-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 12								
Static Water Level (WL): 3.96								
One ~~Casing~~ Volume(gal/L): ~3l								
Start Purge (hrs): 1040								
End Purge (hrs): 1105								
Total Purge Time (min): 25 min								
Total Vol. Purged (gal/L) 2.3l								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	✓
TCL SVOC	4°	(2) 1 L Glass amber glass	—
TAL Metals	HNO3 4°	HDPE plastic container	—
Cyanide	NaOH 4°	HDPE plastic container	—
Pest/PCBs	4°	(2) 1 L Glass amber glass	—
Explosives	4°	(2) 1 L Glass amber glass	—
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

BEGIN TO DEVELOPE @ 1025 FINISH @ 1032 WATER CLEAR BEGIN TO PURGE, WELL WENT DRY JUST AS I WAS TOWING THE FLOWRATE ALLOW TO RECOVER TO ~9' BGC BEGIN TO PURGE @ 100 ml

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q- 39-0105
Sample Location: 17~~MIP~~ TW 39
Sampled By: BC
C.O.C. No.: 4356
Type of Sample:
[x] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~
Date: 01/16/2005	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Time: 0930								
Method: Peristaltic	slight cloudy	6.1	0.21	14.88	300	0	-422	Sal 0.0

PURGE DATA:

Date: 01/16/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 3/4" PVC								
Total Well Depth (TD): 11.95								
Static Water Level (WL): 4.15								
One ~~Casing~~ Volume(gal/L): ~.3l								
Start Purge (hrs): 0845								
End Purge (hrs): 0930								
Total Purge Time (min): 45								
Total Vol. Purged (gal/L): 9l								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4°	(3) 40-ml vial	6
TCL SVOC		4°	(2) 1 L Glass amber glass	4
TAL Metals	HNO3	4°	HDPE plastic container	2
Cyanide	NaOH	4°	HDPE plastic container	2
Pest/PCBs		4°	(2) 1 L Glass amber glass	4
Explosives		4°	(2) 1 L Glass amber glass	4
Organochlor Herb		4°	(2) 1 L Glass amber glass	—
Organophos Pest		4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL	4°	(3) 40-ml vial	—
APP 9 SVOC		4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs		4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Turbidity dropped to 28.2 NTUs @ time metals were collected

Circle if Applicable:

MS/MSD —

Duplicate ID No. 17-Q-39-0105-D

Signature(s): B. Cole

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-~~Q~~ 40-0105
Sample Location: 17~~MIP~~ TW 40
Sampled By: BC
C.O.C. No.: 4355
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 01/16/2005	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~ Sal
Time: 1245	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic	slight cloudy	6.5	0.35	16.32	169	0	-323	0.0

PURGE DATA:

Date: 01/16/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 12.5								
Static Water Level (WL): 3.49								
One Casing Volume(gal/L): ~3L								
Start Purge (hrs): 1140								
End Purge (hrs): 1245								
Total Purge Time (min): 65								
Total Vol. Purged (gal/L) 13								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	3
TCL SVOC	4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3 4°	HDPE plastic container	1
Cyanide	NaOH 4°	HDPE plastic container	1
Pest/PCBs	4°	(2) 1 L Glass amber glass	2
Explosives	4°	(2) 1 L Glass amber glass	2
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Turbidity dropped to 18.9 NTU @ time metals sample collected

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): B. Cook

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q-41-0105
Sample Location: ~~17MIP~~ TW 41
Sampled By: PYR
C.O.C. No.: 4355
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	~~TDS~~ SAL
Date: 1-17-05								
Time: 1110								
Method: Peristaltic	CLR	4.70	0.28	16.3	22	0.00	220	0.0

PURGE DATA:

Date: 1-17-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 3/4" PVC								
Total Well Depth (TD): 13.2								
Static Water Level (WL): 5.60								
One ~~Casing~~ Volume(gal/L): ~.3l								
Start Purge (hrs): 1045								
End Purge (hrs): 1110								
Total Purge Time (min): 25								
Total Vol. Purged (gal/L): 6.25l								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	✓
TCL SVOC	4°	(2) 1 L Glass amber glass	✓
TAL Metals	HNO3 4°	HDPE plastic container	✓
Cyanide	NaOH 4°	HDPE plastic container	✓
Pest/PCBs	4°	(2) 1 L Glass amber glass	✓
Explosives	4°	(2) 1 L Glass amber glass	✓
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

BEGIN TO DEVELOPE 1030 @ 500 ml/min w/ DROPPING PAST LOWER FLOW TO 300 ml/min. 1045 COMPLETED DEV. BEGIN PURGE @ 250 ml/min

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Brad Ramer

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q- 42-0105
Sample Location: 17~~MIP~~ TW 42
Sampled By: BC
C.O.C. No.: 4336, 4357
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 01/17/05	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	~~TDS~~ Sal
Time: 1705								
Method: Peristaltic	cloudy	7.0	0.32	15.76	400	0	13	0.0

PURGE DATA:

Date: 01/17/05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 3/4" PVC								
Total Well Depth (TD): 18.8								
Static Water Level (WL): 38'								
One ~~Casing~~ Volume(gal/L): ~.3l								
Start Purge (hrs): 1605								
End Purge (hrs): 1705								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): 12								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4°	(3) 40-ml vial	3
TCL SVOC		4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3	4°	HDPE plastic container	1
Cyanide	NaOH	4°	HDPE plastic container	1
Pest/PCBs		4°	(2) 1 L Glass amber glass	2
Explosives		4°	(2) 1 L Glass amber glass	2
Organochlor Herb		4°	(2) 1 L Glass amber glass	—
Organophos Pest		4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL	4°	(3) 40-ml vial	—
APP 9 SVOC		4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs		4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Turbidity dropped to 210 NTU @ time of metals sample collection

Circle if Applicable:

MS/MSD: —
Duplicate ID No.: —

Signature(s): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q-43-0105
Sample Location: 17MHP TW 43
Sampled By: FRED W. RAMSER
C.O.C. No.: 4355
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	~~TDS~~ SAL %
Date: 1-16-05								
Time: 1220								
Method: Peristaltic	CLR	6.43	0.88	18.2	8	0.00	-49	0.4

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Date: 1-16-05								
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 3/4" PVC								
Total Well Depth (TD): 21.3								
Static Water Level (WL): 5.34								
One ~~Casing~~ Volume(gal/L): ~.3l								
Start Purge (hrs): 1145								
End Purge (hrs): 1220								
Total Purge Time (min): 35								
Total Vol. Purged (gal/L): 6.25l								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4°	(3) 40-ml vial	✓
TCL SVOC		4°	(2) 1 L Glass amber glass	✓
TAL Metals	HNO3	4°	HDPE plastic container	✓
Cyanide	NaOH	4°	HDPE plastic container	✓
Pest/PCBs		4°	(2) 1 L Glass amber glass	✓
Explosives		4°	(2) 1 L Glass amber glass	✓
Organochlor Herb		4°	(2) 1 L Glass amber glass	—
Organophos Pest		4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL	4°	(3) 40-ml vial	—
APP 9 SVOC		4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs		4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

BEGIN TO DEVELOPE @ 1135 @ 500 ml/MIN FINNISH DEVELOPMENT @1145 WL @ 14.8 CLEAR BEGIN TO PURGE

Circle if Applicable:

MS/MSD | Duplicate ID No.: —

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q-44-0105
Sample Location: 17~~MP~~TW44
Sampled By: FWR
C.O.C. No.: 4336, 4357
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 1-17-05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~
Time: 1300	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	S/D
Method: Peristaltic	CLR	4.05	3.3	16.6	2	0.00	263	0.2

PURGE DATA:

Date: 1-17-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 3/4" PVC								
Total Well Depth (TD): 13.1								
Static Water Level (WL): 3.76								
One ~~Casing~~ Volume(gal/L): .3 l								
Start Purge (hrs): 1240								
End Purge (hrs): 1300								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 5.2 l								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	✓
TCL SVOC	4°	(2) 1 L Glass amber glass	✓
TAL Metals	HNO3 4°	HDPE plastic container	✓
Cyanide	NaOH 4°	HDPE plastic container	✓
Pest/PCBs	4°	(2) 1 L Glass amber glass	✓
Explosives	4°	(2) 1 L Glass amber glass	✓
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

BEGIN TO DEV @ 1220 @ 300 ml/min, FINISH DEV @ 1240 ~1.5-2 gal,
BEGIN PURGE @ 1240

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q-45-0105
Sample Location: 17MPTW45
Sampled By: FREDWRAMSER
C.O.C. No.: 444337
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	~~TDS~~ SAL
Date: 1-17-05								
Time: 0905								
Method: Peristaltic	CLR	7.62	0.52	17.00	2	0.00	-105	0.0

PURGE DATA:

Date: 1-17-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 32.5								
Static Water Level (WL): 4.3								
One Casing Volume(gal/L): ~3 l								
Start Purge (hrs): 0850								
End Purge (hrs): 0905								
Total Purge Time (min): 15								
Total Vol. Purged (gal/L): 5 l								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4°	(3) 40-ml vial	✓
TCL SVOC		4°	(2) 1 L Glass amber glass	
TAL Metals	HNO3	4°	HDPE plastic container	✓
Cyanide	NaOH	4°	HDPE plastic container	✓
Pest/PCBs		4°	(2) 1 L Glass amber glass	
Explosives		4°	(2) 1 L Glass amber glass	✓
Organochlor Herb		4°	(2) 1 L Glass amber glass	✓
Organophos Pest		4°	(2) 1 L Glass amber glass	✓
APP 9 VOC	HCL	4°	(3) 40-ml vial	✓
APP 9 SVOC		4°	(2) 1 L Glass amber glass	✓
APP 9 Pest/PCBs		4°	(2) 1 L Glass amber glass	✓

OBSERVATIONS / NOTES:

BEGIN TO DEV. @ 0830 @ 500 ml/min BECOME CLEAR DISCHARGE
BEGIN TO PURGE 0850 @ 250 ml/min

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q-46-0905
Sample Location: 17MP TW46
Sampled By: FREDWRAMSER
C.O.C. No.: 4355
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 1-16-05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~
Time: 1445	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	SAL
Method: Peristaltic	CLR	5.84	6.3	18.1	4	0.00	-0	0.3

PURGE DATA:

Date: 1-16-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 15'								
Static Water Level (WL): 2.90								
One Casing Volume(gal/L): .3l								
Start Purge (hrs): 1430								
End Purge (hrs): 1445								
Total Purge Time (min): 15								
Total Vol. Purged (gal/L): 3.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	✓
TCL SVOC	4°	(2) 1 L Glass amber glass	✓
TAL Metals	HNO3 4°	HDPE plastic container	✓
Cyanide	NaOH 4°	HDPE plastic container	✓
Pest/PCBs	4°	(2) 1 L Glass amber glass	✓
Explosives	4°	(2) 1 L Glass amber glass	✓
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

BEGIN DEVELOPMENT @ 1415 @ 500ml/min FINISH AT 1430
BEGIN TO PURGE

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-~~Q~~-47-0105
Sample Location: 17~~MW~~ TW 47
Sampled By: BC
C.O.C. No.: —
Type of Sample:
[x] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. ~~mS/cm~~ S/m	Temp. °C	Turbidity NTU	DO ~~%~~ mg/l	ORP mV	~~TDS~~ Sal
Date: 01/13/2005								
Time: 0915								
Method: Peristaltic	clear	6.5	1.2	19.1	6.7	0	-174	0.7

PURGE DATA:

Date: 01/13/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type 3/4" PVC								
Total Well Depth (TD): 16.45								
Static Water Level (WL): 4.3					BC			
One Casing Volume(gal/L): 1.4								
Start Purge (hrs): 0740								
End Purge (hrs): ~~0815~~ BC 0915								
Total Purge Time (min): 95								
Total Vol. Purged (gal/L): 14.2								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4°	(3) 40-ml vial	3
TCL SVOC		4°	(2) 1 L Glass amber glass	—
TAL Metals	HNO3	4°	HDPE plastic container	—
Cyanide	NaOH	4°	HDPE plastic container	—
Pest/PCBs		4°	(2) 1 L Glass amber glass	—
Explosives		4°	(2) 1 L Glass amber glass	—
Organochlor Herb		4°	(2) 1 L Glass amber glass	—
Organophos Pest		4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL	4°	(3) 40-ml vial	—
APP 9 SVOC		4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs		4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Brian Cole

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q-48-0105
Sample Location: 17~~MIP~~ TW48
Sampled By: BC
C.O.C. No.: —
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~
Date: 01/13/2005	Visual	Standard	~~mS/cm~~ S/m	°C	NTU	mg/l	mV	Sal
Time: 1055								
Method: Peristaltic	clear	7.4	1.2	19.2	5.88	0	-114	0.7

PURGE DATA:

Date: 01/13/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 16.3								
Static Water Level (WL): 2.95								
One Casing Volume(gal/L): ~.3L								
Start Purge (hrs): 1000								
End Purge (hrs): 1055								
Total Purge Time (min): 55								
Total Vol. Purged (gal/L): 8.25								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4°	(3) 40-ml vial	3
TCL SVOC		4°	(2) 1 L Glass amber glass	—
TAL Metals	HNO3	4°	HDPE plastic container	—
Cyanide	NaOH	4°	HDPE plastic container	—
Pest/PCBs		4°	(2) 1 L Glass amber glass	—
Explosives		4°	(2) 1 L Glass amber glass	—
Organochlor Herb		4°	(2) 1 L Glass amber glass	—
Organophos Pest		4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL	4°	(3) 40-ml vial	—
APP 9 SVOC		4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs		4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): B. Cole

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q-49-0105
Sample Location: 17 ~~MW~~ 49 TW 49
Sampled By: BC
C.O.C. No.: —
Type of Sample:
[x] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~
Date: 01/13/2005	Visual	Standard	~~mb/cm~~ S/m	°C	NTU	mg/l	mV	Sal
Time: 1230								
Method: Peristaltic	Clear	7.5	0.51	19.5	20.8	0	-112	0.3

PURGE DATA:

Date: 01/13/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 22.9								
Static Water Level (WL): 2.8								
One Casing Volume(gal/L): .3L								
Start Purge (hrs): 1135								
End Purge (hrs): 1230								
Total Purge Time (min): 55								
Total Vol. Purged (gal/L) 8.25								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	3
TCL SVOC	4°	(2) 1 L Glass amber glass	—
TAL Metals	HNO3 4°	HDPE plastic container	—
Cyanide	NaOH 4°	HDPE plastic container	—
Pest/PCBs	4°	(2) 1 L Glass amber glass	—
Explosives	4°	(2) 1 L Glass amber glass	—
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Ben Cole

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-~~Q~~ 50-0105
Sample Location: 17~~MW~~ TW 50
Sampled By: BC
C.O.C. No.: —
Type of Sample:
[x] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 01/13/2005	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~
Time: 1500	Visual	Standard	~~mS/cm~~ S/m	°C	NTU	mg/l	mV	Sal
Method: Peristaltic	Clear	8.9	72	19.0	14.1	0	-201	0.0

PURGE DATA:

Date: 01/13/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 29.19								
Static Water Level (WL): 2.45								
One Casing Volume(gal/L): ~.3l								
Start Purge (hrs): 1350								
End Purge (hrs): 1500								
Total Purge Time (min): 70								
Total Vol. Purged (gal/L): 10.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	3
TCL SVOC	4°	(2) 1 L Glass amber glass	—
TAL Metals	HNO3 4°	HDPE plastic container	—
Cyanide	NaOH 4°	HDPE plastic container	—
Pest/PCBs	4°	(2) 1 L Glass amber glass	—
Explosives	4°	(2) 1 L Glass amber glass	—
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q-51-0105
Sample Location: 17~~MIP~~ TW51
Sampled By: BC
C.O.C. No.: —
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 01/13/2005	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~
Time: 1645	Visual	Standard	~~mS/cm~~ S/m	°C	NTU	mg/l	mV	Sal
Method: Peristaltic	Cloudy	6.7	1.8	18.3	29	0.12	-144	1.0

PURGE DATA:

Date: 01/13/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 11.45								
Static Water Level (WL): 2.6								
One Casing Volume(gal/L): ~.3 l								
Start Purge (hrs): 1545								
End Purge (hrs): 1645								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): 9.0								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4°	(3) 40-ml vial	3
TCL SVOC		4°	(2) 1 L Glass amber glass	—
TAL Metals	HNO3	4°	HDPE plastic container	—
Cyanide	NaOH	4°	HDPE plastic container	—
Pest/PCBs		4°	(2) 1 L Glass amber glass	—
Explosives		4°	(2) 1 L Glass amber glass	—
Organochlor Herb		4°	(2) 1 L Glass amber glass	—
Organophos Pest		4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL	4°	(3) 40-ml vial	—
APP 9 SVOC		4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs		4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD

Duplicate ID No.: —

Signature(s): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: ~~16-Q-~~ 17-Q-52-0105
Sample Location: ~~16MW~~ ~~FLO~~ 16TW52
Sampled By: SL
C.O.C. No.: 4356
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	TDS
Date: 1-15-05								
Time: 1505								
Method: Peristaltic	CLR	5.66	25	17.8	10	0.00	71	—

PURGE DATA:

Date: 1-15-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 18								
Static Water Level (WL): 4.07								
One ~~Casing~~ Volume(gal/L): ~.3l								
Start Purge (hrs): 1440								
End Purge (hrs): 1505								
Total Purge Time (min): 25								
Total Vol. Purged (gal/L): 5l								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	✓
TCL SVOC	4°	(2) 1 L Glass amber glass	—
TAL Metals	HNO3 4°	HDPE plastic container	—
Cyanide	NaOH 4°	HDPE plastic container	—
Pest/PCBs	4°	(2) 1 L Glass amber glass	—
Explosives	4°	(2) 1 L Glass amber glass	—
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

BEGIN DEV. 1433 HRS @ ~500ml/min END DEV. @ 1440 ~ 1GAL
WATER CLEARED LOWER FLOW TO 200ml/min

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred Moore

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: ~~16Q-~~ 17-Q-53-0105
Sample Location: ~~16MIP~~ 17TW53
Sampled By: FRED W RAMSER
C.O.C. No.: 4356
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	~~TDS~~ SAL
Date: 1-15-05								
Time: 915								
Method: Peristaltic	CLR	5.24	0.51	16.5	26	0.00	46	0.3

PURGE DATA:

Date: 1-15-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 15								
Static Water Level (WL): 3.75								
One Casing Volume(gal/L):								
Start Purge (hrs): 0850								
End Purge (hrs): 0915								
Total Purge Time (min): 25								
Total Vol. Purged (gal/L): 5.5L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	✓
TCL SVOC	4°	(2) 1 L Glass amber glass	✓
TAL Metals	HNO3 4°	HDPE plastic container x3	✓
Cyanide	NaOH 4°	HDPE plastic container	✓
Pest/PCBs	4°	(2) 1 L Glass amber glass	✓
Explosives	4°	(2) 1 L Glass amber glass	✓
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

BEGIN DEVELOPMENT @ 0836 PUMPED ~1/2 GAL MUDDY/SANDY WATER BECAME CLEAR @ 845 BEGIN TO RECORD PURGE DATA @ 0855

Circle if Applicable:

MS/MSD ✓

Duplicate ID No.: ——

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: ~~18~~ 17-Q-54-0105
Sample Location: ~~16MW~~ 17TW54
Sampled By: FRED W RAMSER
C.O.C. No.: 4356
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 1-15-05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~
Time: 1340	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	SAL
Method: Peristaltic	CLR	5.12	0.12	18	15	0.00	96	0.1

PURGE DATA:

Date: 1-15-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 16								
Static Water Level (WL): 3.81								
One Casing Volume(gal/L): ~.3 l								
Start Purge (hrs): 1315								
End Purge (hrs): 1340								
Total Purge Time (min): 25								
Total Vol. Purged (gal/L): 5 l								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	✓
TCL SVOC	4°	(2) 1 L Glass amber glass	—
TAL Metals	HNO3 4°	HDPE plastic container	—
Cyanide	NaOH 4°	HDPE plastic container	—
Pest/PCBs	4°	(2) 1 L Glass amber glass	—
Explosives	4°	(2) 1 L Glass amber glass	—
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

STICK UP = 2.0 DEVELOPED WELL START 1300 PURGED ~1.5 GALS @ 400ml CLOUDY TO CLEAR BEGAN PURGE @ 1315 HRS

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	17-Q-54-0105-D

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q-55-0105
Sample Location: 17~~MP~~ TW 55
Sampled By: FRED WRAMSER
C.O.C. No.: 4336
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 1-17-05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1710	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	SAL
Method: Peristaltic	CLR	5.69	11	17.1	1	0.00	3	0.6

PURGE DATA:

Date: 1-17-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 14'								
Static Water Level (WL): 2.00								
One Casing Volume(gal/L): ~.3L								
Start Purge (hrs): 1645								
End Purge (hrs): 1710								
Total Purge Time (min): 25								
Total Vol. Purged (gal/L): 5.5L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	✓
TCL SVOC	4°	(2) 1 L Glass amber glass	—
TAL Metals	HNO3 4°	HDPE plastic container	—
Cyanide	NaOH 4°	HDPE plastic container	—
Pest/PCBs	4°	(2) 1 L Glass amber glass	—
Explosives	4°	(2) 1 L Glass amber glass	—
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

BEGIN DEV. 1635 FINISH DEV. @ 1645, BEGIN TO PURGE @ 220ml/h @ 500ml/min

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred M Ramser

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q- 56-0105
Sample Location: 17~~MIP~~ TW 56
Sampled By: BC
C.O.C. No.: 4356
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~
	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	Sal
Date: 1/15/2005								
Time: 1630								
Method: Peristaltic	Cloudy	7.1	0.63	17.48	330	0	10	0.0

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Date: 1/15/2005								
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 17.8								
Static Water Level (WL): 5.15								
One Casing Volume(gal/L): ~.3L								
Start Purge (hrs): 1510								
End Purge (hrs): 1630								
Total Purge Time (min): 80								
Total Vol. Purged (gal/L): 12								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4°	(3) 40-ml vial	6
TCL SVOC		4°	(2) 1 L Glass amber glass	—
TAL Metals	HNO3	4°	HDPE plastic container	—
Cyanide	NaOH	4°	HDPE plastic container	—
Pest/PCBs		4°	(2) 1 L Glass amber glass	—
Explosives		4°	(2) 1 L Glass amber glass	—
Organochlor Herb		4°	(2) 1 L Glass amber glass	—
Organophos Pest		4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL	4°	(3) 40-ml vial	—
APP 9 SVOC		4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs		4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	17-Q-56-0105-D

Signature(s): Brian Cole

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q- 57-0105
Sample Location: 17~~MIP~~ TW 57
Sampled By: BC
C.O.C. No.: 4355
Type of Sample:
[x] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 01/16/2005	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~
Time: 1535	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	Sal
Method: Peristaltic	Clear	6.7	5.6	16.94	7.42	0	-31	0.3

PURGE DATA:

Date: 01/16/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 13.55								
Static Water Level (WL): 4.0								
One Casing Volume(gal/L): 3L								
Start Purge (hrs): 1435								
End Purge (hrs): 1535								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L) 12								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	9
TCL SVOC	4°	(2) 1 L Glass amber glass	—
TAL Metals	HNO3 4°	HDPE plastic container	—
Cyanide	NaOH 4°	HDPE plastic container	—
Pest/PCBs	4°	(2) 1 L Glass amber glass	—
Explosives	4°	(2) 1 L Glass amber glass	—
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): Brian Cole

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q- 58-0105
Sample Location: ~~17MIP~~ TW 58
Sampled By: BC
C.O.C. No.: 4355
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 01/16/2005	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~
Time: 1655	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	Sal
Method: Peristaltic	Clear	6.4	1.8	17.68	90	0	-67	0.1

PURGE DATA:

Date: 01/16/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 14.5								
Static Water Level (WL): 3.6								
One Casing Volume(gal/L): ~.3L								
Start Purge (hrs): 1610								
End Purge (hrs): 1655								
Total Purge Time (min): 45								
Total Vol. Purged (gal/L): 9								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	3
TCL SVOC	4°	(2) 1 L Glass amber glass	—
TAL Metals	HNO3 4°	HDPE plastic container	—
Cyanide	NaOH 4°	HDPE plastic container	—
Pest/PCBs	4°	(2) 1 L Glass amber glass	—
Explosives	4°	(2) 1 L Glass amber glass	—
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): B. Cole

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: ~~16-Q~~ 17 59-0105
Sample Location: ~~16MIP~~ 17TW59
Sampled By: FREDW RAMSER
C.O.C. No.: 4356
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 1-15-05	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	~~TDS~~ Sal
Time: 1715								
Method: Peristaltic	CLR	5.11	24	16.3	160	5.96	112	0.0

PURGE DATA:

Date: 1-15-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 14.2								
Static Water Level (WL): 6.09								
One Casing Volume(gal/L): ~.3l								
Start Purge (hrs): 1645								
End Purge (hrs): 1700								
Total Purge Time (min): 15								
Total Vol. Purged (gal/L): 1.5l								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	✓
TCL SVOC	4°	(2) 1 L Glass amber glass	—
TAL Metals	HNO3 4°	HDPE plastic container	—
Cyanide	NaOH 4°	HDPE plastic container	—
Pest/PCBs	4°	(2) 1 L Glass amber glass	—
Explosives	4°	(2) 1 L Glass amber glass	—
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

BEGIN DEVELOPMENT 1616 @ ~600 ml/min WELL PUMPED DRY @ 1621
1645 START PUMP @ ~100 ml/min TO RECORD PARAMETER

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q-60-0105
Sample Location: 17~~MW~~ TW60
Sampled By: PWR
C.O.C. No.: 4336
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 1-17-05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~
Time: 1610	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	SAL
Method: Peristaltic	CLEAR	4.62	3.1	16.4	35	0.00	116	0.2

PURGE DATA:

Date: 1-17-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 12								
Static Water Level (WL): 4.20								
One ~~Casing~~ Volume(gal/L): .3 l								
Start Purge (hrs): 1550								
End Purge (hrs): 1610								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 4.4 l								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	✓
TCL SVOC	4°	(2) 1 L Glass amber glass	—
TAL Metals	HNO3 4°	HDPE plastic container	—
Cyanide	NaOH 4°	HDPE plastic container	—
Pest/PCBs	4°	(2) 1 L Glass amber glass	—
Explosives	4°	(2) 1 L Glass amber glass	—
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

BEGIN TO DEVELOP 1535 @ 500ml/min, BI
FINISH DEV. @ 1550

Circle if Applicable:

MS/MSD — Duplicate ID No.: —

Signature(s): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q-G1-0105
Sample Location: ~~17MIP~~ TW61
Sampled By: FWR
C.O.C. No.: 4336
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Date: 1-17-05	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	SAL
Time: 1515								
Method: Peristaltic	CLEAR	4.24	3.4	16.3	7	0.00	210	0.2

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Date: 1-17-05								
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 3/4" PVC								
Total Well Depth (TD): 10'								
Static Water Level (WL): 3.96								
One ~~Gaeing~~ Volume(gal/L): 3 l								
Start Purge (hrs): 1455								
End Purge (hrs): 1515								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 4.4 l								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	✓
TCL SVOC	4°	(2) 1 L Glass amber glass	—
TAL Metals	HNO3 4°	HDPE plastic container	—
Cyanide	NaOH 4°	HDPE plastic container	—
Pest/PCBs	4°	(2) 1 L Glass amber glass	—
Explosives	4°	(2) 1 L Glass amber glass	—
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

BEGIN TO DEV: 1445 COMPLETED DEVELOPMENT @ 1455
@ 500ml/min

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred W Rowe

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q-62-0105
Sample Location: 17MIP TWG2
Sampled By: FRED W RAMSER
C.O.C. No.: 4355
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 1-16-05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1400	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	SAL %
Method: Peristaltic	GREY	3.99	7.4	17.5	265	0.00	210	0.4

PURGE DATA:

Date: 1-16-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 8.5								
Static Water Level (WL): 2.50								
One ~~Casing~~ Volume(gal/L): .3 l								
Start Purge (hrs): 1340								
End Purge (hrs): 1400								
Total Purge Time (min): 20								
Total Vol. Purged (gal/L): 4 l								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	✓
TCL SVOC	4°	(2) 1 L Glass amber glass	—
TAL Metals	HNO3 4°	HDPE plastic container	—
Cyanide	NaOH 4°	HDPE plastic container	—
Pest/PCBs	4°	(2) 1 L Glass amber glass	—
Explosives	4°	(2) 1 L Glass amber glass	—
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

BEGIN TO DEVELOP @ 1330, FINISH @ 1340 CLEAR DISCHARGE

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-Q-63-0105
Sample Location: 17MP TW63
Sampled By: FRED W RAMSER
C.O.C. No.: 4355
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	~~TDS~~ SAL
Date: 1-16-05								
Time: 1550								
Method: Peristaltic	CLR	4.75	13	17.2	8	0.00	134	0.7

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Date: 1-16-05								
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 9.5								
Static Water Level (WL): 3.61								
One Casing Volume(gal/L): .3 L								
Start Purge (hrs): 1535								
End Purge (hrs): 1550								
Total Purge Time (min): 15								
Total Vol. Purged (gal/L): 3.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	✓
TCL SVOC	4°	(2) 1 L Glass amber glass	—
TAL Metals	HNO3 4°	HDPE plastic container	—
Cyanide	NaOH 4°	HDPE plastic container	—
Pest/PCBs	4°	(2) 1 L Glass amber glass	—
Explosives	4°	(2) 1 L Glass amber glass	—
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

BEGIN DEVELOPMENT @ 1525 @ 500ml/min FINNISH DEVELOPMENT @ 1535 CLEAR DISCHARGE BEGIN PURGE

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Well Type: Temporary well
[] QA Sample Type:

Sample ID No.: 17-~~Q~~-64-0105
Sample Location: 17~~MP~~ TW64
Sampled By: FRED WRAMSER
C.O.C. No.: 4355
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 1-16-05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~
Time: 1700	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	SAL
Method: Peristaltic	CLR	4.36	11	15.2	50	1.62	138	0.6

PURGE DATA:

Date: 1-16-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 3/4" PVC								
Total Well Depth (TD): 8.5								
Static Water Level (WL): 2.25								
One Casing Volume(gal/L): .3 l								
Start Purge (hrs): SEE BELOW								
End Purge (hrs): 1700								
Total Purge Time (min): ~15 min								
Total Vol. Purged (gal/L): ~3 l								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4°	(3) 40-ml vial	✓
TCL SVOC		4°	(2) 1 L Glass amber glass	—
TAL Metals	HNO3	4°	HDPE plastic container	—
Cyanide	NaOH	4°	HDPE plastic container	—
Pest/PCBs		4°	(2) 1 L Glass amber glass	—
Explosives		4°	(2) 1 L Glass amber glass	—
Organochlor Herb		4°	(2) 1 L Glass amber glass	—
Organophos Pest		4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL	4°	(3) 40-ml vial	—
APP 9 SVOC		4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs		4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

BEGIN TO DEVELOPE @ 500 ml/min PUMPED DRY 1628 HRS ALLOW TO RECOVERY 1640 WELL RECOVERED TO 9.5' BEGIN TO PURGE @ 100 ml/min. 1650 WELL WENT DRY (BEGIN RECORDED PARAMETER THEN ALLOWED WELL TO RECOVERY TO COLLECT SAMPLE. **NO PURGE DATA RECORDED. **** (1.40 BTOC)

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred Wramser

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 16-G-015-0305
Sample Location: 16MW015
Sampled By: GS
C.O.C. No.: 4313, 4312
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 10Mar 05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1520	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic	Clear	4.33	0.603	17.51	1.20	2.32	369	—

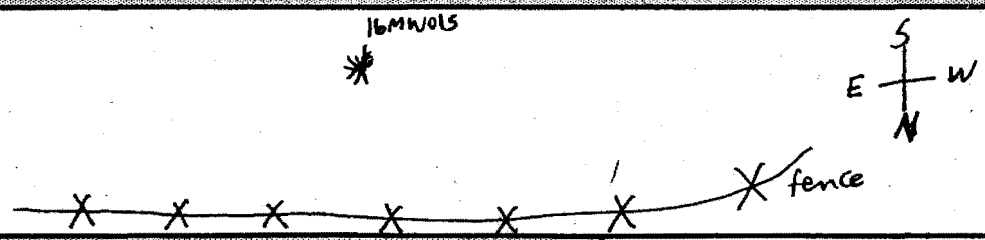
PURGE DATA:

Date: 10Mar 05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 17.45								
Static Water Level (WL): 4.3								
One ~~Casing~~ Volume(gal(L)): 6.21								
Start Purge (hrs): 1350								
End Purge (hrs): 1515								
Total Purge Time (min): 85								
Total Vol. Purged (gal(L)): 12.95								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4°	(3) 40-ml vial	3
TCL SVOC		4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3	4°	HDPE plastic container	1
Cyanide	NaOH	4°	HDPE plastic container	1
Pest/PCBs		4°	(2) 1 L Glass amber glass	2
Explosives		4°	(2) 1 L Glass amber glass	2
~~Organochlor Herb~~		~~4°~~	~~(2) 1 L Glass amber glass~~	
Organophos Pest		4°	~~(2) 1 L Glass amber glass~~	
APP 9 VOC	~~HCL~~	~~4°~~	(3) 40-ml vial	
APP 9 SVOC		4°	(2) 1 L Glass amber glass	
APP 9 Pest/PCBs		4°	(2) 1 L Glass amber glass	

OBSERVATIONS / NOTES:



Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 16-G- 025-0205
Sample Location: 16MW-025
Sampled By: BC
C.O.C. No.: 4311 / 4348
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 02/25/2005	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1620	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	BC
Method: Peristaltic	sl. yellow	6.98	25.7	18.59	23	0.79	-370	

PURGE DATA:

Date: 02/25/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material							BC	
Type: 2-inch PVC								
Total Well Depth (TD): 18.55 ~~20.9~~ BC								
Static Water Level (WL): 4.19 ~~3.74~~ BC								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 1445								
End Purge (hrs): 1620								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L): 12.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	3
TCL SVOC	4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3 4°	HDPE plastic container	1
Cyanide	NaOH 4°	HDPE plastic container	1
Pest/PCBs	4°	(2) 1 L Glass amber glass	2
Explosives	4°	(2) 1 L Glass amber glass	2
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): B Cole

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 16-G-035-0205
Sample Location: 16MW035
Sampled By: BC
C.O.C. No.: 4390/4360
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 02/23/2005	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1610	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	BC
Method: Peristaltic	Cloudy	7.17	22.9	19.89	68.1	0.85	-399	

PURGE DATA:

Date: 02/23/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2-inch PVC							BC	
Total Well Depth (TD): 16.6								
Static Water Level (WL): 2.91								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 1445								
End Purge (hrs): 1610								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L): 12.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	3
TCL SVOC	4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3 4°	HDPE plastic container	1
Cyanide	NaOH 4°	HDPE plastic container	1
Pest/PCBs	4°	(2) 1 L Glass amber glass	2
Explosives	4°	(2) 1 L Glass amber glass	2
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Metals collected last to allow Turb. to decrease

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 16-G-045-0205
Sample Location: 16MW045
Sampled By: SCS
C.O.C. No.: 4311 / 4348
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 25 Feb 05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1605	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic	murky	6.74	31.2	16.54	33.6	0.00	-363	Sulphur odor

PURGE DATA:

Date: 25 Feb 05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): NA								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 16.45					SCS			
Static Water Level (WL): 3.15								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 1440								
End Purge (hrs): 1605								
Total Purge Time (min): 80								
Total Vol. Purged (gal/L): 12.0								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	3
TCL SVOC	4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3 4°	HDPE plastic container	1
Cyanide	NaOH 4°	HDPE plastic container	1
Pest/PCBs	4°	(2) 1 L Glass amber glass	2
Explosives	4°	(2) 1 L Glass amber glass	2
~~Organochlor Herb~~	~~4°~~	~~(2) 1 L Glass amber glass~~	
Organophos Pest	4°	(2) 1 L Glass amber glass	
APP 9 VOC	HCL 4°	(3) 40-ml vial	
APP 9 SVOC	4°	(2) 1 L Glass amber glass	
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 16-G-055-0205
Sample Location: 16MW055
Sampled By: SCS
C.O.C. No.: 4340 / 4360
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 23 Feb 05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1630	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic	Cloudy	6.93	33.5	18.56	2.32	0.47	-386	

PURGE DATA:

Date: 23 Feb 05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): NA								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 16.4'								
Static Water Level (WL): 3.18'								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 1450								
End Purge (hrs): 1630								
Total Purge Time (min): 90								
Total Vol. Purged (gal/L): 13.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4°	(3) 40-ml vial	3
TCL SVOC		4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3	4°	HDPE plastic container	1
Cyanide	NaOH	4°	HDPE plastic container	1
Pest/PCBs		4°	(2) 1 L Glass amber glass	2
Explosives		4°	(2) 1 L Glass amber glass	2
~~Organochlor Herb~~		~~4°~~	~~(2) 1 L Glass amber glass~~	
~~Organophos Pest~~		~~4°~~	~~(2) 1 L Glass amber glass~~	
~~APP 9 VOC~~	~~HCL~~	~~4°~~	~~(3) 40-ml vial~~	
~~APP 9 SVOC~~		~~4°~~	~~(2) 1 L Glass amber glass~~	
~~APP 9 Pest/PCBs~~		~~4°~~	~~(2) 1 L Glass amber glass~~	

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G-015-0205
Sample Location: 17MW015
Sampled By: SCS
C.O.C. No.: 4311/4348
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 24 Feb 05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1630	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic	Clear	5.00	0.270	16.57	2.30	0.22	65	—

PURGE DATA:

Date: 24 Feb 05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): NA								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 18.0								
Static Water Level (WL): 7.4								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 1505								
End Purge (hrs): 1630								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L): 12.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	3
TCL SVOC	4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3 4°	HDPE plastic container	1
Cyanide	NaOH 4°	HDPE plastic container	1
Pest/PCBs	4°	(2) 1 L Glass amber glass	2
Explosives	4°	(2) 1 L Glass amber glass	2
~~Organochlor Herb~~	4°	(2) 1 L Glass amber glass	2
Organophos Pest	4°	(2) 1 L Glass amber glass	
APP 9 VOC	HCL 4°	(3) 40-ml vial	
APP 9 SVOC	4°	(2) 1 L Glass amber glass	
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G-~~BFS~~-0205
Sample Location: 17 mw ~~BFS~~-02S
Sampled By: BC
C.O.C. No.: 4311 (SW) 4311 / 4335
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 02/27/05	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 1120	Visual	Standard	mS/cm	°C	NTU	mg/l	% BC	mv
Method: peri. pump	Clear	4.05	3.40	17.25	3.4	1.94	/	353

PURGE DATA:

Date: 02/27/05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: peri. pump								BC
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 18.3								
Static Water Level (WL): 3.74								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 0955								
End Purge (hrs): 1120								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L): 12.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	3 X 40 ML VIAL	3
TCL SVOC		4 C	2 X 1L AMBER	2
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	2
TAL METALS	HNO3	4 C	1 L POLY	1
CYANIDE	NAOH	4 C	250 ML POLY	1
EXPLOSIVES		4 C	2 X 1L AMBER	2
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	—
APP. IX SVOCS		4 C	2 X 1L AMBER	—
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	—
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	—
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	—

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): B Cole

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G-03~~1~~5-0205
Sample Location: 17MW03S
Sampled By: BC
C.O.C. No.: 4339/4338
Type of Sample:
[x] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 02/14/2005	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~
Time: 1645	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	Sal
Method: Peristaltic	clear	5.09	0.201	18.34	5.4	1.48	189	0.01

PURGE DATA:

Date: 02/14/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 18.3								
Static Water Level (WL): 5.4								
One ~~Casing~~ Volume (gal/L) BC 6.2 L								
Start Purge (hrs): 1520								
End Purge (hrs): 1645								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L) 12.75								

BC

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	6
TCL SVOC	4°	(2) 1 L Glass amber glass	4
TAL Metals	HNO3 4°	HDPE plastic container	2
Cyanide	NaOH 4°	HDPE plastic container	2
Pest/PCBs	4°	(2) 1 L Glass amber glass	~~2~~ BC 4
Explosives	4°	(2) 1 L Glass amber glass	~~2~~ BC 4
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: 17-G-03~~1~~5-0205-D

Signature(s): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G-045-0205
Sample Location: 17MW045
Sampled By: SS
C.O.C. No.: 4311/4335
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 27 Feb 05	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 1125	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method: Peristaltic	CLR	5.04	2.82	16.69	7.22	0.00	–	90

PURGE DATA:

Date: 27 Feb 05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: peristaltic								
Monitor Reading (ppm): NA								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 18.3								
Static Water Level (WL): 3.5								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): ~~0950~~ SS 0950								
End Purge (hrs): 1120								
Total Purge Time (min): 90								
Total Vol. Purged (gal/L): 14.4								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	3 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	✓
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	✓
TAL METALS	HNO3	4 C	1 L POLY	✓
CYANIDE	NAOH	4 C	250 ML POLY	✓
EXPLOSIVES		4 C	2 X 1L AMBER	✓
~~APP. IX VOCS~~	~~HCL~~	~~4 C~~	~~2 X 40 ML VIAL~~	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [illegible]

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G- 055-0205
Sample Location: 17MW - 055
Sampled By: BC
C.O.C. No.: 4311 / 4348
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 02/25/2005	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1030	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic	Clear	5.45	0.849	16.78	16	0.85	61	—

PURGE DATA:

Date: 02/25/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material							BC	
Type: 2-inch PVC								
Total Well Depth (TD): 20.9								
Static Water Level (WL): 3.77								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 0905								
End Purge (hrs): 1030								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L) 12.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	6
TCL SVOC	4°	(2) 1 L Glass amber glass	4
TAL Metals	HNO3 4°	HDPE plastic container	2
Cyanide	NaOH 4°	HDPE plastic container	2
Pest/PCBs	4°	(2) 1 L Glass amber glass	4
Explosives	4°	(2) 1 L Glass amber glass	4
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Circle If Applicable:

MS/MSD —

Duplicate ID No.: 17-G-055-0205-D

Signature(s): Ben Cole

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G-06D-0205
Sample Location: 17MW-06D
Sampled By: BC
C.O.C. No.: 4311 / 4348
Type of Sample:
[x] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 02/24/2005	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1030	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic	clear	6.89	0.651	19.59	0.49	4.71	57	

PURGE DATA:

Date: 02/24/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): ~~19.85~~ FMK 25.6								
Static Water Level (WL): 3.82								
One ~~Casing~~ Volume(gal/L): 3.1								
Start Purge (hrs): 0930								
End Purge (hrs): 1030								
Total Purge Time (min): 60								
Total Vol. Purged (gal): 9.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	3
TCL SVOC	4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3 4°	HDPE plastic container	1
Cyanide	NaOH 4°	HDPE plastic container	1
Pest/PCBs	4°	(2) 1 L Glass amber glass	2
Explosives	4°	(2) 1 L Glass amber glass	2
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Ben Cole

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G-075-0205
Sample Location: 17MW075
Sampled By: BC
C.O.C. No.: 4311/4335
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Date: 02/28/2005	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Time: 1140								
Method: peri pump	Clear	5.40	0.868	17.98	11	1.24	BC	34

PURGE DATA:

Date: 02/28/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: Peri Pump								
Monitor Reading (ppm): —								
Well Casing Diameter & Material							BC	
Type: 2" - PVC								
Total Well Depth (TD): 21.35								
Static Water Level (WL): 3.41								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 1015								
End Purge (hrs): 1140								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L) 12.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	3 X 40 ML VIAL	9
TCL SVOC		4 C	2 X 1L AMBER	6
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	6
TAL METALS	HNO3	4 C	1 L POLY	3
CYANIDE	NAOH	4 C	250 ML POLY	3
EXPLOSIVES		4 C	2 X 1L AMBER	6
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	—
APP. IX SVOCS		4 C	2 X 1L AMBER	—
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	—
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	—
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	—

OBSERVATIONS / NOTES:

*

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): B. Cole

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G-115-0205
Sample Location: 17MW115
Sampled By: SCS
C.O.C. No.: 4359 / 4360
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 23 Feb 05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1120	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic	clear	4.98	0.229	20.92	4.28	3.86	213	

PURGE DATA:

Date: 23 Feb 05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): NA								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 22.25'								
Static Water Level (WL): 5.6'								
One ~~Casing~~ Volume(gal/L): ~~12.40~~ PAC 6.2								
Start Purge (hrs): 0945								
End Purge (hrs): 1120								
Total Purge Time (min): 95								
Total Vol. Purged (gal/L): 14.25								

SCS

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
~~TCL VOC~~	~~HCL 4°~~	~~(3) 40-ml vial~~	
~~TCL SVOC~~	~~4°~~	~~(2) 1 L Glass amber glass~~	
TAL Metals	HNO3 4°	HDPE plastic container	1
Cyanide	NaOH 4°	HDPE plastic container	1
~~Pest/PCBs~~	~~4°~~	~~(2) 1 L Glass amber glass~~	
Explosives	4°	(2) 1 L Glass amber glass	2
Organochlor Herb	4°	(2) 1 L Glass amber glass	2
Organophos Pest	4°	(2) 1 L Glass amber glass	2
APP 9 VOC	HCL 4°	(3) 40-ml vial	3
APP 9 SVOC	4°	(2) 1 L Glass amber glass	2
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	2

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G-125-0205
Sample Location: 17MW125
Sampled By: SLS
C.O.C. No.: 4311/4348
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 25 Feb 05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1035	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic	Clear	4.92	0.181	15.93	2.9	0.20	199	

PURGE DATA:

Date: 25 Feb 05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): NA								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 16.7								
Static Water Level (WL): 3.3								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 0900								
End Purge (hrs): 1030								
Total Purge Time (min): 90								
Total Vol. Purged (gal/L): 13.5								

SLS

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	✓
TCL SVOC	4°	(2) 1 L Glass amber glass	✓
TAL Metals	HNO3 4°	HDPE plastic container	✓
Cyanide	NaOH 4°	HDPE plastic container	✓
Pest/PCBs	4°	(2) 1 L Glass amber glass	✓
Explosives	4°	(2) 1 L Glass amber glass	✓
~~Organochlor Herb~~	~~4°~~	~~(2) 1 L Glass amber glass~~	
Organophos Pest	4°	(2) 1 L Glass amber glass	
APP 9 VOC	HCL 4°	(3) 40-ml vial	
APP 9 SVOC	4°	(2) 1 L Glass amber glass	
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):
—	17-G-125-0205D	SLS

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G-12D-0205
Sample Location: 17MW 12 D
Sampled By: SS
C.O.C. No.: 4311/4334
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	TDS
Date: 28 Feb 05								
Time: 1200								
Method: Peristaltic	Clear	6.68	0.477	18.67	10.01	0.00	-102	—

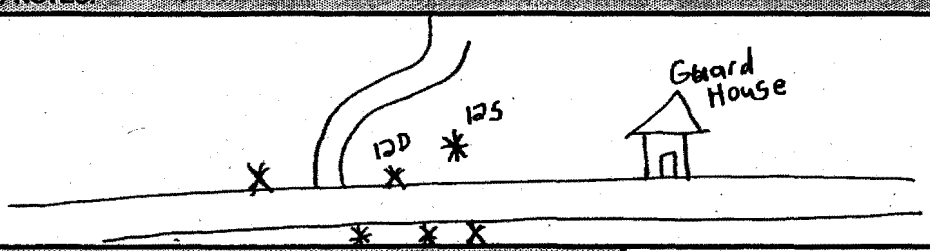
PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Date: 28 Feb 05								
Method: Peristaltic								
Monitor Reading (ppm): NA								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 33.65								
Static Water Level (WL): 3.65								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 1025								
End Purge (hrs): 1155								
Total Purge Time (min): 90								
Total Vol. Purged (gal/L): 13.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
~~TCL VOC~~	~~HCL 4°~~	~~(3) 40-ml vial~~	
~~TCL SVOC~~	~~4°~~	~~(2) 1 L Glass amber glass~~	
TAL Metals	HNO3 4°	HDPE plastic container	1
Cyanide	NaOH 4°	HDPE plastic container	1
~~Pest/PCBs~~	~~4°~~	~~(2) 1 L Glass amber glass~~	
Explosives	4°	(2) 1 L Glass amber glass	2
Organochlor Herb	4°	(2) 1 L Glass amber glass	4
Organophos Pest	4°	(2) 1 L Glass amber glass	4
APP 9 VOC	HCL 4°	(3) 40-ml vial	3
APP 9 SVOC	4°	(2) 1 L Glass amber glass	2
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	2

OBSERVATIONS / NOTES:



Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):
—	17-G-12D-0205D	

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G-135-0205
Sample Location: 17MW135
Sampled By: BC
C.O.C. No.: 4311 / 4335
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Date: 2/27/2005								
Time: 1515	Visual	Standard	mS/cm	°C	NTU	mg/l	~~%~~ BC	mv
Method: peri. pump	clear	4.77	0.105	16.16	2.6	1.58		303

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Date: 2/27/2005								
Method: peri. pump								
Monitor Reading (ppm): —								
Well Casing Diameter & Material							BC	
Type: 2" - PVC								
Total Well Depth (TD): 16.51								
Static Water Level (WL): 3.41								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 1350								
End Purge (hrs): 1515								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L): 12.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	3 X 40 ML VIAL	3
TCL SVOC		4 C	2 X 1L AMBER	2
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	2
TAL METALS	HNO3	4 C	1 L POLY	1
CYANIDE	NAOH	4 C	250 ML POLY	1
EXPLOSIVES		4 C	2 X 1L AMBER	2
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	—
APP. IX SVOCS		4 C	2 X 1L AMBER	—
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	—
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	—
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	—

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [signature]

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G-145-0305
Sample Location: 17MW 145
Sampled By: BC
C.O.C. No.: 4358 4332
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 03/09/2005	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1330	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic	Clear	3.84	11.6	16.38	2.9	1.74	263	BC

PURGE DATA:

Date: 03/09/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								BC
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 17.56								
Static Water Level (WL): 3.07								
One Casing Volume(gal/L): 6.2								
Start Purge (hrs): 1205								
End Purge (hrs): 1330								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L) 12.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	3
TCL SVOC	4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3 4°	HDPE plastic container	1
Cyanide	NaOH 4°	HDPE plastic container	1
Pest/PCBs	4°	(2) 1 L Glass amber glass	2
Explosives	4°	(2) 1 L Glass amber glass	2
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):
—	—	[signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G- 14D-0305
Sample Location: 17MW 14D
Sampled By: BC
C.O.C. No.: 4358 4330
Type of Sample:
[x] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 03/09/2005	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1110	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	BC
Method: Peristaltic	Clear	6.25	9.7	16.57	18	1.72	-93	

PURGE DATA:

Date: 03/09/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								BC
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 28.14								
Static Water Level (WL): 5.08								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 0945								
End Purge (hrs): 1110								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L): 12.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	3
TCL SVOC	4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3 4°	HDPE plastic container	1
Cyanide	NaOH 4°	HDPE plastic container	1
Pest/PCBs	4°	(2) 1 L Glass amber glass	2
Explosives	4°	(2) 1 L Glass amber glass	2
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Ben Cole

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G-155-0305
Sample Location: 17MW 155
Sampled By: SCS
C.O.C. No.: 4358 4332
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 9 Mar 05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1325	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic	Clear	5.09	18.1	15.52	12.8	0.00	111	—

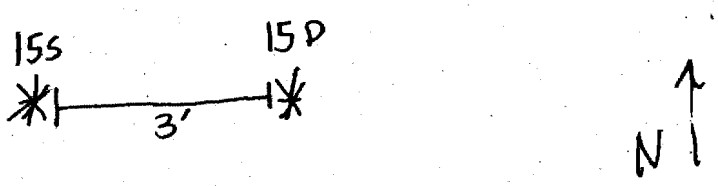
PURGE DATA:

Date: 9 Mar 05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 22.1								
Static Water Level (WL): 3.15								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 1155								
End Purge (hrs): 1320								
Total Purge Time (min): ~~90~~ 85								
Total Vol. Purged (gal/L): 12.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	
TCL SVOC	4°	(2) 1 L Glass amber glass	
TAL Metals	HNO3 4°	HDPE plastic container	
Cyanide	NaOH 4°	HDPE plastic container	
Pest/PCBs	4°	(2) 1 L Glass amber glass	
Explosives	4°	(2) 1 L Glass amber glass	
~~Organochlor Herb~~	~~4°~~	~~(2) 1 L Glass amber glass~~	
Organophos Pest	4°	(2) 1 L Glass amber glass	
APP 9 VOC	HCL 4°	(3) 40-ml vial	
APP 9 SVOC	4°	(2) 1 L Glass amber glass	
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	

OBSERVATIONS / NOTES:



Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G-15D-0305
Sample Location: 17MW15D
Sampled By: S/S
C.O.C. No.: 4358 4332
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Date: 9Mar05	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Time: 1105								
Method: Peristaltic	Clear	7.13	0.747	16.33	6.47	0.00	-67	"EXR 3" or Horiba

PURGE DATA:

Date: 9Mar05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 41.7								
Static Water Level (WL): 3.00								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 0930								
End Purge (hrs): ~~1105~~ 1100								
Total Purge Time (min): 95								
Total Vol. Purged (gal/L): 15.2								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	3
TCL SVOC	4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3 4°	HDPE plastic container	1
Cyanide	NaOH 4°	HDPE plastic container	1
Pest/PCBs	4°	(2) 1 L Glass amber glass	2
Explosives	4°	(2) 1 L Glass amber glass	2
~~Organochlor Herb~~	~~4°~~	~~(2) 1 L Glass amber glass~~	
Organophos Pest	4°	(2) 1 L Glass amber glass	
APP 9 VOC	HCL 4°	(3) 40-ml vial	
APP 9 SVOC	4°	(2) 1 L Glass amber glass	
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G-165-0305
Sample Location: 17MW165
Sampled By: 365
C.O.C. No.: 4358 4332
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8 Mar 05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1035	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic	Clear	3.79	2.49	17.26	5.53	0.00	265	

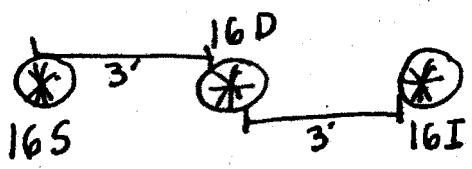
PURGE DATA:

Date: 0910 8 Mar 05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 17.5								
Static Water Level (WL): 2.6								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 0910								
End Purge (hrs): 1030								
Total Purge Time (min): 80								
Total Vol. Purged (gal/L): 12.0 - FB								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	3
TCL SVOC	4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3 4°	HDPE plastic container	1
Cyanide	NaOH 4°	HDPE plastic container	1
Pest/PCBs	4°	(2) 1 L Glass amber glass	2
Explosives	4°	(2) 1 L Glass amber glass	2
~~Organochlor Herb~~	~~4°~~	~~(2) 1 L Glass amber glass~~	
Organophos Pest	4°	(2) 1 L Glass amber glass	
APP 9 VOC	HCL 4°	(3) 40-ml vial	
APP 9 SVOC	4°	(2) 1 L Glass amber glass	
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	

OBSERVATIONS / NOTES:



Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G- 16I-0305
Sample Location: 17MW 16I
Sampled By: BC
C.O.C. No.: 4358 4332
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 03/08/2005	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1540	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	BC
Method: Peristaltic	Clear	6.38	14.3	18.90	11	1.28	-107	

PURGE DATA:

Date: 3/8/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm):								BC
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 27.65								
Static Water Level (WL): 3.02								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 1415								
End Purge (hrs): 1540								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L) 12.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	3
TCL SVOC	4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3 4°	HDPE plastic container	1
Cyanide	NaOH 4°	HDPE plastic container	1
Pest/PCBs	4°	(2) 1 L Glass amber glass	2
Explosives	4°	(2) 1 L Glass amber glass	2
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

← N

Wells Cluster
☒ S
☒ D
☒ I

Circle if Applicable:

MS/MSD —
Duplicate ID No.: —

Signature(s): B. Cole

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G-16D-0305
Sample Location: 17MW 16D
Sampled By: SCS
C.O.C. No.: 4358 4332
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8 Mar 05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1535	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic	Clear	7.07	1.09	18.57	5.98	0.00	-99	

PURGE DATA:

Date: 8 Mar 05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 45.15								
Static Water Level (WL): 3.3								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 1410								
End Purge (hrs): 1530								
Total Purge Time (min): 80								
Total Vol. Purged (gal/L): 12.0+ FC								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	3
TCL SVOC	4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3 4°	HDPE plastic container	1
Cyanide	NaOH 4°	HDPE plastic container	1
Pest/PCBs	4°	(2) 1 L Glass amber glass	2
Explosives	4°	(2) 1 L Glass amber glass	2
~~Organochlor Herb~~	~~4°~~	~~(2) 1 L Glass amber glass~~	
Organophos Pest	4°	(2) 1 L Glass amber glass	
APP 9 VOC	HCL 4°	(3) 40-ml vial	
APP 9 SVOC	4°	(2) 1 L Glass amber glass	
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	

SCS

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G-175-0205
Sample Location: 17MW175
Sampled By: BC
C.O.C. No.: 4311/4335
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 02/26/2005	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1050	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic	Clear	3.96	15.9	17.03	7.3	0.86	236	BC

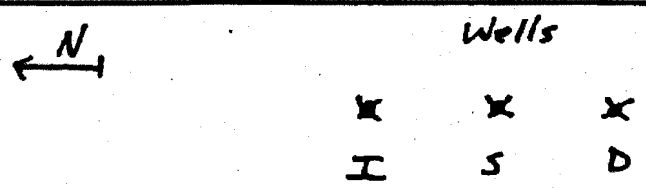
PURGE DATA:

Date: 02/26/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2-inch PVC						BC		
Total Well Depth (TD): 16.52								
Static Water Level (WL): 2.7								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 0925								
End Purge (hrs): 1050								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L): 12.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	3
TCL SVOC	4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3 4°	HDPE plastic container	1
Cyanide	NaOH 4°	HDPE plastic container	1
Pest/PCBs	4°	(2) 1 L Glass amber glass	2
Explosives	4°	(2) 1 L Glass amber glass	2
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:



Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Ben Cole

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G-17I-0205
Sample Location: 17MW 17I
Sampled By: BC
C.O.C. No.: 4311/4335
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 02/26/2005	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1540	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	BC
Method: Peristaltic	Clear	6.23	1.15	18.39	13	1.39	-143	

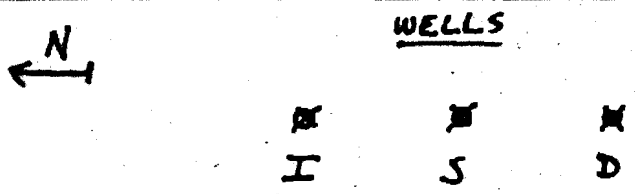
PURGE DATA:

Date: 02/26/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								BC
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 19.99								
Static Water Level (WL): 3.02								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 1415								
End Purge (hrs): 1540								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L): 12.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	3
TCL SVOC	4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3 4°	HDPE plastic container	1
Cyanide	NaOH 4°	HDPE plastic container	1
Pest/PCBs	4°	(2) 1 L Glass amber glass	2
Explosives	4°	(2) 1 L Glass amber glass	2
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:



Circle if Applicable:

MS/MSD —

Duplicate ID No.:

Signature(s): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G- 17D-0305
Sample Location: 17MW17D
Sampled By: BC
C.O.C. No.: 4358 4332
Type of Sample:
[x] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 03/08/2005	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1030	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	BC
Method: Peristaltic	clear	7.15	0.771	17.23	9.62	1.28	-132	

PURGE DATA:

Date: 03/08/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 40.03								
Static Water Level (WL): 2.91								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 0905								
End Purge (hrs): 1030								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L): 12.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4°	(3) 40-ml vial	3
TCL SVOC		4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3	4°	HDPE plastic container	1
Cyanide	NaOH	4°	HDPE plastic container	1
Pest/PCBs		4°	(2) 1 L Glass amber glass	2
Explosives		4°	(2) 1 L Glass amber glass	2
Organochlor Herb		4°	(2) 1 L Glass amber glass	—
Organophos Pest		4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL	4°	(3) 40-ml vial	—
APP 9 SVOC		4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs		4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G-185-0205
Sample Location: 17MW185
Sampled By: SJ
C.O.C. No.: 4311/4334
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 26 Feb 05	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	TDS
Time: 1035								
Method: Peristaltic	Clear	4.24	22.1	15.43	4.26	0.00	189	

PURGE DATA:

Date: 26 Feb 05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): NA								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 16.25								
Static Water Level (WL): 2.3								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 0900								
End Purge (hrs): 1030								
Total Purge Time (min): 90								
Total Vol. Purged (gal/L): 14.4								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
~~TCL VOC~~	HCL 4°	(3) 40-ml vial	
~~TCL SVOC~~	4°	(2) 1 L Glass amber glass	
TAL Metals	HNO3 4°	HDPE plastic container	1
Cyanide	NaOH 4°	HDPE plastic container	1
~~Pest/PCBs~~	4°	(2) 1 L Glass amber glass	
Explosives	4°	(2) 1 L Glass amber glass	2
Organochlor Herb	4°	(2) 1 L Glass amber glass	2
Organophos Pest	4°	(2) 1 L Glass amber glass	2
APP 9 VOC	HCL 4°	(3) 40-ml vial	3
APP 9 SVOC	4°	(2) 1 L Glass amber glass	2
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	2

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD — Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G-18D-0205
Sample Location: 17MW18D
Sampled By: SCS
C.O.C. No.: 4311/4335
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	TDS
Date: 26 Feb 05								
Time: 1555								
Method: Peristaltic	~~6.50~~ Clear	6.50	11.7	17.78	3.01	0.00	-134	

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Date: 26 Feb 05								
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 24.75								
Static Water Level (WL): 2.3								
One Casing Volume(gal/L): 4.3								
Start Purge (hrs): 1420								
End Purge (hrs): 1550								
Total Purge Time (min): 90								
Total Vol. Purged (gal/L): 14.4								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	3
TCL SVOC	4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3 4°	HDPE plastic container	1
Cyanide	NaOH 4°	HDPE plastic container	1
Pest/PCBs	4°	(2) 1 L Glass amber glass	2
Explosives	4°	(2) 1 L Glass amber glass	2
~~Organochlor Herb~~	~~4°~~	~~(2) 1 L Glass amber glass~~	
Organophos Pest	4°	(2) 1 L Glass amber glass	
APP 9 VOC	HCL 4°	(3) 40-ml vial	
APP 9 SVOC	4°	(2) 1 L Glass amber glass	
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	

OBSERVATIONS / NOTES:

- 7' SCREEN INTERVAL

17-G-18D ✱ ← 3.5' → ✱ 17-G-18S

N W E S

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G- 195-0205
Sample Location: 17MW-195
Sampled By: BC
C.O.C. No.: 4311/4348
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 02/24/2005	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1625	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	BC
Method: Peristaltic	clear	5.65	0.230	18.07	2.38	1.12	53	

PURGE DATA:

Date: 02/24/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material							BC	
Type: 2-inch PVC								
Total Well Depth (TD): 20.65								
Static Water Level (WL): 3.49								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 1450								
End Purge (hrs): 1625								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L): 12.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4°	(3) 40-ml vial	3
TCL SVOC		4°	(2) 1 L Glass amber glass	2
TAL Metals	HNO3	4°	HDPE plastic container	1
Cyanide	NaOH	4°	HDPE plastic container	1
Pest/PCBs		4°	(2) 1 L Glass amber glass	2
Explosives		4°	(2) 1 L Glass amber glass	2
Organochlor Herb		4°	(2) 1 L Glass amber glass	—
Organophos Pest		4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL	4°	(3) 40-ml vial	—
APP 9 SVOC		4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs		4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Brian Cole

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G-205-0205
Sample Location: 17MW205
Sampled By: SCS
C.O.C. No.: 4311/4335
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Date: 27 Feb 05								
Time: 1525 peristalt	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method: low flow	Clear	3.92	4.00	15.31	0.37	0.00	—	318

PURGE DATA:

Date: 27 Feb 05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method: low flow peristalt.								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 17.7								
Static Water Level (WL): 4.5								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 1350								
End Purge (hrs): 1525								
Total Purge Time (min): 95								
Total Vol. Purged (gal/L): 14.25								

SCS

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	3 X 40 ML VIAL	3
TCL SVOC		4 C	2 X 1L AMBER	2
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	2
TAL METALS	HNO3	4 C	1 L POLY	1
CYANIDE	NAOH	4 C	250 ML POLY	1
EXPLOSIVES		4 C	2 X 1L AMBER	2
~~APP. IX VOCS~~	~~HCL~~	~~4 C~~	~~2 X 40 ML VIAL~~	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	~~2 X 1L AMBER~~	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX ~~PEST/ PCBs~~		4 C	2 X 1L AMBER	

SCS

OBSERVATIONS / NOTES:

17-205
*
Utility Corridor
*17-0205

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G- 21 ~~X~~ 3-0205
Sample Location: 17MW21S
Sampled By: BC
C.O.C. No.: 4339/4338
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 02/15/2005	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~ Sal
Time: 1030	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic	Clear	5.40	0.425	19.27	2.8	4.50	212	0.02

PURGE DATA:

Date: 02/15/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 20.6								
Static Water Level (WL): 7.2								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 0910								
End Purge (hrs): 1030								
Total Purge Time (min): 80								
Total Vol. Purged (gal/L): 12.0 + Flow cell								

BC

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4°	(3) 40-ml vial	9
TCL SVOC		4°	(2) 1 L Glass amber glass	6
TAL Metals	HNO3	4°	HDPE plastic container	3
Cyanide	NaOH	4°	HDPE plastic container	3
Pest/PCBs		4°	(2) 1 L Glass amber glass	6
Explosives		4°	(2) 1 L Glass amber glass	6
Organochlor Herb		4°	(2) 1 L Glass amber glass	—
Organophos Pest		4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL	4°	(3) 40-ml vial	—
APP 9 SVOC		4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs		4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Circle if Applicable:
MS/MSD
Duplicate ID No.:

Signature(s): Brian Cole

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G- 225-0205
Sample Location: 17MW 225
Sampled By: BC
C.O.C. No.: 4340/4360
Type of Sample:
[x] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~TDS~~
Date: 02/23/2005	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	Sal %
Time: 1100								
Method: Peristaltic	Clear	6.23	0.287	20.48	1.75	1.89	153	0.01

PURGE DATA:

Date: 02/23/2005	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 22.5								
Static Water Level (WL): 6.19								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 0940								
End Purge (hrs): 1100								
Total Purge Time (min): 80 (Plus Flow Cell)								
Total Vol. Purged (gal/L): 12.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	6
TCL SVOC	4°	(2) 1 L Glass amber glass	4
TAL Metals	HNO3 4°	HDPE plastic container	2
Cyanide	NaOH 4°	HDPE plastic container	2
Pest/PCBs	4°	(2) 1 L Glass amber glass	4
Explosives	4°	(2) 1 L Glass amber glass	4
Organochlor Herb	4°	(2) 1 L Glass amber glass	—
Organophos Pest	4°	(2) 1 L Glass amber glass	—
APP 9 VOC	HCL 4°	(3) 40-ml vial	—
APP 9 SVOC	4°	(2) 1 L Glass amber glass	—
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	—

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):
—	17-G-225-0205-D	B. Cole

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[x] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 17-G-235-0205
Sample Location: 17MW235
Sampled By: SCS
C.O.C. No.: 4311 / 4348
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 24 Feb 05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1115	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic	Clear	5.00	0.451	18.67	4.25	0.00	112	—

PURGE DATA:

Date: 24 Feb 05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm): NA								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 21.65								
Static Water Level (WL): 2.81								
One ~~Casing~~ Volume(gal/L): 6.2								
Start Purge (hrs): 0940								
End Purge (hrs): 1115								
Total Purge Time (min): 95								
Total Vol. Purged (gal/L): 14.25								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	✓
TCL SVOC	4°	(2) 1 L Glass amber glass	✓
TAL Metals	HNO3 4°	HDPE plastic container	✓
Cyanide	NaOH 4°	HDPE plastic container	✓
Pest/PCBs	4°	(2) 1 L Glass amber glass	✓
Explosives	4°	(2) 1 L Glass amber glass	✓
~~Organochlor Herb~~	~~4°~~	~~(2) 1 L Glass amber glass~~	
~~Organophos Pest~~	~~4°~~	~~(2) 1 L Glass amber glass~~	
~~APP 9 VOC~~	~~HCL 4°~~	~~(3) 40 ml vial~~	
~~APP 9 SVOC~~	~~4°~~	~~(2) 1 L Glass amber glass~~	
~~APP 9 Pest/PCBs~~	~~4°~~	~~(2) 1 L Glass amber glass~~	

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

APPENDIX A-7
SURFACE WATER SAMPLE LOG SHEETS

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/0528

Sample ID No.: 16W01 1001
Sample Location: 16 SW/SD 01
Sampled By: RS/FW
C.O.C. No.: 16-101601

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	Salinity %	Other NA
Date: 10-16-01 Time: 1230 Depth: 0-12" Method: DIRECT FILL	CLEAR	7.48	19.7	20.7	10	5.82	1.3	

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements		Collected
TCL VOC	HCL	4 C	8	2 X 40 ML VIAL	✓
TCL SVOC		4 C	8	2 X 1L AMBER	✓
TCL PESTICDES/ PCBS		4 C	6	2 X 1L AMBER	✓
TAL METALS	HNO3	4 C	3	1 L POLY	✓
CYANIDE	NAOH	4 C	3	250 ML POLY	✓
EXPLOSIVES		4 C	6	2 X 1L AMBER	✓
APP. IX VOCS	HCL	4 C		2 X 40 ML VIAL	—
APP. IX SVOCS		4 C		2 X 1L AMBER	—
ORGANOCHLOR HERB		4 C		2 X 1L AMBER	—
ORGANOPHOSPHOROUS PEST		4 C		2 X 1L AMBER	—
APP. IX PEST/ PCBs		4 C		2 X 1L AMBER	—
X VOC COLLECTED FOR DUP + MS/MSD					

OBSERVATIONS / NOTES:

LOW TIDE @ 1459

LOCATION STAKED

≈ 300 GPM

MAP:

SEE FIG 2-3

Circle if Applicable:

MS/MSD	Duplicate ID No.:
YES	16 W 01 1001 D

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/0528

[✓] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Sample ID No.: 16W021001
Sample Location: 16SW/SD 02
Sampled By: RS/FW
C.O.C. No.: 16-101601

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	Salinity %	Other NA
Date: 10.16.01								
Time: 1330								
Depth: 0-4"		7.45	19.3	21.1	63	4.13	1.3	
Method: DIRECT FILL								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
~~TCL VOC~~	HCL	4 C	2 X 40 ML VIAL	—
~~TCL SVOC~~		4 C	2 X 1L AMBER	—
~~TCL PESTICIDES/ PCBS~~		4 C	2 X 1L AMBER	—
TAL METALS	HNO3	4 C	1 L POLY	✓
CYANIDE	NAOH	4 C	250 ML POLY	✓
EXPLOSIVES		4 C	2 X 1L AMBER	✓
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	✓
APP. IX SVOCS		4 C	2 X 1L AMBER	✓
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	✓
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	✓
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	✓

OBSERVATIONS / NOTES:

APX IX
LOW TIDE @ 1459

MAP:

SEE FIG 2-3

Circle if Applicable:

MS/MSD —
Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/0528

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: MARSH, TIDAL
[] QA Sample Type:

Sample ID No.: 16W031001
Sample Location: 16SW/SD03
Sampled By: RS/ FW
C.O.C. No.: 16-101801

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	Salinity %	Other NA
Date: 10.18.01 Time: 1400 Depth: 0 - 10 Method: DIRECT FILL	CLEAR	7.54	20.7	21.1	1	8.69	1.4	

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	2 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	✓
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	✓
TAL METALS	HNO3	4 C	1 L POLY	✓
CYANIDE	NAOH	4 C	250 ML POLY	✓
EXPLOSIVES		4 C	2 X 1L AMBER	✓
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	—
APP. IX SVOCS		4 C	2 X 1L AMBER	—
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	—
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	—
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	—

OBSERVATIONS / NOTES:

LOW TIDE @ 1637

STREAM WATER ≈ 4' DEEP

MAP:

SEE FIG 2-3

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): [illegible]

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/0528

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: TIDAL MARSH
[] QA Sample Type:

Sample ID No.: 16W04 1001
Sample Location: 16SW/SD 04
Sampled By: KS/FW
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	Salinity %	Other NA
Date: 10.18.01 Time: 1420 Depth: 0-10 Method: DIRECT FILL	TRANSLUCENT	7.71	21.1	20.9	20	8.05	1.4	

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	2 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	✓
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	✓
TAL METALS	HNO3	4 C	1 L POLY	✓
CYANIDE	NAOH	4 C	250 ML POLY	✓
EXPLOSIVES		4 C	2 X 1L AMBER	✓
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	—
APP. IX SVOCS		4 C	2 X 1L AMBER	—
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	—
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	—
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	—

OBSERVATIONS / NOTES:

1637 LOW TIDE

MAP:

SEE FIG 2-3

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/0528

[] Stream
[] Spring
[] Pond
[] Lake
[✓] Other: TIDAL MARSH
[] QA Sample Type:

Sample ID No.: 16W05 1001
Sample Location: 16SW15005
Sampled By: FW
C.O.C. No.: 16-102001

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	Salinity %	Other NA
Date: 10-21-01 Time: 1710 Depth: 0-3 Method: DIRECT FILL	CLOUDY	6.80	22.3	23.8	101	4.97	1.4	

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	2 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	✓
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	✓
TAL METALS	HNO3	4 C	1 L POLY	✓
CYANIDE	NAOH	4 C	250 ML POLY	✓
EXPLOSIVES		4 C	2 X 1L AMBER	✓
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	—
APP. IX SVOCS		4 C	2 X 1L AMBER	—
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	—
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	—
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	—

OBSERVATIONS / NOTES:

LOW TIDE @ 1904

FLOW ≈ 50 GPM

MAP:

SEE FIGURE 2.3

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): FW

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/0528

[] Stream
[] Spring
[] Pond
[] Lake
[✓] Other: TIDAL MARSH
[] QA Sample Type:

Sample ID No.: 16-W-06-101
Sample Location: 16SW1SD03
Sampled By: KS/Fa
C.O.C. No.: 16 101801

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	Salinity %	Other NA
Date: 10-18-01 Time: 1455 Depth: 0-10 Method: DIRECT FILL		7.76	19.4	20.3	25	9.07	1.3	

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	2 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	✓
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	✓
TAL METALS	HNO3	4 C	1 L POLY	✓
CYANIDE	NAOH	4 C	250 ML POLY	✓
EXPLOSIVES		4 C	2 X 1L AMBER	✓
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

LOW TIDE @ 1637

STREAM WATER = 2' DEEP

MAP:

SEE FIG. 2-3

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/0528

[] Stream
[] Spring
[] Pond
[] Lake
[✓] Other: TIDAL MARSH
[] QA Sample Type:

Sample ID No.: 16W071001
Sample Location: 16SW15007
Sampled By: FW
C.O.C. No.: 16-102001

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	Salinity %	Other NA
Date: 10-21-04								
Time: 1725								
Depth: 0-6								
Method: DIRECT FILL		7.13	24.5	23.8	80	7.06	1.5	

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	2 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	✓
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	✓
TAL METALS	HNO3	4 C	1 L POLY	✓
CYANIDE	NAOH	4 C	250 ML POLY	✓
EXPLOSIVES		4 C	2 X 1L AMBER	✓
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

LOW TIDE @ 1904

MAP:

SEE FIG. 2.3

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): FW

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/0528

17 SW 01 1001

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Sample ID No.: 17SW/SD01 1001
Sample Location: 17SW01
Sampled By: KS/FW
C.O.C. No.: 17-101701

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	Salinity %	Other NA
Date: 10.17.01								
Time: 1510								
Depth: 0 - 4"	CLEAR	6.59	19.1	17.9	77	9.63	1.3	
Method: DIRECT FILL								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	2 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	✓
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	✓
TAL METALS	HNO3	4 C	1 L POLY	✓
CYANIDE	NAOH	4 C	250 ML POLY	✓
EXPLOSIVES		4 C	2 X 1L AMBER	✓
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	—
APP. IX SVOCS		4 C	2 X 1L AMBER	—
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	—
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	—
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	—

OBSERVATIONS / NOTES:

FLOW = APPROX. 30 GPM

LOW TIDE @ 1549

MAP:

SEE FIG 2-3

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): K. Fl

APPENDIX A-8
SEDIMENT SAMPLE LOG SHEETS

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 16 D 01 1001
Sample Location: 16 SW/S001
Sampled By: RS/FW
C.O.C. No.:

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-16-01 Time: 1300 Method: PLASTIC TROWEL Monitor Reading (ppm): —	0 – 0.5'	BRN	F. SAND AND SILT WET, TR ROOTS, WITH ORGANIC CONTANT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	12	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	3	
TAL METALS AND CYANIDE	2 OZ JAR	3	
EXPLOSIVES	4 OZ JAR	3	
APP. IX VOCS	4 OZ JAR	—	
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR	—	
HERBICIDES	4 OZ JAR	—	
ORGANOPHOSPHOUROUS PEST	4 OZ JAR	—	
X VOL COLLECTED FOR DUP + MS/MSD			

OBSERVATIONS / NOTES:

LOW TIDE @ 1459
LOCATION STAKED

SALT MARSH, WETLAND

MAP:

SEE FIG. 2-3

Circle if Applicable:

MS/MSD	Duplicate ID No.:
YES	16 D 01 1001 D

Signature(s):

RS / SL

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 16D021001
Sample Location: 16SW/SD02
Sampled By: RS/FW
C.O.C. No.: 16-101601

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10/16/01 Time: 1400 Method: PLASTIC TROWEL Monitor Reading (ppm):	0-0.5'	DRK GREY	SILT + CLAY HIGH ORGANIC CONTENT WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
~~TCL VOCS~~	3 X 5 g ENCORE	—	
~~TCL SVOCS/ PEST/ PCBs~~	8 OZ JAR	—	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR	✓	
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR	✓	
HERBICIDES	4 OZ JAR	✓	
ORGANOPHOSPHOUROUS PEST	4 OZ JAR	✓	

OBSERVATIONS / NOTES:

APX. IX

LOW TIDE @ 1459

≈ 40 GPM

MAP:

SEE FIG 2-3

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 16 D03 1001
Sample Location: 16 SW/SD 03
Sampled By: RS/ FW
C.O.C. No.: 16-101801

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10·18·01 Time: 1410 Method: PLASTIC TROWEL Monitor Reading (ppm):	0 - 0.5'	OLIVE GRAY	WET, HIGH ORGANIC MATERIAL SILT (OL)

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR	—	
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR	—	
HERBICIDES	4 OZ JAR	—	
ORGANOPHOSPHOUROUS PEST	4 OZ JAR	—	

OBSERVATIONS / NOTES:

LOW TIDE @ 1637

MAP:

SEE FIG 2-3

Circle If Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 16D04 1001
Sample Location: 16SW/SD04
Sampled By: KS/FW
C.O.C. No.: 16-101801

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10.18.01 Time: 1430 Method: DIRECT FILL Monitor Reading (ppm): —	0-0.5'	OLIVE GRAY	WET, HIGH ORGANIC MATERIAL SILT (OL)

COMPOSITE SAMPLE DATA

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR	—	
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR	—	
HERBICIDES	4 OZ JAR	—	
ORGANOPHOSPHOUROUS PEST	4 OZ JAR	—	

OBSERVATIONS/NOTES:

LOW TIDE @ 1637

MAP:

SEE FIG 2-3

Circle if Applicable:

MS/MSD — Duplicate ID No.:

Signature(s): [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 16DO5 1001
Sample Location: 16SW 15DO5
Sampled By: FW
C.O.C. No.: 16-102001

[] Surface Soil
[] Subsurface Soil
[✓] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[✓] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-21-01 Time: 1715 Method: PE TROWEL Monitor Reading (ppm): —	0-0.5'	BLACK	SILT + CLAY HIGH ORGANIC CONTENT (OL) WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

LOW TIDE @ 1904

MAP:

SEE FIG. 2.3

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): FW

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[] Subsurface Soil
[✓] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 16-D-06-1001
Sample Location: 16SW/5006
Sampled By: FW/KS
C.O.C. No.: 16-101801

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-18-01 Time: 1510 Method: PLASTIC TROWEL Monitor Reading (ppm): —	0-0.5'	GRAY BLK	SILT (OL) HIGH ORGANIC CONTENT WET

COMPOSITE SAMPLE DATA

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS/NOTES:

LOW TIDE @ 1637

MAP:

SEE FIG. 2-3

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): FW

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 16-D-07-1001
Sample Location: 16SW15D07
Sampled By: FW
C.O.C. No.: 16-102001

- [ ] Surface Soil
- [ ] Subsurface Soil
- [x] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-21-01 Time: 1735 Method: PE TROWEL Monitor Reading (ppm): —	0-0.5'	BLACK	SILT + CLAY HIGH ORGANIC CONTENT (OH) WET

COMPOSITE SAMPLE DATA

	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS/NOTES:

LOW TIDE @ 1904

MAP:

Circle If Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): FW

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17 D 01 1001
Sample Location: 17 SW/SD 01
Sampled By: RS/FW
C.O.C. No.: 17-101701

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-17-01 Time: 1520 Method: PLASTIC TROWEL Monitor Reading (ppm): —	0-0.5'	BRN/GRAY	WET, SOME ROOTS, SILT WITH ORGANIC MATERIAL HIGH

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR	—	
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR	—	
HERBICIDES	4 OZ JAR	—	
ORGANOPHOSPHOUROUS PEST	4 OZ JAR	—	

OBSERVATIONS / NOTES:

MAP:

SEE FIG 2-3

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

APPENDIX A-9
SOIL SAMPLE LOG SHEETS

16-S-01-00

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page 1 of 1

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: ~~165501-00~~ (EA)
Sample Location: SWMU 16
Sampled By: FCW
C.O.C. No.: 17-101001

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [ ] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-11-01 Time: 1500 Method: PE TROWEL Monitor Reading (ppm): –	0-6"	ORG.	MED. GR. SAND WET

COMPOSITE SAMPLE DATA:

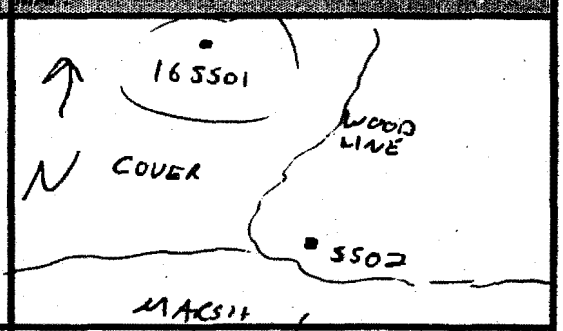
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:



Circle If Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

16-5-02-00

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: ~~16-5-02-00~~
Sample Location: SWMU 16
Sampled By: FCW
C.O.C. No.: ~~16-101101~~ 17-101001

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-11-01 Time: 1440 Method: PE TROWEL Monitor Reading (ppm): –	0-6"	~~DK BROWN~~ DRY PURPLE BLACK	CLAY DRY w/ ORGANICS

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

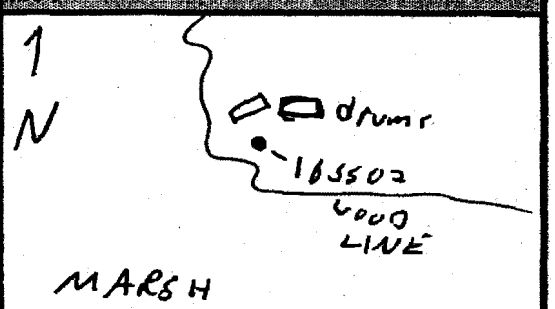
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

7-VOCs

MAP:



Circle if Applicable:

MS/MSD

Duplicate ID No.: 16-5-02-00-D

Signature(s): FCW

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON SWMU16/17 RFI
Project No.: N0528

Sample ID No.: 16-S-03-00
Sample Location: 16S03
Sampled By: FWR
C.O.C. No.: 4309, 4310

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Date: 7-18-05	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1110			
Method: DIRECT FILL	0-1'	DK BRN	SILT, CLAY + SAND VERY MOIST
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

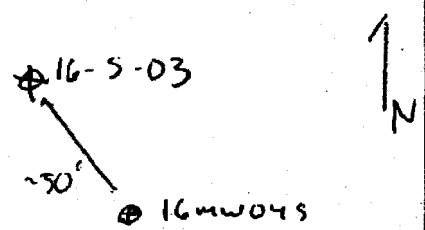
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	4x ENCORE	✓	
TCL SVOC'S, PEST/PCB/TOC	8 oz	✓	
TAL METALS + CN	2 oz	✓	
EXPLOSIVES	4 oz	✓	

OBSERVATIONS / NOTES:

COLLECTED FROM DEBRIS PILE, CONCRETE, METAL ETC

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON SWMU16/17 RFI
Project No.: N0528

Sample ID No.: 16-S-04-00
Sample Location: 16S04
Sampled By: RWR
C.O.C. No.: 4309, 4310

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 1-18-05 Time: 1125 Method: DIRECT FILL Monitor Reading (ppm): 0	0-1'	DK BRN	MOIST SILT, CLAY + SAND

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

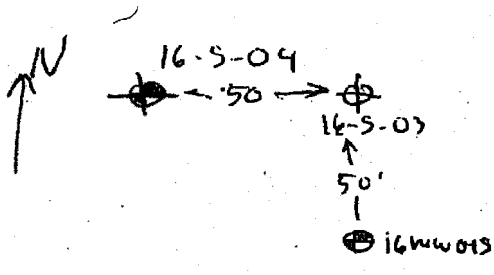
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOC'S	4 X ENCORE	✓	
TCL SVOC'S PEST/PCB/TPH	8 OZ	✓	
TAL METALS + CN	2 OZ	✓	
EXPLOSIVES	4 OZ	✓	

OBSERVATIONS/NOTES:

COLLECTED FROM DEBRIS PILE, CONCRETE, METALS, PLASTIC ETC.

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 16-B-01-01
Sample Location: 16SS01
Sampled By: S. NEIL
C.O.C. No.: 16-061101

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/11/01 Time: 0920 Method: SPLIT SPOON Monitor Reading (ppm): 0	1-3'	BLACK	MUCK w/ ORGANICS MATERIAL

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 16-B-01-03
Sample Location: 16SB01
Sampled By: S. Neil
C.O.C. No.: 16-061101

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/11/01 Time: 0928 Method: SPLIT SPOON Monitor Reading (ppm): 0	3-5'	BLACK/GRAY	MUCK W/ ORGANICS MATERIAL

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Check If Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Scott w Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 16-B-01-05
Sample Location: 16SB01
Sampled By: S. NEIL
C.O.C. No.: 16-061101

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/11/01 Time: 0935 Method: SPLIT SPOON Monitor Reading (ppm): 0	5-7'	GRAY	CLAYEY SILT / SILTY CLAY W/ORGANICS

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott M. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 16-B-02-01
Sample Location: 16SB02
Sampled By: S. NAIL
C.O.C. No.: 16-061101

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10/11/01 Time: 1444 Method: SPLIT SPOON Monitor Reading (ppm): 0	1 – 3'	OR/BRN/GRY	SILTY SANDY CLAY / SILTY SAND w/ DEBRIS

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS/NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott A. Nail

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 16-B-02-05
Sample Location: 16SB02
Sampled By: S. NEIL
C.O.C. No.: 16-061101

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/11/01 Time: 1514 Method: SPLIT SPOON Monitor Reading (ppm): 0	5-7'	GRAY	SILTY CLAY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott A. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 16-B-03-01
Sample Location: 16SB03
Sampled By: S.NEIL
C.O.C. No.: 16-061101

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/11/01 Time: 1405 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	1-3'	BRN/OR/GRY	SILTY SANDY CLAY, TR FINE - ASPHALT FRAGS

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.: 16-B-03-01-D

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[ ] Surface Soil
[x] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: 16-B-03-03
Sample Location: 16SB03
Sampled By: S. NSIL
C.O.C. No.: 16-061101

Type of Sample:
[x] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/11/01 Time: 1422 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	3-5'	GRAY	SILTY SANDY CLAY W/ OR MOTTLING

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE		
TCL SVOCS/ PEST/ PCBs	8 OZ JAR		
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR	✓	
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR	✓	
HERBICIDES	4 OZ JAR	✓	
ORGANOPHOSPHOUROUS PEST	4 OZ JAR	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 16-B-03-05
Sample Location: 16SB03
Sampled By: S. NEIL
C.O.C. No.: 16-061101

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/11/01 Time: 1424 Method: SPLIT SPOON Monitor Reading (ppm): 0	5-7'	BRN/BLK/GRAY	CLAYEY SILTY SAND TO FILL MATERIAL/ CLAYEY PEAT TO GRAY CLAY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 16-B-04-01
Sample Location: 16SB04
Sampled By: S. NEIL
C.O.C. No.: 16-061101

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/11/01 Time: 1620 Method: Split Spoon Monitor Reading (ppm): 0	1 - 3'	BRN GRAY	CLAYEY SAND

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE		
TCL SVOCS/ PEST/ PCBs	8 OZ JAR		
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR	✓	
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR	✓	
HERBICIDES	4 OZ JAR	✓	
ORGANOPHOSPHOUROUS PEST	4 OZ JAR	✓	

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 16-B-04-03
Sample Location: 16SB04
Sampled By: S.NFIL
C.O.C. No.: 16-061101

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/11/01 Time: 1600 Method: SPLIT SPOON Monitor Reading (ppm): 0	3-5'	DARK GRAY	CLAYEY SAND

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings				
(Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	16-B-04-03-D

Signature(s): [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 16-B-04-05
Sample Location: 16SB04
Sampled By: S. NEIL
C.O.C. No.: 16-041107

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/11/01 Time: 1633 Method: SPLIT SPOON Monitor Reading (ppm): 0	5-7'	GRAY	MUCK / CLAYEY SILT / SILTY CLAY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-B-01-00
Sample Location: 17SB01
Sampled By: S. Neil
C.O.C. No.: 17-060701

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/7/01 Time: 0957 Method: HAND AUGER Monitor Reading (ppm): 0.0	0-1'	BRN	SANDY SILT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE		
TCL SVOCS/ PEST/ PCBs	8 OZ JAR		
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR	✓	
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR	✓	
HERBICIDES	4 OZ JAR	✓	
ORGANOPHOSPHOUROUS PEST	4 OZ JAR	✓	

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-01-01
Sample Location: 17SB01
Sampled By: S. NOIL
C.O.C. No.: 17-060701

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/7/01 Time: 1005 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	1-3'	RED/OR	SILTY SANDY CLAY / SANDY SILT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): Scott W. Reid

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-01-03
Sample Location: 17SB01
Sampled By: S. NEIL
C.O.C. No.: 17-060701

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/7/01 Time: 1012 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	3-5'	BRN	SILTY SAND OR MOT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-01-05
Sample Location: 17SB01
Sampled By: S.PSIL
C.O.C. No.: 17-060701

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/7/01 Time: 1021 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	5-7'	GRAY	SILTY SANDY CLAY OR MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Scott W. Stein

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: 17-B-02-00
Sample Location: 17SB02
Sampled By: S. NEIL
C.O.C. No.: 17-060701

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Date: 6/7/01	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0920			
Method: HAND AUGER	0-1'	BRN	SANDY SILT
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD: —

Duplicate ID No.: 17-B-02-00-D

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-02-01
Sample Location: MSB02
Sampled By: S. NEIL
C.O.C. No.: 17-060701

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/7/01 Time: 0933 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	1-3'	BRN/ORG/GRAY	Sandy silt. ~~SILTY/SANDY CLAY~~ (SWN)

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-02-03
Sample Location: 17SB02
Sampled By: S. NEIL
C.O.C. No.: 17-000701

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/7/01 Time: 0943 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	3-5'	BRN	Fine sand some silt

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-02-05
Sample Location: 17SB02
Sampled By: S. NAIL
C.O.C. No.: 17-000701

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/7/01 Time: 0950 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	5-7'	GRAY	SILTY SANDY CLAY OR MOT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Scott W. Reid

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-6-03-00
Sample Location: MSB03
Sampled By: S. NEIL
C.O.C. No.: 17-000601

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 1420 Method: HAND AUGER Monitor Reading (ppm): 0.0	0-1'	BRN/RED	SANDY SILT / SILTY SANDY CLAY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[x] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-03-01
Sample Location: 17B03
Sampled By: S. NFIL
C.O.C. No.: 17-000601

Type of Sample:
[x] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 1441 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	1-3'	RED	SILTY SANDY CLAY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott W. [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-03-03
Sample Location: 17SB03
Sampled By: S. NEIL
C.O.C. No.: 17-000601

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 1505 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	3-5'	ORANGE	SILTY SANDY CLAY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-03-05
Sample Location: 17B03
Sampled By: S. NEIL
C.O.C. No.: 17-060601

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 1520 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	5-7'	ORANGE/GRAY	SILTY SANDY CLAY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-B-04-00
Sample Location: 17SB04
Sampled By: S. NEIL
C.O.C. No.: 17-060601

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 1300 Method: HAND AUGER Monitor Reading (ppm): 0	0-1'	BRN	SANDY SILT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-04-01
Sample Location: 17SB04
Sampled By: S. NEIL
C.O.C. No.: 17-060601

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 1317 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	1-3'	RED	SILTY/SANDY CLAY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-6-04-03
Sample Location: 17SB04
Sampled By: S. NEIL
C.O.C. No.: 17-060601

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 1330 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	3-5'	RED/ORANGE	SILTY SANDY CLAY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): Scott Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-04-05
Sample Location: 17SB04
Sampled By: S. NEIL
C.O.C. No.: 17-060601

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 1345 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	5-7'	GRAY	SILTY / SANDY CLAY OR MOT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: 17-B-04-05-D

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-B-05-00
Sample Location: 17SB05
Sampled By: S. NEIL
C.O.C. No.: 17-060601

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 1110 Method: HAND AUGER Monitor Reading (ppm): 0	0-1'	BRN	SANDY SILT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

- [x] Surface Soil
- [x] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Sample ID No.: 17-B-05-0P
Sample Location: 17B05
Sampled By: S.NTIL
C.O.C. No.: 17-060001

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 1120 Method: SPLIT SPOON Monitor Reading (ppm): 0	1-3'	GRAY	SILTY/SANDY CLAY OR MOT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott W. Neal

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-6-05-03
Sample Location: 17SB05
Sampled By: S. NEIL
C.O.C. No.: 17-06060

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 1132 Method: SPLIT SPOON Monitor Reading (ppm): 0	3-5'	GRAY	SILTY SANDY CLAY OR MOT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Scott L. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-05-05
Sample Location: 17SB05
Sampled By: S. NAIL
C.O.C. No.: 17-060601

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 1145 Method: SPLIT SPOON Monitor Reading (ppm): 0	5-7'	GRAY	SILTY/SANDY CLAY OR MOT.

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: 17-B-06-00
Sample Location: 17SB06
Sampled By: S.NEIL
C.O.C. No.: 17-060601

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 1015 Method: HAND AUGER Monitor Reading (ppm): 0.0	0-1'	BRN	SANDY SILT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Scott W. [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-06-01
Sample Location: 17SB06
Sampled By: S. NEIL
C.O.C. No.: 17-060601

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01			
Time: 1030			
Method: SPLIT SPOON			
Monitor Reading (ppm): 4.1	1-3'	GRAY	SILTY SANDY CLAY OR MOT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott L. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-06-03
Sample Location: 17SB06
Sampled By: S.NEIL
C.O.C. No.: 17-060601

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01			
Time: 1040			
Method: SPLIT SPOON	3-5'	GRAY	SILTY SANDY CLAY DR MOT
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): Scott Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-06-05
Sample Location: 17B06
Sampled By: S. PEIL
C.O.C. No.: 17-000601

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01			
Time: 1050	5-7'		
Method: SPLIT SPOON	~~3-5'~~ 6 WW	GRAY	SILTY SANDY CLAY OR MOTTLE
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott M. Peil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-B-07-00
Sample Location: 17SB07
Sampled By: S. NEIL
C.O.C. No.: 17-060601

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 1540 Method: HAND AUGER Monitor Reading (ppm): 0.0	0-1'	BRN/RED	SANDY SILT/ SILTY/SANDY CLAY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-07-01
Sample Location: 17SB07
Sampled By: S. NGIL
C.O.C. No.: 12060601

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 1554 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	1-3'	OR/BRN	SILTY SAND / SILTY SANDY CLAY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott W. Stein

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-07-03
Sample Location: 17SB07
Sampled By: S. NGIL
C.O.C. No.: 17-060601

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 1603 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	3-5'	ORANGE BROWN	SILTY SANDY CLAY / SILTY SAND

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-07-05
Sample Location: 17SB07
Sampled By: S. JEIL
C.O.C. No.: 17-060601

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10/6/01 Time: 1615 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	5-7'	GRAY	SILTY SANDY CLAY W/ OR MOTTLE

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	17-B-07-05-D

Signature(s): Scott A. [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: 17-B-08-00
Sample Location: 173608
Sampled By: S.NEIL
C.O.C. No.: 17-060601

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 0930 Method: HAND AUGER Monitor Reading (ppm): 0.0	0-1'	BRN	SANDY SILT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-08-01
Sample Location: 17SB08
Sampled By: S. NEIL
C.O.C. No.: 17-060001

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 0940 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	1-3'	GRAY	SILTY/SANDY CLAY OR MOT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE		
TCL SVOCS/ PEST/ PCBs	8 OZ JAR		
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR	✓	
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR	✓	
HERBICIDES	4 OZ JAR	✓	
ORGANOPHOSPHOUROUS PEST	4 OZ JAR	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[x] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-08-03
Sample Location: 17SB08
Sampled By: S. NEIL
C.O.C. No.: 17-060601

Type of Sample:
[x] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 0948 Method: SPLIT SPOON Monitor Reading (ppm):	3-5'	GRAY	SILTY/SANDY CLAY ORANGE MOTTLE

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-6-08-05
Sample Location: MS608
Sampled By: S. NEIL
C.O.C. No.: 17-060601

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 1000 Method: SPLIT SPOON Monitor Reading (ppm):	5-7'	GRAY	SILTY SANDY CLAY OR MOT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-6-09-00
Sample Location: 17SB09
Sampled By: S. NEIL
C.O.C. No.: 17-000401

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 0830 Method: HAND AUGER Monitor Reading (ppm): 0.0	0-1'	BRN	SANDY SILT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD

Duplicate ID No.: 17-6-09-00-D

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-09-01
Sample Location: 17SB09
Sampled By: S. NEIL
C.O.C. No.: 17-000001

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 0851 Method: SPLIT SPOON Monitor Reading (ppm): *	1-3'	BRN / GRAY	SANDY SILT / SILTY SANDY CLAY OR MOT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): Scott M. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-09-03
Sample Location: 17SB09
Sampled By: S. NEIL
C.O.C. No.: 17-060601

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 0905 Method: SPLIT SPOON Monitor Reading (ppm): *	3-5'	GRAY	SILTY SANDY CLAY OR MUD

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): Scott M. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-09-05
Sample Location: 17SB09
Sampled By: S. NEIL
C.O.C. No.: 17-060601

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 0915 Method: SPLIT SPOON Monitor Reading (ppm): *	5-7'	Gray	SILTY SANDY CLAY OR MOT - MORE SANDY.

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Scott L. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-B-10-00
Sample Location: 17SB10
Sampled By: S. NEIL
C.O.C. No.: 17-060501

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 1700 Method: HAND AUGER Monitor Reading (ppm): 5.1	0-1'	BRN	SANDY SILT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-10-01
Sample Location: 17SB10
Sampled By: S. NAIK
C.O.C. No.: 17-060501

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 1712 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	1-3'	LT BRN / GRAY	SANDY SILT/SILTY SANDY CLAY DAMPT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE		
TCL SVOCS/ PEST/ PCBs	8 OZ JAR		
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR	✓	
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR	✓	
HERBICIDES	4 OZ JAR	✓	
ORGANOPHOSPHOUROUS PEST	4 OZ JAR	✓	

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Eric W. Reid

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[x] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-10-03
Sample Location: 17SB10
Sampled By: S. NEIL
C.O.C. No.: 17-060501

Type of Sample:
[x] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01			
Time: 1723			
Method: SPLIT SPOON	3-5'	GRAY	SILTY SANDY CLAY OR MOT
Monitor Reading (ppm): 1.3			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott W. [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-10-05
Sample Location: 17SB0
Sampled By: S.NYIL
C.O.C. No.: 17-060501

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 1735 Method: SPLIT SPOON Monitor Reading (ppm): 3.2	5-7'	GRAY	SILTY SANDY CLAY OR MOT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott W. [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-B-11-00
Sample Location: 17SB11
Sampled By: S. NFIL
C.O.C. No.: 17-060601

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 1635 Method: HAND AUGER Monitor Reading (ppm): 0.0	0-1'	BRN	SANDY SILT TR CLAY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-11-01
Sample Location: 17SB11
Sampled By: S. NEIL
C.O.C. No.: 17-066601

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 1650 Method: HAND AUGER Monitor Reading (ppm): 0.0	1-3' (SUN)	OR/BRN	SILTY SANDY CLAY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE		
TCL SVOCS/ PEST/ PCBs	8 OZ JAR		
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR	✓	
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR	✓	
HERBICIDES	4 OZ JAR	✓	
ORGANOPHOSPHOUROUS PEST	4 OZ JAR	✓	

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD

Duplicate ID No.: 17-B-11-01-D

Signature(s): Scott Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-11-03
Sample Location: 17SB11
Sampled By: S.NSIL
C.O.C. No.: 17-060601

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 1705 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	3-5'	GRAY	SILTY SANDY CLAY OR MOT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS/NOTES:

MAP:

Circle If Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Scott. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-11-05
Sample Location: 17SB11
Sampled By: S. NEIL
C.O.C. No.: 17-002601

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/6/01 Time: 1721 Method: SPLIT SPOON Monitor Reading (ppm): 0	5-7'	GRAY	SILTY SANDY CLAY OR MOTTLE

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-B-12-00
Sample Location: 17SB12
Sampled By: S. NEIL
C.O.C. No.: 17-060701

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/7/01 Time: 0750 Method: HAND AUGER Monitor Reading (ppm): *	0 - 1'	BRN/GRAY	SANDY SILT / GRAY CLAY ON TOP

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Scott L. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-12-01
Sample Location: 17SB12
Sampled By: S. NEIL
C.O.C. No.: 17-060701

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/7/01 Time: 0800 Method: SPLIT SPOON Monitor Reading (ppm): *	1-3'	GRAY	SILTY SANDY CLAY OR MOT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
~~TCL VOCS~~	~~3 X 5 g ENCORE~~	~~✓~~	
~~TCL SVOCS/ PEST/ PCBs~~	~~8 OZ JAR~~	~~✓~~	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR	✓	
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR	✓	
HERBICIDES	4 OZ JAR	✓	
ORGANOPHOSPHOUROUS PEST	4 OZ JAR	✓	

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-12-03
Sample Location: 17SB12
Sampled By: S. NEIL
C.O.C. No.: 17-060701

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/7/01	3-5'	GRAY	SILTY SANDY CLAY OR MOT
Time: 0810			
Method: SPLIT SPOON			
Monitor Reading (ppm): 25.1			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-12-05
Sample Location: 17B12
Sampled By: S. NEIL
C.O.C. No.: 17-060701

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/7/01 Time: 0923 Method: Split Spoon Monitor Reading (ppm): 4.2	5-7'	GRAY	SANDY / SILTY CLAY OR MOT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-B-13-00
Sample Location: 175613
Sampled By: S. NEIL
C.O.C. No.: 17-060501

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 1605 Method: HAND AUGER Monitor Reading (ppm): 0.0	0-1'	BRN	SILT SOME F. GR. SAND

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-13-01
Sample Location: 17SD13
Sampled By: S. NEIL
C.O.C. No.: 17-060501

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 1615 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	1-3'	GRAY	SILTY SANDY CLAY w/ OR MOT.

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott L. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-13-03
Sample Location: 17SB13
Sampled By: S. Neil
C.O.C. No.: 17-060501

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 1624 Method: SPLIT SPOON Monitor Reading (ppm): 6.5	3-5'	GRAY	SILTY SANDY CLAY DRY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-13-05
Sample Location: 17SB13
Sampled By: S. NGIL
C.O.C. No.: 17-060501

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01			
Time: 1637			
Method: SPLIT SPOON	5-7'	GRAY	SILTY SANDY CLAY DR MOT.
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Scott W. Shea

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-B-14-00
Sample Location: DSB14
Sampled By: S. Pfik
C.O.C. No.: 17-060501

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 0940 Method: HAND AUGER Monitor Reading (ppm): 0.0	0-1'	BRN	SILT SOME FINE SAND

COMPOSITE SAMPLE DATA:

	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Scott W. Shaw

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-14-01
Sample Location: 17SB14
Sampled By: S.NIL
C.O.C. No.: 17-060501

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 0953 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	1-3'	BRN	SILT SOME FINE SAND TR OR MOT.

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[ ] Surface Soil
[X] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: 17-B-14-03
Sample Location: 17SB14
Sampled By: S. NTIL
C.O.C. No.: 17-060501

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 1007 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	3-5'	BRN/GRAY	SILT SOME FINE SAND / SILTY SANDY CLAY WH CHALKY MATERIAL

COMPOSITE SAMPLE DATA:

	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

WHITE CHALKY MATERIAL = 4' deep.

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-14-05
Sample Location: 17SB14
Sampled By: S. NGIL
C.O.C. No.: 17-060501

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 1020 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	5-7'	GRAY	SANDY CLAY OR MOT WHITE CHALKY MATERIAL

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

WHITE CHALKY MATERIAL ≈ 5.5 FEET.

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-B-15-00
Sample Location: 17SB15
Sampled By: S. MYIL
C.O.C. No.: 17-060501

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 1250 Method: HAND AUGER Monitor Reading (ppm): 0.0	0-1'	BRN	SANDY SILT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.: 17-B-15-00-D

Signature(s): Scott W. Myil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-15-01
Sample Location: 17SB15
Sampled By: S. NEIL
C.O.C. No.: 17-060581

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 1310 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	1-3'	BRN/GRAY	SANDY SILT/GRAY CLAY OR MOT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[x] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-15-03
Sample Location: 17SB15
Sampled By: S. NEIL
C.O.C. No.: 17-060501

Type of Sample:
[x] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01			
Time: 1324			
Method: SPLIT SPOON	3-5'		SANDY SILT / SILTY CLAY OR MOT
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-15-05
Sample Location: 17SB15
Sampled By: S. NIK
C.O.C. No.: 17-06081

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01			
Time: 1337			
Method: SPLIT SPOON			
Monitor Reading (ppm): 0.0	5-7'	GRAY	SILTY CLAY - OR MOT SILTY SAND OR MOT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott L. Stein

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[x] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: 17-B-16-00
Sample Location: 17SB16
Sampled By: S. NFIL
C.O.C. No.: 17-060501

Type of Sample:
[x] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01			
Time: 1400			
Method: HAND AUGER	0-1'	BRN	FINE SANDY SILT
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD

Duplicate ID No.: 17-B-16-00-D

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-16-01
Sample Location: 17SB16
Sampled By: S.NGIL
C.O.C. No.: 17-060501

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 1433 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	1-3'	LT BRN	FINE SANDY SILT.

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Scott Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-16-03
Sample Location: 17SB16
Sampled By: S. NAIL
C.O.C. No.: 17-060501

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01			
Time: 1445			
Method: SPLIT SPOON	3-5'	BRN/GRAY	Fine sandy silt / SILTY SANDY CLAY OR MOT
Monitor Reading (ppm): 20.1			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

Staining observed ≈ 4' interval.

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott L. Nail

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-16-05
Sample Location: 17SB16
Sampled By: S. NGIL
C.O.C. No.: 17-060501

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 1500 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	5-7'	GRAY	SILTY SANDY CLAY OR MUD

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR		
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR	✓	
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR	✓	
HERBICIDES	4 OZ JAR	✓	
ORGANOPHOSPHOUROUS PEST	4 OZ JAR	✓	

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD: S

Duplicate ID No.:

Signature(s): Scott L. [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-6-17-00
Sample Location: 17 SB17
Sampled By: S. NSIL
C.O.C. No.: 17-060501

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 0845 Method: HAND AUGER Monitor Reading (ppm): 0.0	0-1'	GRAY/BRN	DK MOT, SILTY CLAY, SOME SILT.

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	17-6-17-00-D

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-17-01
Sample Location: 17SB17
Sampled By: S.NFIL
C.O.C. No.: 17-060501

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 0957 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	1-3'	GRAY/BRN	SILTY CLAY, SOME SILT, DRY MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR		
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR	✓	
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR	✓	
HERBICIDES	4 OZ JAR	✓	
ORGANOPHOSPHOUROUS PEST	4 OZ JAR	✓	

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott W. Neal

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-17-03-
Sample Location: 17SB17
Sampled By: S. NEIL
C.O.C. No.: 17-060501

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 0915 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	3-5	GRAY	SILTY CLAY TR. OR MOT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD: —

Duplicate ID No.: —

Signature(s): Sara M. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-17-05
Sample Location: 17SB17
Sampled By: S.Hill
C.O.C. No.: 17-060501

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 0921 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	5-7'	GRAY	SILTY SAND OR MOT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Scott W. Neid

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: 17-B-1V-00
Sample Location: 17SB18
Sampled By: S. NEIL
C.O.C. No.: 17-060501

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 1050 Method: HAND AUGER Monitor Reading (ppm): 0.0	0-1'	BRN	SILT W FINE SAND

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-18-01
Sample Location: 17SB18
Sampled By: S. NEIL
C.O.C. No.: 17-060501

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 1100 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	1-3'	BRN/GRAY	SILTY/SANDY CLAY OR MOT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott W. [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-18-03
Sample Location: 17SB18
Sampled By: S. NEIL
C.O.C. No.: 17-060501

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 1112 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	3-5'	GRAY	SILTY SANDY CLAY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-6-18-05
Sample Location: 17SB18
Sampled By: S. NYIL
C.O.C. No.: 17-060501

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 1124 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	5-7'	GRAY	SILTY SANDY CLAY OR MOT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Scott W. Reid

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: 17-B-19-00
Sample Location: 17SB19
Sampled By: S. NEIL
C.O.C. No.: 17-060501

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 0750 Method: HAND AUGER Monitor Reading (ppm): 0.0	0-1'	BRN	SILT SOME F. GRAINED SAND, ROOT MAT

COMPOSITE SAMPLE DATA:

	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓ (P.O.)	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR		
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR	✓	
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR	✓	
HERBICIDES	4 OZ JAR	✓	
ORGANOPHOSPHOUROUS PEST	4 OZ JAR	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott L. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-19-01
Sample Location: 175619
Sampled By: S. NEIL
C.O.C. No.: 17-040501

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 0905 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	1 - 3	OR/ BRN	SILTY CLAY, TR. F.G. SAND

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott Mulford

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-19-03
Sample Location: 17SB19
Sampled By: S. Neil
C.O.C. No.: 17-060501

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 0814 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	3-5	OR/GRAY	SILTY/SANDY CLAY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-19-05
Sample Location: 17SB19
Sampled By: S.RILL
C.O.C. No.: 17-060501

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6/5/01 Time: 0523 Method: SPLIT SPOON Monitor Reading (ppm): 0.0	5-7'	GRAY	DR MOT SILTY CLAY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	
TCL SVOCS/ PEST/ PCBs	8 OZ JAR	✓	
TAL METALS AND CYANIDE	2 OZ JAR	✓	
EXPLOSIVES	4 OZ JAR	✓	
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Scott W. Riley

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-B-20-00
Sample Location: 173520
Sampled By: FCW
C.O.C. No.: 17042703

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1105 Method: DPT Monitor Reading (ppm): —	0-1	BROWN	SILT ROOT WET

COMPOSITE SAMPLE DATA:

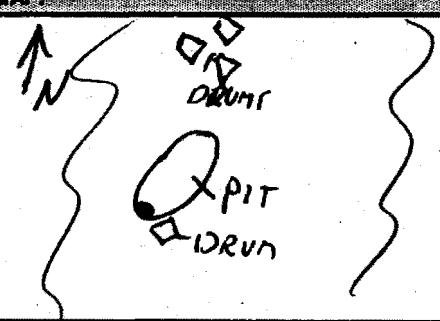
	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[ ] Surface Soil
[✓] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: 17-B-20-01
Sample Location: 175820
Sampled By: FCW
C.O.C. No.: 17042703

Type of Sample:
[✓] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1110 Method: DPT Monitor Reading (ppm): –	1-3	ORG GREY	SILTY CLAY MOTTLED DRY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:

SEE 17-B-20-00

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

FCW

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-20-03
Sample Location: 17B20
Sampled By: FCL
C.O.C. No.: 17042003

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03	3-5	ORG GREY	SILTY CLAY DRY MOTTLED
Time: 1115			
Method: DPT			
Monitor Reading (ppm): —			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:

SEE 17-B-20-00

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

FCL

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Sample ID No.: 17-B-21-00
Sample Location: 175B21
Sampled By: FCW
C.O.C. No.: 17042703

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1035 Method: DPT Monitor Reading (ppm): —	0-1	BROWN	SILT, CLAY WET

COMPOSITE SAMPLE DATA:

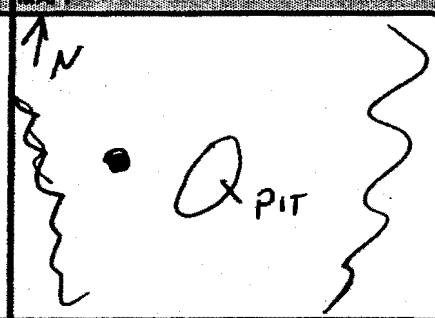
	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD — Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[ ] Surface Soil
[✓] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: 17-B-21-01
Sample Location: 17SB21
Sampled By: FCW
C.O.C. No.: 17042707

Type of Sample:
[✓] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1040 Method: OPT Monitor Reading (ppm): –	1-3	GREY GREEN	CLAY DRY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:

SEE 17-B-21-00

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[✓] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-21-03
Sample Location: 17SB21
Sampled By: FCW
C.O.C. No.: 17042707

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1050 Method: DPT Monitor Reading (ppm): –	3'-5'	GREY ORANGE	SILTY CLAY DAMP

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:

SEE 17-B-21-00

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-B-22-00
Sample Location: 17SB22
Sampled By: FCW
C.O.C. No.: 17042703

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [ ] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 0825 Method: DPT Monitor Reading (ppm): -	0-1	BROWN	SILT + SAND WET

COMPOSITE SAMPLE DATA:

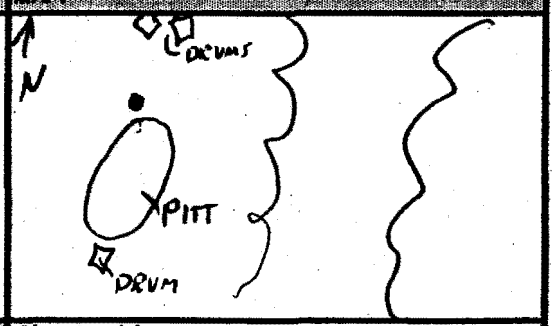
	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [signature]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-22-01
Sample Location: 175822
Sampled By: FCW
C.O.C. No.: 17042707

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 0830 Method: DPT Monitor Reading (ppm): —	1-3	GREY ORANGE	SILT + CLAY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:

SEE 17-B-22-00

Circle If Applicable:

MS/MSD —

Duplicate ID No.: 17-B-22-01-D

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-22-03
Sample Location: 17 5B22
Sampled By: FCW
C.O.C. No.: 17042703

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03	3-5	GREY/ORG	CLAY
Time: 0835			
Method: DPT			
Monitor Reading (ppm): 1.7			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:

SEE 17-B-22-00

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-B-23-00
Sample Location: MSB23
Sampled By: FCW
C.O.C. No.:

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 0800 Method: DPT Monitor Reading (ppm): –	0-1	BROWN	SILT WET

COMPOSITE SAMPLE DATA:

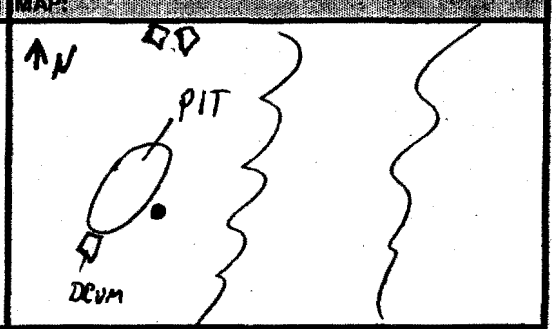
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[✓] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: M-B-23-01
Sample Location: 175823
Sampled By: FCW
C.O.C. No.:

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 0805 Method: DPT Monitor Reading (ppm): –	1-3	GREY ORG.	SILTY CLAY MOTTLED

COMPOSITE SAMPLE DATA:

	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:

SEE 17-B-23-00

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[✓] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-23-03
Sample Location: 175823
Sampled By: FCW
C.O.C. No.:

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 0810 Method: DPT Monitor Reading (ppm): -	3-5	GREY	CLAY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:

SEE 17-B-23-00

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[✓] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: 17-B-24-00
Sample Location: 175824
Sampled By: FCW
C.O.C. No.: 17042703

Type of Sample:
[ ] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1135 Method: DPT Monitor Reading (ppm): —	0-1	BROWN	WET SILT W/ ROOTS

COMPOSITE SAMPLE DATA:

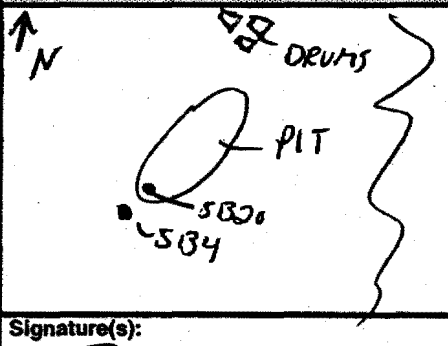
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD

Duplicate ID No.: 17-B-24-00-D

Signature(s): [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[✓] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-24-01
Sample Location: 175024
Sampled By: FCW
C.O.C. No.: 17042703

Type of Sample:
[✓] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1140 Method: DPT Monitor Reading (ppm): --	1-3	ORG/RED	SILTY CLAY MOTTLED

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:

SEE 17-B-24-00

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Fd W

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[✓] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-24-03
Sample Location: 175324
Sampled By: FCW
C.O.C. No.: 17042703

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1145 Method: DPT Monitor Reading (ppm): -	3-5	ORG GREY	SILTY CLAY DRY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:

SEE 17-B-24-00

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): FCW

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-B-25-00
Sample Location: 175825
Sampled By: FCW
C.O.C. No.: 17042503

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [ ] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1410 Method: DPT Monitor Reading (ppm): –	0-1	BROWN	SILT WET ROOTS

COMPOSITE SAMPLE DATA:

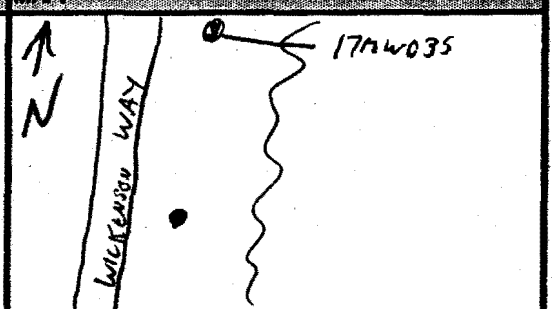
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[✓] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-25-01
Sample Location: 175B25
Sampled By: FCW
C.O.C. No.: 17042503

Type of Sample:
[✓] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1415 Method: DPT Monitor Reading (ppm): –	1-3	ORG. GREY	SILTY CLAY MOTTLED DRY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:
SEE 17-B-25-00

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[✓] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-25-03
Sample Location: 175325
Sampled By: FCW
C.O.C. No.: 17042503

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1420 Method: DPT Monitor Reading (ppm): –	3-5	ORG. GREY	SILTY CLAY DAMP

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:

SEE 17-B-25-00

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[✓] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: 17-B-26-00
Sample Location: 175826
Sampled By: FCW
C.O.C. No.: 17042707

Type of Sample:
[ ] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1330 Method: DPT Monitor Reading (ppm): -	0-1	BROWN	FINE SAND & SILT WET

COMPOSITE SAMPLE DATA:

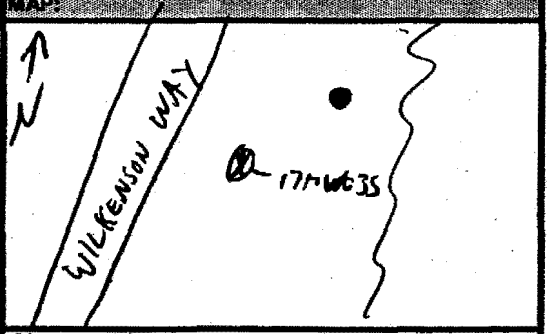
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:



Circle If Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-B-26-01
Sample Location: 17SB26
Sampled By: FCW
C.O.C. No.: 17042703

- [ ] Surface Soil
- [x] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [ ] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1335 Method: DPT Monitor Reading (ppm):	1-3	BROWN	SILT ~~T~~-CLAY DAMP

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:

SEE 17-B-26-00

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-26-03
Sample Location: 175326
Sampled By: FCW
C.O.C. No.: 17042707

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1340 Method: DPT Monitor Reading (ppm): –	3-5	GREY ORG	SILTY CLAY DAMP MOTTLED

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:

SEE 17-B-26-00

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	17-B-26-03-D

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-B-27-00
Sample Location: 17SB27
Sampled By: FCH
C.O.C. No.: 17042703

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1015 Method: DPT Monitor Reading (ppm): –	0-1	ORG BROWN	SILT - WET ROOTS

COMPOSITE SAMPLE DATA:

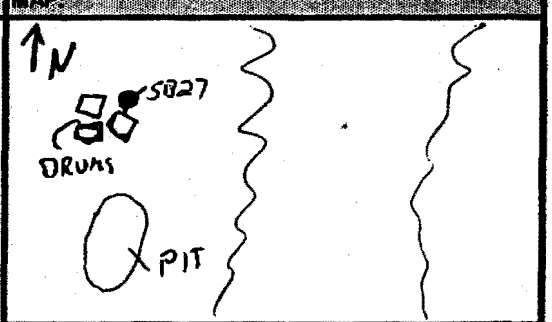
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[✓] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: 17-B-27-01
Sample Location: 175327
Sampled By: FCW
C.O.C. No.: 17042703

Type of Sample:
[✓] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1020 Method: DPT Monitor Reading (ppm): –	1-3	ORG GREY	CLAY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:

SEE 17-B-27-00

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: 17-B-27-03
Sample Location: 175827
Sampled By: FCW
C.O.C. No.: 17042707

Type of Sample:
[ ] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1025 Method: DPT Monitor Reading (ppm): –	3-5	GREY	CLAY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:

SEE 17-B-27-00

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-B-28-00
Sample Location: 175B28
Sampled By: FCW
C.O.C. No.: 17042703

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1200 Method: DPT Monitor Reading (ppm): –	0-1	BROWN	SILT 5-SAND WET

COMPOSITE SAMPLE DATA:

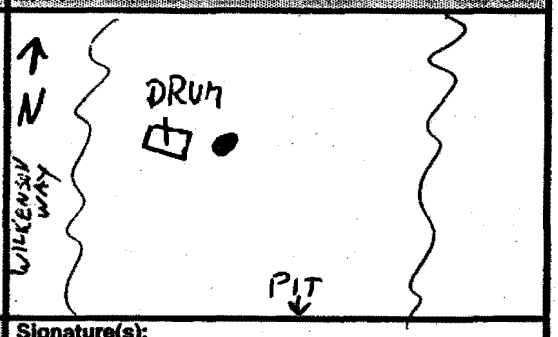
	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD — Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-B-28-01
Sample Location: 17SB28
Sampled By: PCW
C.O.C. No.: 17042703

- [ ] Surface Soil
- [x] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1205 Method: DPT Monitor Reading (ppm): -	1-3	RED ORG GREY	SILTY CLAY DRY MOTTLED

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE		

OBSERVATIONS / NOTES:

MAP:

SEE 17-B-28-00

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[✓] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-28-03
Sample Location: 17SB28
Sampled By: FCW
C.O.C. No.: 17042903

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1210 Method: DPT Monitor Reading (ppm): –	3-5	ORG/ GREY	SILTY CLAY MOTTLED DRY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:

SEE 17-B-28-00

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-B-29-00
Sample Location: 17SB29
Sampled By: FCW
C.O.C. No.: 17042703

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1350 Method: DPT Monitor Reading (ppm):	0-1	BROWN	SILT ROOTS WET

COMPOSITE SAMPLE DATA:

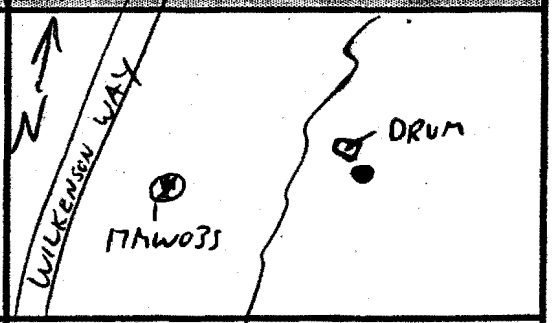
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[✓] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-29-01
Sample Location: 175829
Sampled By: FCW
C.O.C. No.: 17042703

Type of Sample:
[✓] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1355 Method: DPT Monitor Reading (ppm):	1-3	ORG/ GREY	SILTY CLAY MOTTLED WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:

SEE 17-B-29-00

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[✓] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-29-03
Sample Location: 17SB29
Sampled By: FCW
C.O.C. No.: 17042903

Type of Sample:
[✓] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03 Time: 1400 Method: DPT Monitor Reading (ppm):	3-5	ORG GREY	SILTY CLAY WET MOTTLED

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: CHARLESTON N
Project No.: 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-30-02
Sample Location: 175B30
Sampled By: FWR
C.O.C. No.: 4310, 4309

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 1-18-05 Time: 15 1250 Method: HA Monitor Reading (ppm): 20 ppm	2'-3'	YEL BRN	CLAYEY SAND MOIST TO WET PID HS = 20ppm

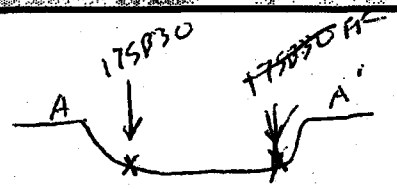
COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

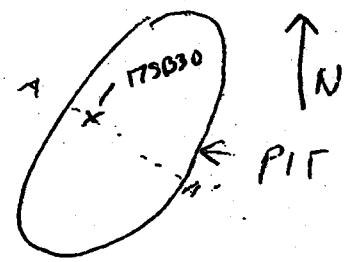
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	4x1 ENCORE	✓	—
TCL S-VOA	8oz	✓	—
PEST/PCB + TOC			
TAL METALS + CN	2oz	✓	—
EXPLOSIVES	4oz	✓	—

OBSERVATIONS/NOTES:



MAP:



Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [signature]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: CHARLESTON NWS
Project No.: 05282

Sample ID No.: 17-B-31-02
Sample Location: 17B31
Sampled By: RVZ
C.O.C. No.: 4309, 4310

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 1-18-05 Time: 1350 Method: HA / TROWEL Monitor Reading (ppm): 100	2'-3'	YEL BRN MOTTLED	SAND, f-g SILTY TR CLAY MOIST

COMPOSITE SAMPLE DATA:

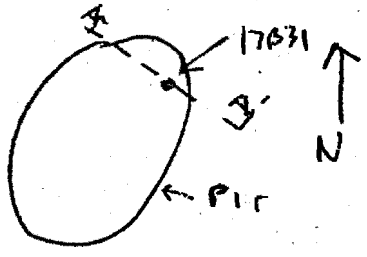
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	4 X ENCOR	✓	
TCL SVOA	3 8oz	✓	
PEST/PCBS + TOC			
TAL METALS + CN	2oz	✓	
EXPLOSIVES	4oz	✓	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD —

Duplicate ID No.: 17-B-31-02-D

Signature(s): [signature]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of___

Project Site Name: CHARLESTON NWS
Project No.: 0528

Sample ID No.: 17-B-32-03
Sample Location: 17SD32
Sampled By: FMC
C.O.C. No.: 4309, 4310

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 1-18-05 Time: 1500 Method: HA Monitor Reading (ppm): 20+	3-4	YEL BRN MOTTLED	SAND + CLAY TR SILT F-g

COMPOSITE SAMPLE DATA:

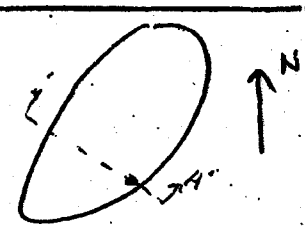
Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
~~TCL VOA~~ ~~APP IX~~ VOA	7x ENCORE	✓	
~~TO APP IX~~ SVOA TCL	8oz	✓	
PEST/PCBs			
TOC			
TAL METALS + CN	2oz	✓	
HERBICIDES	8oz	✓	
ORGANOPHOS PEST	4oz	✓	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: CHARLESTON NEVS
Project No.: 0528

Sample ID No.: 17-B-33-03
Sample Location: 17MIP27
Sampled By: PWR
C.O.C. No.: 4309, 4310

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 1-18-05 Time: 1540 Method: HA + TRENCH Monitor Reading (ppm): 22	3'-5'	DK BRN TO BLK	SAND TR SILT + CLAY BRICK PCS. WOOD FRAG (DECAYING BRN)

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

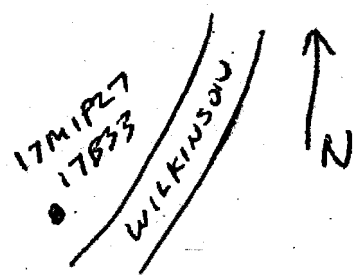
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	4x ENCORE	✓	
TCL SVOA, PEST/PCBS	3 8oz	✓	
TOC			
TAL METALS + CN	2oz	✓	
EXR	4oz	✓	

OBSERVATIONS / NOTES:

FILL MATL. !

MAP:



Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of___

Project Site Name: CHARLESTON NWS
Project No.: 0528

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 17-B-34-06
Sample Location: 17MIP41
Sampled By: FWR
C.O.C. No.:

Type of Sample: 17-B-34-06
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 1-18-05 Time: 1700 Method: HA + TROWEL Monitor Reading (ppm): 0.5	6-8	BLUE GREY	CLAY + SAND BLUE + YELLOW

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOA	4 x ENCORE	✓	
TCL SVOA, PEST/PCB	3 8oz	✓	
TOC			
TAL METALS + CN	2oz	✓	
EXP	4oz	✓	

OBSERVATIONS / NOTES:

COLLECTED @ 17MIP41 LOC.

MAP:

Circle if Applicable:

MS/MSD ✓ | Duplicate ID No.: —

Signature(s):

APPENDIX A-10
QA/QC & IDW SAMPLE LOG SHEETS

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-T-060501-01
Sampled By: FCW
C.O.C. Number: ~~16/17~~ 17060501

[x] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 6-5-01
Time: 0700
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40 ml vial	YES / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): FCW

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-T-060601-02
Sampled By: FCW
C.O.C. Number: 17-060601

[✓] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 6-6-01
Time: 0800
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40 ml vial	(YES) / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): [illegible]

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-T060701-03
Sampled By: FCW
C.O.C. Number: 17-060701

[x] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 6-7-01
Time: 0730
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40 ml Vial	YES / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): FCW

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 16-T-061101-04
Sampled By: FCW
C.O.C. Number: 16-061101

[x] Trip Blank
[ ] Source Water Blank
[ ] Rinsate Blank
[ ] Other Blank

SAMPLING DATA:

Date: 6-11-01
Time: 0900
Method:

WATER SOURCE:

[ ] Laboratory Prepared
[ ] Purchased
[ ] Other
[ ] Tap
[ ] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[ ] Dedicated
[ ] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40 ml / vial	YES / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s):

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Sample ID Number: 24-T-101101
Project Number: CTO- 457/7754
Sampled By: FCU
Sample Location: YEAMANS HALL
C.O.C. Number: 24-101101
QA Sample Type:

- [x] Trip Blank
- [ ] Rinsate Blank
- [ ] Source Water Blank
- [ ] Other Blank

SAMPLING DATA:

Date: 10-11-01
Time: 0800
Method:

WATER SOURCE:

- [ ] Laboratory Prepared
- [ ] Tap
- [ ] Purchased
- [ ] Fire Hydrant
- [ ] Other

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:

- [ ] Dedicated
- [ ] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	3X 40mL VIAL	YES / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): [illegible]

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 16-T-101901-05
Sampled By: FCW
C.O.C. Number: 16 402001

[x] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 10-19-01
Time: 1600
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40 mL	YES / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): [illegible]

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 16-T-101601-06
Sampled By: FCW
C.O.C. Number: 16-101601

[x] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 10-16-01
Time: 0800
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40 ml Vial	YES / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): FCW

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-T-101701-07
Sampled By: FCW
C.O.C. Number: 17-101701

[✓] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 10-17-01
Time: 0800
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2x 40 mL	(YES) / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): [illegible]

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 16-T-1018-01-08
Sampled By: FCW
C.O.C. Number: 16-7-101801

[] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 10-18-01
Time: 1300
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2x 40 ml	YES / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s):

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 16-T-101901-09
Sampled By: FCW
C.O.C. Number: 16-101901

[✓] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 10-19-01
Time: 0730
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40 ml Vial	YES / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): FCW

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 17
QA Sample Type:

Sample ID Number: 17-T-030702-10
Sampled By: FCW
C.O.C. Number: 17-030702

[✓] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 3-7-02
Time: 0900
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2x40 ML VIAL	(YES) / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): FCW

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 17
QA Sample Type:

Sample ID Number: 17-T-030802-11
Sampled By: Fan
C.O.C. Number: 17-030902

[x] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 3-8-02
Time: 0700
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2x 40 mL VIAL	YES / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s):

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Sample ID Number: 17-T-030902-12
Project Number: CTO 137/0528
Sampled By: FCW
Sample Location: SWMU 17
C.O.C. Number: 17030902
QA Sample Type:

[✓] Trip Blank
[] Rinsate Blank
[] Source Water Blank
[] Other Blank

SAMPLING DATA:

Date: 3-9-02
Time: 0630
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Tap
[] Purchased
[] Fire Hydrant
[] Other

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40 mL VIAL	YES / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): FCW

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

T

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 17
QA Sample Type:

Sample ID Number: 17042603-01
Sampled By: FCW
C.O.C. Number: 17042603

[✓] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 4-26-03
Time: 0700
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 X 40 ML VIAL	YES / NO
Semivolatiles	Cool 4°C	2 X 1L AMBER	YES / NO
Pesticide / PCB	Cool 4°C	2 X 1L AMBER	YES / NO
Metals	Cool 4°C & HNO_3	500 ML POLY	YES / NO
Cyanide	Cool 4°C & NaOH	250 ML POLY	YES / NO

OBSERVATIONS / NOTES:

Signature(s):

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 17
QA Sample Type:

Sample ID Number: 17-T-042703-02
Sampled By: FCW
C.O.C. Number: 17042703

- [x] Trip Blank
- [ ] Source Water Blank
- [ ] Rinsate Blank
- [ ] Other Blank

SAMPLING DATA:

Date: 4-27-03
Time: 0700
Method:

WATER SOURCE:

- [ ] Laboratory Prepared
- [ ] Purchased
- [ ] Other
- [ ] Tap
- [ ] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:

- [ ] Dedicated
- [ ] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 X 40 ML VIAL	YES / NO
Semivolatiles	Cool 4°C	2 X 1L AMBER	YES / NO
Pesticide / PCB	Cool 4°C	2 X 1L AMBER	YES / NO
Metals	Cool 4°C & HNO_3	500 ML POLY	YES / NO
Cyanide	Cool 4°C & NaOH	250 ML POLY	YES / NO

OBSERVATIONS / NOTES:

Signature(s):

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 16-F-060501-01
Sampled By: FCW
C.O.C. Number: 17060501

[] Trip Blank
[✓] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 6-5-01
Time: 1430
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[✓] Other DRILLERS POLY TANK
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2x 40ml vial	~~YES~~ / NO
Semivolatiles	Cool 4°C	2x 1 liter amber	~~YES~~ / NO
Pesticide / PCB	Cool 4°C	2x 1 liter amber	~~YES~~ / NO
Metals	Cool 4°C & HNO_3	1 liter	~~YES~~ / NO
Cyanide	Cool 4°C & NaOH	~~250~~ ml 500 ml	~~YES~~ / NO
~~Explosives~~			

OBSERVATIONS / NOTES:

Signature(s):

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

[] Trip Blank
[X] Source Water Blank
[] Rinsate Blank
[] Other Blank

Sample ID Number: 16-F-060501-02
Sampled By: FCV
C.O.C. Number: 17060501

SAMPLING DATA:

Date: 6-5-01
Time: 1450
Method:

WATER SOURCE:

[X] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	3 x 40 ml vial	YES / NO
Semivolatiles	Cool 4°C	2 x 1 liter Amber	YES / NO
Pesticide / PCB	Cool 4°C	2 x 1 liter Amber	YES / NO
Metals	Cool 4°C & HNO_3	1 liter Poly	YES / NO
Cyanide	Cool 4°C & NaOH	500 ml Poly	YES / NO

OBSERVATIONS / NOTES:

Signature(s):

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

[] Trip Blank
[X] Source Water Blank
[] Rinsate Blank
[] Other Blank

Sample ID Number: 16 F 1019 01 03
Sampled By: KEITH SIMPSON
C.O.C. Number: 16-101901

SAMPLING DATA:

Date: 10-19-01
Time: 0750
Method: DIRECT FILL

WATER SOURCE:

[] Laboratory Prepared
[X] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name: DI WATER
Supplier: VWR SCIENTIFIC
Manufacturer: NERL DIAGNOSTICS
Order Number: PO# P1395
Lot Number: 0510011
Expiration Date: 05-2002

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	✓	YES / NO
Semivolatiles	Cool 4°C	✓	YES / NO
Pesticide / PCB	Cool 4°C	✓	YES / NO
Metals	Cool 4°C & HNO_3	✓	YES / NO
Cyanide	Cool 4°C & NaOH	✓	YES / NO

OBSERVATIONS / NOTES:

Signature(s): K. Simpson

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 16 F 1019 0104
Sampled By: FW / RS
C.O.C. Number: 16-101901

[] Trip Blank
[X] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 10.19.01
Time: 0810
Method: DIRECT FILL

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[X] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	VIALS	YES / NO
Semivolatiles	Cool 4°C	2 AMBER L	YES / NO
Pesticide / PCB	Cool 4°C	2 AMBER L	YES / NO
Metals	Cool 4°C & HNO_3	1 L PE	YES / NO
Cyanide	Cool 4°C & NaOH	1 250 ML PE	YES / NO

OBSERVATIONS / NOTES:

TAP IN SWMU 5 AREA

Signature(s):

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 17
QA Sample Type:

Sample ID Number: 17-F-042703-01
Sampled By: FCW
C.O.C. Number: 17042703

[] Trip Blank
[✓] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 4-27-03
Time: 1610
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[✓] Other DRILLERS WATER
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	3 X 40 ML VIAL	YES / NO
Semivolatiles	Cool 4°C	2 X 1L AMBER	YES / NO
Pesticide / PCB	Cool 4°C	2 X 1L AMBER	YES / NO
Metals	Cool 4°C & HNO_3	500 ML POLY	YES / NO
Cyanide	Cool 4°C & NaOH	250 ML POLY	YES / NO

OBSERVATIONS / NOTES:

Signature(s):

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 17
QA Sample Type:

Sample ID Number: 17-F-042703-02
Sampled By: FCW
C.O.C. Number: 17042703

[] Trip Blank
[✓] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 4-27-03
Time: 1645
Method:

WATER SOURCE:

[] Laboratory Prepared
[✓] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	3 X 40 ML VIAL	YES / NO
Semivolatiles	Cool 4°C	2 X 1L AMBER	YES / NO
Pesticide / PCB	Cool 4°C	2 X 1L AMBER	YES / NO
Metals	Cool 4°C & HNO_3	500 ML POLY	YES / NO
Cyanide	Cool 4°C & NaOH	250 ML POLY	YES / NO

OBSERVATIONS / NOTES:

Signature(s):

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 18-R-060501-01
Sampled By: FCW
C.O.C. Number: 17-060501

[] Trip Blank
[] Source Water Blank
[✓] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 6-5-01
Time: 1550
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type: DI H_2O
Equipment Used: Split Spoon
Equipment Type:
[] Dedicated
[✓] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2x 40 ml Vial	(YES) / NO
Semivolatiles	Cool 4°C	2x 1 liter Amber	(YES) / NO
Pesticide / PCB	Cool 4°C	2x 1 liter Amber	(YES) / NO
Metals	Cool 4°C & HNO_3	1 liter Poly	(YES) / NO
Cyanide	Cool 4°C & NaOH	500 ml Poly	(YES) / NO
EXPLOSIVES	–	2x 1 liter Amber	✓

OBSERVATIONS / NOTES:

Signature(s): [signature]

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-R-060601-02
Sampled By: FCW
C.O.C. Number: 17-060601

[] Trip Blank
[] Source Water Blank
[✓] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 6-6-01
Time: 1350
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type: DI H_2O
Equipment Used: Splitspoon
Equipment Type:
[] Dedicated
[✓] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2x 40 ml vial	YES / NO
Semivolatiles	Cool 4°C	2x 1 liter Amb.	YES / NO
Pesticide / PCB	Cool 4°C	2x 1 liter Amb	YES / NO
Metals	Cool 4°C & HNO_3	1 liter poly	YES / NO
Cyanide	Cool 4°C & NaOH	500 ml poly	YES / NO
Explosives	4°C	2x 1 liter Amb	✓

OBSERVATIONS / NOTES:

Signature(s):

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-R-060701-03
Sampled By: FCW
C.O.C. Number: 17-060701

[] Trip Blank
[] Source Water Blank
[✓] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 6-7-01
Time: 1540
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type: DI H_2O
Equipment Used: SS HAND AUGER
Equipment Type:
[] Dedicated
[✓] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40 ML VIAL	~~YES~~ / NO
Semivolatiles	Cool 4°C	2x 1L AMBER	~~YES~~ / NO
Pesticide / PCB	Cool 4°C	2x 1L AMBER	~~YES~~ / NO
Metals	Cool 4°C & HNO_3	1L POLY	~~YES~~ / NO
Cyanide	Cool 4°C & NaOH	500 mL POLY	~~YES~~ / NO
EXPLOSIVES	4°C	2X 1L AMBER	YES

OBSERVATIONS / NOTES:

Signature(s): FCW

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 16-R-0611-01-04
Sampled By: FCW
C.O.C. Number: 16-061101

[] Trip Blank
[] Source Water Blank
[✓] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 6-11-01
Time: 1750
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type: DI H_2O
Equipment Used: SPLIT SPOON
Equipment Type:
[] Dedicated
[✓] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2x 40 ml VIAL	YES / NO
Semivolatiles	Cool 4°C	2x 1L AMBER	YES / NO
Pesticide / PCB	Cool 4°C	2x 1L AMBER	YES / NO
Metals	Cool 4°C & HNO_3	1 L POLY	YES / NO
Cyanide	Cool 4°C & NaOH	500 ml POLY	YES / NO
EXPLOSIVES	4°C	2x 1L AMBER	✓

OBSERVATIONS / NOTES:

Signature(s): FCW

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 16 R 1019 01 05
Sampled By: KEITH SIMPSON
C.O.C. Number: 16-10 1901

[] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 10-19-01
Time: 0815
Method: RAN WATER OVER TRAWEL TO BTL

WATER SOURCE:

[] Laboratory Prepared
[X] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name: DI WATER
Supplier: VWR SCIENTIFIC
Manufacturer: NERL DIAGNOSTICS
Order Number: PO # P1395
Lot Number: 0510011
Expiration Date: 05-2002

RINSATE INFORMATION (If Applicable):

Media Type: SEDIMENT
Equipment Used: PLASTIC TRAWEL
Equipment Type:
[X] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	VIALS	YES / NO
Semivolatiles	Cool 4°C	2 AMBER L	YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3	1 PE L	YES / NO
Cyanide	Cool 4°C & NaOH	1 250 ML PE	YES / NO

OBSERVATIONS / NOTES:

Signature(s):

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 16 R 1019 01 06
Sampled By: KS - FW
C.O.C. Number: 16-101901

[] Trip Blank
[] Source Water Blank
[X] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 10.19.01
Time: 0830
Method: PUMPED WATER THRU TUBING

WATER SOURCE:

[] Laboratory Prepared
[X] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name: DI WATER
Supplier: VWR SCIENTIFIC
Manufacturer: NERL DIAGNOSTICS
Order Number: PO # P1395
Lot Number: 05 10011
Expiration Date: 05-2002

RINSATE INFORMATION (If Applicable):

Media Type: GROUND WATER
Equipment Used: SILCONE - PE TUBING
Equipment Type:
[X] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	VOA VAIS 40 ML	(YES) / NO
Semivolatiles	Cool 4°C	2 AMBER L	(YES) / NO
Pesticide / PCB	Cool 4°C	—	YES / (NO)
Metals	Cool 4°C & HNO_3	1 L PE	(YES) / NO
Cyanide	Cool 4°C & NaOH	1 250 ML PE	(YES) / NO

OBSERVATIONS / NOTES:

SILCONE & PE TUBING USED FOR GW SAMPLING, PUMPED FROM DI CUBE IN TO SAMPLE CONTAINERS

Signature(s):

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 17
QA Sample Type:

Sample ID Number: 17-R-042803-01
Sampled By: FCW
C.O.C. Number: 17042703

[] Trip Blank
[] Source Water Blank
[✓] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 4-28-03
Time: 1510
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used: CUTTING SHOE
Equipment Type:
[] Dedicated
[✓] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	3 X 40 ML VIAL	YES / NO
Semivolatiles	Cool 4°C	2 X 1L AMBER	YES / NO
Pesticide / PCB	Cool 4°C	2 X 1L AMBER	YES / NO
Metals	Cool 4°C & HNO_3	500 ML POLY	YES / NO
Cyanide	Cool 4°C & NaOH	250 ML POLY	YES / NO

OBSERVATIONS / NOTES:

Signature(s): FCW

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 17
QA Sample Type:

Sample ID Number: 17-R-042803-02
Sampled By: FCW
C.O.C. Number: 17042703

[] Trip Blank
[] Source Water Blank
[✓] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 4-28-03
Time: 1720
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type: AQ
Equipment Used: PE+SILICON TUBING
Equipment Type:
[✓] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	3 X 40 ML VIAL	YES / NO
Semivolatiles	Cool 4°C	2 X 1L AMBER	YES / NO
Pesticide / PCB	Cool 4°C	2 X 1L AMBER	YES / NO
Metals	Cool 4°C & HNO_3	500 ML POLY	YES / NO
Cyanide	Cool 4°C & NaOH	250 ML POLY	YES / NO

OBSERVATIONS / NOTES:

Signature(s):

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

[] Trip Blank
[X] Source Water Blank
[] Rinsate Blank
[] Other Blank

Sample ID Number: 17-F-011405-01
Sampled By: FLURAMSTER
C.O.C. Number: —

SAMPLING DATA:

Date: 1-14-05
Time: 1200
Method: DIRECT FILL

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Tap
[] Fire Hydrant
[X] Other DRILLER PLASTIC TANK

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type: GROUNDWATER
Equipment Used: DIRECT PUSH
Equipment Type:

[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	3 x 40ml VIALS	(YES) / NO
Semivolatiles	Cool 4°C	2 x 1 l AMB G	(YES) / NO
Pesticide / PCB	Cool 4°C	2 x 1 l AMB G	(YES) / NO
Metals	Cool 4°C & HNO_3	1 x .5 l HDPE	(YES) / NO
Cyanide	Cool 4°C & NaOH	1 x .25 l HDPE	(YES) / NO

OBSERVATIONS / NOTES:

Signature(s): Fred Ramser

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-F-0305-03
Sampled By: SCS
C.O.C. Number: 4333

[] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank potable water

SAMPLING DATA:

Date: 1 Mar 05
Time: 1110
Method: Grab

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[X] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	3x vials glass	(YES) / NO
Semivolatiles	Cool 4°C	2x amber glass	(YES) / NO
Pesticide / PCB	Cool 4°C	2x amber glass	(YES) / NO
Metals	Cool 4°C & HNO_3	1x poly plastic	(YES) / NO
Cyanide	Cool 4°C & NaOH	1x poly plastic	(YES) / NO

OBSERVATIONS / NOTES:

Collected from black hose at the Charleston NWS Fire Station

Signature(s):

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

[] Trip Blank
[X] Source Water Blank
[] Rinsate Blank
[] Other Blank

Sample ID Number: 17-F-011405-02
Sampled By: FRED URAMSER
C.O.C. Number: —

SAMPLING DATA:

Date: 1-14-05
Time: 1640
Method: DIRECT FILL

WATER SOURCE:

[] Laboratory Prepared
[X] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name: NERL REAGENT GRADE H_2O
Supplier: NERL
Manufacturer: NERL DIST.
Order Number: —
Lot Number: 1009064
Expiration Date: 10-2005

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl		YES / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): Fred Uramser

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location:
QA Sample Type:

Sample ID Number: 17-F-0305-04
Sampled By: SCS
C.O.C. Number: 4333

[] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank DI water

SAMPLING DATA:

Date: 1 Mar 05
Time: 1335
Method: Grab

WATER SOURCE:

[] Laboratory Prepared
[X] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name: Nerl Reagent Grade Water
Supplier: Nerl
Manufacturer: Nerl Diagnostics
Order Number:
Lot Number: 1009064
Expiration Date: 10-2005

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	3x vials glass	YES / NO
Semivolatiles	Cool 4°C	2x amber glass	YES / NO
Pesticide / PCB	Cool 4°C	2x amber glass	YES / NO
Metals	Cool 4°C & HNO_3	1x poly plastic	YES / NO
Cyanide	Cool 4°C & NaOH	1x poly plastic	YES / NO

OBSERVATIONS / NOTES:

Signature(s): [illegible]

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

[] Trip Blank
[] Source Water Blank
[X] Rinsate Blank
[] Other Blank

Sample ID Number: 17-R-011305-01
Sampled By: FRED URAMSER
C.O.C. Number: —

SAMPLING DATA:

Date: 1-13-05
Time: 1645
Method: DIRECT FILL

WATER SOURCE:

[] Laboratory Prepared
[X] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name: NERL REAGENT GRADE H_2O
Supplier: NERL
Manufacturer: NERL DIAGNOSTICS
Order Number: NA
Lot Number: 1009064
Expiration Date: 10-2005

RINSATE INFORMATION (If Applicable):

Media Type: GROUNDWATER
Equipment Used: SILICON + TEFLON TUBING
Equipment Type:
[X] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	3x 40 ml VIALS	(YES) NO
Semivolatiles	Cool 4°C	2 x 1 l AMB G.	(YES) NO
Pesticide / PCB	Cool 4°C	2 x 1 l AMB G.	(YES) NO
Metals	Cool 4°C & HNO_3	1 x .5 l HDPE	YES / NO
Cyanide	Cool 4°C & NaOH	1 x .25 l HDPE	YES / NO
EXPLOSIVES		2 x 1 l AMB G	

OBSERVATIONS / NOTES:

Signature(s): Fred U Ramsey

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-T-011305-01
Sampled By: FWRAMSER
C.O.C. Number: —

[X] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 1-13-05
Time: 0800
Method: —

WATER SOURCE:

[X] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40ml VIAL	(YES) NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-R-011805-02
Sampled By: FRED URAMSER
C.O.C. Number: —

[] Trip Blank
[] Source Water Blank
[X] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 1-18-05
Time: 1330
Method: DIRECT FILL

WATER SOURCE:

[] Laboratory Prepared
[X] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name: NERL REAGENT GRADE H_2O
Supplier: NERL
Manufacturer: NERL DIAGNOSTICS
Order Number: NA
Lot Number: 1009064
Expiration Date: 10-2005

RINSATE INFORMATION (If Applicable):

Media Type: SOIL + SUBSURFACE
Equipment Used: HAND AUGER
Equipment Type:
[X] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	3x 40ml VIALS	(YES) NO
Semivolatiles	Cool 4°C	2x 1l AMB G.	(YES) NO
Pesticide / PCB	Cool 4°C	2x 1l AMB G.	(YES) NO
Metals	Cool 4°C & HNO_3	1x .5l HDPE	(YES) NO
Cyanide	Cool 4°C & NaOH	1x .25l HDPE	(YES) NO
EXPLOSIVES	cool 4°C	2x 1l AMB G	✓

OBSERVATIONS / NOTES:

Signature(s): Fred URamser

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-T-011505-01
Sampled By: FWRAMSER
C.O.C. Number: 4356

[X] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank ___

SAMPLING DATA:

Date: 1-15-05
Time: 0800
Method: —

WATER SOURCE:

[X] Laboratory Prepared
[] Purchased
[] Other ___
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40ml VIAL	(YES) / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: TB-011605-01
Sampled By: FWRAMSER
C.O.C. Number: 4355

[X] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 1-16-05
Time: 0800
Method: —

WATER SOURCE:

[X] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40ml VIAL	(YES) / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

[] Trip Blank
[] Source Water Blank

Sample ID Number: 17-T-011705-01
Sampled By: FURAMSER
C.O.C. Number: 4336

[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 1-17-05
Time: 0800
Method: —

WATER SOURCE:

[X] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40ml vial	(YES) / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): Fred M Ramser

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-T-011805-01
Sampled By: FWRAMSER
C.O.C. Number: 4347

[X] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 1-18-05
Time: 0800
Method: —

WATER SOURCE:

[X] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40ml VIAL	(YES) / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-T-021405-01
Sampled By: FURRAMSER
C.O.C. Number: 4339

[X] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 2-14-05
Time: 0900
Method: —

WATER SOURCE:

[X] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40ml VIAL	(YES) NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-T-022305-01
Sampled By: FURRAMSER
C.O.C. Number: 4340

[X] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 2-23-05
Time: 0900
Method: —

WATER SOURCE:

[X] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40ml VIAL	(YES) / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-T-022405-02
Sampled By: FWRAMSER
C.O.C. Number: 4311

[X] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 2-24-05
Time: 0900
Method: —

WATER SOURCE:

[X] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40ml VIAL	(YES) / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-T-022505-03
Sampled By: FURRAMSER
C.O.C. Number: 4311

[X] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 2-25-05
Time: 0900
Method: —

WATER SOURCE:

[X] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40ml VIAL	(YES) / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-T-022605-04
Sampled By: FURAMSER
C.O.C. Number: 4335

[X] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 2-26-05
Time: 0900
Method: —

WATER SOURCE:

[X] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40ml VIAL	(YES) NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-T-022705-05
Sampled By: FURRAMSER
C.O.C. Number: 4335

[X] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 2-27-05
Time: 0900
Method: —

WATER SOURCE:

[X] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40ml VIAL	(YES) NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-T-022805-06
Sampled By: FWRAMSER
C.O.C. Number: 4335

[X] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 2-28-05
Time: 0900
Method: —

WATER SOURCE:

[X] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40ml VIAL	(YES) / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-T-030105-07
Sampled By: FWRAMSER
C.O.C. Number: 4333

[X] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 3-1-05
Time: 1000
Method: —

WATER SOURCE:

[X] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40ml VIAL	(YES) / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-T-030805-08
Sampled By: FURAMSER
C.O.C. Number: 4358

[X] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 3-8-05
Time: 0800
Method: —

WATER SOURCE:

[X] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40ml VIAL	(YES) / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-T-030805-09
Sampled By: FWRAMSER
C.O.C. Number: 4358

[X] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 3-8-05
Time: 0800
Method: —

WATER SOURCE:

[X] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40ml VIAL	(YES) / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-T-031005-10
Sampled By: FURRAMSER
C.O.C. Number: 4313

[X] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 3-10-05
Time: 0900
Method: —

WATER SOURCE:

[X] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40ml VIAL	(YES) NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 16/17
QA Sample Type:

Sample ID Number: 17-T-031105-11
Sampled By: FURRAMSER
C.O.C. Number: 4313

[X] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 3-11-05
Time: 0800
Method: —

WATER SOURCE:

[X] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	2 x 40ml VIAL	(YES) NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[✓] QA Sample Type: FOW DECON PAD

Sample ID No.: 16-0-062101-04
Sample Location: DECON PAD
Sampled By: FCW
C.O.C. No.: 16-062101

Type of Sample:
[✓] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6-21-01			
Time: FCW ~~1610~~ 1455			
Method: PE TROWEL			
Monitor Reading (ppm): —			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings				
(Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE		
TCL SVOCS/ PEST/ PCBs	8 OZ JAR		
TAL METALS AND CYANIDE	2 OZ JAR		
EXPLOSIVES	4 OZ JAR		
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		
TCLP ORGANICS	4oz JAR	✓	
TCLP INORGANICS	1L JAR	✓	

OBSERVATIONS / NOTES:

UNDER DECON PAD
SWMU 17

MAP:

QC Samples (If Applicable):

MS/MSD	Duplicate ID No.:
—	—

Signature(s): FCW

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[✓] QA Sample Type: IDW SOIL

Sample ID No.: 17-0-062101-03
Sample Location: DRUMS
Sampled By: PCW
C.O.C. No.: 16-062101

Type of Sample:
[✓] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6-21-01			
Time: 1550			
Method: PE TROWEL			
Monitor Reading (ppm): –			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE		
TCL SVOCS/ PEST/ PCBs	8 OZ JAR		
TAL METALS AND CYANIDE	2 OZ JAR		
EXPLOSIVES	4 OZ JAR		
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		
TCLP VOCS	4 OZ JAR	✓	
TCLP ORGANICS + INORGANICS	1 L. JAR	✓	

OBSERVATIONS / NOTES:

DRUM # 2

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[✓] QA Sample Type: FOW SOIL

Sample ID No.: 17-0-062101-02
Sample Location: DRUMS
Sampled By: FCW
C.O.C. No.: 16-062101

Type of Sample:
[✓] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6-21-01			
Time: 1600			
Method: PE TROWEL			
Monitor Reading (ppm): —			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE		
TCL SVOCS/ PEST/ PCBs	8 OZ JAR		
TAL METALS AND CYANIDE	2 OZ JAR		
EXPLOSIVES	4 OZ JAR		
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		
TCLP VOCS	4 OZ JAR	✓	
TCLP ORGANICS + INORGANICS	1L JAR	✓	

OBSERVATIONS/ NOTES:

DRUMS # 1, 3, 4, 12

MAP:

CHECK if applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[✓] QA Sample Type: FDW SOIL

Sample ID No.: 16-0-0621-01-01
Sample Location: DRUMS
Sampled By: FCW
C.O.C. No.: 16-062101

Type of Sample:
[✓] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6-21-01			
Time: 1610			
Method: PE TROWEL			
Monitor Reading (ppm): —			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings				
(Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE		
TCL SVOCS/ PEST/ PCBs	8 OZ JAR		
TAL METALS AND CYANIDE	2 OZ JAR		
EXPLOSIVES	4 OZ JAR		
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		
TCLP VOCS	4 oz JAR	✓	
TCLP ORGANICS/INORGANICS	1L JAR	✓	

OBSERVATIONS/NOTES:

DRUMS # 7, 8, 11

MAP:

QC/MS/MSD:

MS/MSD

Duplicate ID No.:

Signature(s): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

16-0-062101-05

Page 1 of 1

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[] Monitoring Well Data
[] Other Well Type:
[✓] QA Sample Type: FOW H_2O

Sample ID No.: ~~16-006 210 05~~ FW
Sample Location: DRUMS
Sampled By: FCW
C.O.C. No.: 16-062101
Type of Sample:
[X] Low Concentration
[] High Concentration

Date: 6-21-01 Time: 1620	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	Sal %	ORP mv
Method:								

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method:								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type:								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	2 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	✓
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	✓
TAL METALS	HNO3	4 C	1 L POLY	✓
CYANIDE	NAOH	4 C	250 ML POLY	✓
EXPLOSIVES		4 C	2 X 1L AMBER	✓
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

DRUMS # 13, 14, 16

DECON WATER

MS/MSD —

Duplicate ID No.:

Signature(s): FCW

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[] Monitoring Well Data
[] Other Well Type:
[✓] QA Sample Type: IDW H_2O

Sample ID No.: 17-0-062101006
Sample Location: DRUMS
Sampled By: FCW
C.O.C. No.: 16-062101
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 6-21-01	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 1630	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method:								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method:								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type:								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	2 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	✓
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	✓
TAL METALS	HNO3	4 C	1 L POLY	✓
CYANIDE	NAOH	4 C	250 ML POLY	✓
EXPLOSIVES		4 C	2 X 1L AMBER	✓
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

DRUMS # 5, 9, 10, 15

SWMU 17 DVPT WATER

QC Samples:

MS/MSD — Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO - 137/ 0528

[] Domestic Well Data
[] Monitoring Well Data
[] Other Well Type:
[✓] QA Sample Type: FOW H2O

Sample ID No.: 16-0-062101-07
Sample Location: DRUMS
Sampled By: FCW
C.O.C. No.: 16-062101
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 6-21-01	Color	pH	S.C.	Temp.	Turbidity	DO	Sal	ORP
Time: 1730	Visual	Standard	mS/cm	°C	NTU	mg/l	%	mv
Method:								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Sal	ORP
Method:								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type:								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4 C	2 X 40 ML VIAL	✓
TCL SVOC		4 C	2 X 1L AMBER	✓
TCL PESTICDES/ PCBS		4 C	2 X 1L AMBER	✓
TAL METALS	HNO3	4 C	1 L POLY	✓
CYANIDE	NAOH	4 C	250 ML POLY	✓
EXPLOSIVES		4 C	2 X 1L AMBER	✓
APP. IX VOCS	HCL	4 C	2 X 40 ML VIAL	
APP. IX SVOCS		4 C	2 X 1L AMBER	
ORGANOCHLOR HERB		4 C	2 X 1L AMBER	
ORGANOPHOSPHOROUS PEST		4 C	2 X 1L AMBER	
APP. IX PEST/ PCBs		4 C	2 X 1L AMBER	

OBSERVATIONS / NOTES:

DRUMS 17, 18, 6

SWMU 16 DVPT WATER

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):
—	—	FCW

TBD: To Be Determined

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 17
QA Sample Type:

Sample ID Number: 17-0-042803-01
Sampled By: FCW
C.O.C. Number: 17042703

[] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[✓] Other Blank IDW WATER

SAMPLING DATA:

Date: 4-28-03
Time: 1530
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	3 X 40 ML VIAL	YES / NO
Semivolatiles	Cool 4°C	2 X 1L AMBER	YES / NO
Pesticide / PCB	Cool 4°C	2 X 1L AMBER	YES / NO
Metals	Cool 4°C & HNO_3	500 ML POLY	YES / NO
Cyanide	Cool 4°C & NaOH	250 ML POLY	YES / NO
EXPLOSIVES	Cool 4°C	2X 1L AMBER	✓

OBSERVATIONS / NOTES:

DRUM #1
PURGE H_2O

Signature(s): FCW

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/0528
Sample Location: SWMU 17
QA Sample Type:

Sample ID Number: 17-0-042803-02
Sampled By: FCW
C.O.C. Number: 17042703

[] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[✓] Other Blank IDW WATER

SAMPLING DATA:

Date: 4-28-03
Time: 1545
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	3 X 40 ML VIAL	YES / NO
Semivolatiles	Cool 4°C	2 X 1L AMBER	YES / NO
Pesticide / PCB	Cool 4°C	2 X 1L AMBER	YES / NO
Metals	Cool 4°C & HNO_3	500 ML POLY	YES / NO
Cyanide	Cool 4°C & NaOH	250 ML POLY	YES / NO
EXPLOSIVES	Cool 4°C	2X1 LAMBER	✓

OBSERVATIONS / NOTES:

DECON H_2O DRUM #2

Signature(s): FCW

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page 1 of ___

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[✓] QA Sample Type: 1 DW SOIL CUTTINGS

Sample ID No.: 17-0-042803-03
Sample Location: SWMU17
Sampled By: FCW
C.O.C. No.: 17042703

Type of Sample:
[✓] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03			
Time: 1315			
Method: —			
Monitor Reading (ppm): —			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
~~TCL VOCS~~	3 X 5 g ENCORE		
TCLP ORGANICS	8 oz	✓	
TCLP INORGANICS	8 oz	✓	

OBSERVATIONS / NOTES:

DRUM #3

MAP:

Circle if Applicable:

MS/MSD

~~Duplicate ID No.:~~

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[✓] QA Sample Type: IDW UNDER DECON PAD

Sample ID No.: 17-0-042803-04
Sample Location: SWMU17
Sampled By: FCW
C.O.C. No.: 17042803

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-28-03			
Time: 1600			
Method: —			
Monitor Reading (ppm): —			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE		
TCLP ORGANICS	8 oz	✓	
TCLP INORGANICS	8 oz	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): FCW

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/1028
Sample Location: SWMU 17
QA Sample Type:

[] Trip Blank
[] Source Water Blank

Sample ID Number: 17-0-032404-2
Sampled By: FCW
C.O.C. Number: 17032404

[] Rinsate Blank
[X] Other Blank IDW

SAMPLING DATA:

Date: 3-24-04
Time: 0740
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	3 X 40 ML VIAL	YES / NO
Semivolatiles	Cool 4°C	2 X 1 LITER AMBER	YES / NO
Pesticide / PCB	Cool 4°C	2 X 1 LITER AMBER	YES / NO
Metals	Cool 4°C & HNO_3	500 ML POLY	YES / NO
Cyanide	Cool 4°C & NaOH	250 ML POLY	YES / NO
EXPLOSIVES	Cool 4°C	2X 1L AMBER	YES

OBSERVATIONS / NOTES:

DRUM #7
DECON H_2O

Signature(s): [illegible]

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project Number: CTO 137/1028
Sample Location: SWMU 17
QA Sample Type:

[] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[X] Other Blank IDW

Sample ID Number: 17-O-032404-3
Sampled By: Faw
C.O.C. Number: 17032404

SAMPLING DATA:

Date: 3-24-04
Time: 0800
Method:

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name:
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl	3 ~~2~~ X 40 ML VIAL	YES / NO
Semivolatiles	Cool 4°C	2 X 1 LITER AMBER	YES / NO
Pesticide / PCB	Cool 4°C	2 X 1 LITER AMBER	YES / NO
Metals	Cool 4°C & HNO_3	500 ML POLY	YES / NO
Cyanide	Cool 4°C & NaOH	250 ML POLY	YES / NO
EXPLOSIVES	Cool 4°C	2 X 1L AMBER	YES

OBSERVATIONS / NOTES:

DRUMS # 8, 9, +10

DEVELOPMENT H_2O

Signature(s): FN

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/0528

[] Surface Soil
[] Subsurface Soil
[] Sediment
[X] Other: IDW
[] QA Sample Type:

Sample ID No.: 17-0-032404-1
Sample Location: SWMU 17
Sampled By: FAW
C.O.C. No.: 17032404

Type of Sample:
[✓] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 3-24-04			
Time: 0815			
Method: —			
Monitor Reading (ppm): —			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCLP Organics	2 OZ JAR	✓	
TCLP Inorganics	16 OZ JAR	✓	

OBSERVATIONS / NOTES:

DRUMS # 1-6

SOIL CUTTINGS

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Type: IDW (WATER)
[] QA Sample Type:

Sample ID No.: 17-O- 011805-01
Sample Location: 55-gal drums
Sampled By: BRIAN COLE
C.O.C. No.: 4347, 4309
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 1-18-05	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	TDS
Time: 1500								
Method: Peristaltic								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	✓
TCL SVOC	4°	(2) 1 L Glass amber glass	✓
TAL Metals	HNO3 4°	HDPE plastic container	✓
Cyanide	NaOH 4°	HDPE plastic container	✓
Pest/PCBs	4°	(2) 1 L Glass amber glass	✓
Explosives	4°	(2) 1 L Glass amber glass	✓
Organochlor Herb	4°	(2) 1 L Glass amber glass	
Organophos Pest	4°	(2) 1 L Glass amber glass	
APP 9 VOC	HCL 4°	(3) 40-ml vial	
APP 9 SVOC	4°	(2) 1 L Glass amber glass	
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	

OBSERVATIONS / NOTES:

SAMPLE COMPOSITED FROM TWO DRUMS OF PURGE WATER FROM ALL TEMPORARY WELLS

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [signature] FOR B. C.

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON SWMU16/17 RFI
Project No.: N0528

[] Surface Soil
[] Subsurface Soil
[] Sediment
[X] Other: IDW
[] QA Sample Type:

Sample ID No.: 17-0-011805-02
Sample Location: DRUMS (55-gal)
Sampled By: BRIAN COLE
C.O.C. No.: 4310

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 1-18-05 Time: 1600 Method: COMPOSITE Monitor Reading (ppm): —	NA	DK BRN GREY/SHGRN	SAND, SILT + CLAY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCLP ORGANICS (8260B, 8270C, 8081A 8151A)	2oz	✓	
TCLP INORGANICS 6010B, 7000A	950ml	✓	

OBSERVATIONS/NOTES:

COMPOSITE SAMPLE COLLECTED FROM 3-DRUMS FILLED W/ SOIL CUTTINGS FROM UXO CLEARING.

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [signature] FOR BRIAN COLE

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Type: IDW
[] QA Sample Type:

Sample ID No.: 17-O-01-0305
Sample Location: 55-gal drums
Sampled By: BRIAN COLE
C.O.C. No.: 4312, 4313
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 3-10-05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1600	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	✓
TCL SVOC	4°	(2) 1 L Glass amber glass	✓
TAL Metals	HNO3 4°	HDPE plastic container	✓
Cyanide	NaOH 4°	HDPE plastic container	✓
Pest/PCBs	4°	(2) 1 L Glass amber glass	✓
Explosives	4°	(2) 1 L Glass amber glass	✓
Organochlor Herb	4°	(2) 1 L Glass amber glass	
Organophos Pest	4°	(2) 1 L Glass amber glass	
APP 9 VOC	HCL 4°	(3) 40-ml vial	
APP 9 SVOC	4°	(2) 1 L Glass amber glass	
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	

OBSERVATIONS / NOTES:

COLLECTED FROM 1-DRUM CONTAINING WATER COLLECTED FROM DECON PADS USED FOR BOTH TW + PM INSTALLATIONS

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [signature] FOR B.C.

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-0-02-0305
Sample Location: 17-0-03
Sampled By: BC
C.O.C. No.: 4314

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 03/10/2005 Time: 1650 Method: Composite Monitor Reading (ppm): —	0-3"	brown/ gray	moist loamy sand

COMPOSITE SAMPLE DATA

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

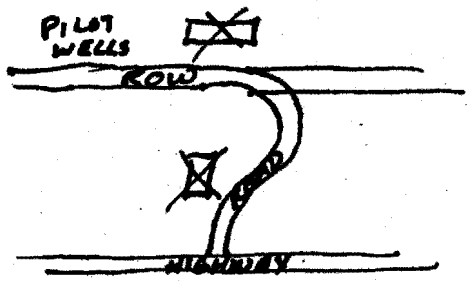
SAMPLE COLLECTION INFORMATION

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE		
TCL SVOCS/ PEST/ PCBs	8 OZ JAR		
TAL METALS AND CYANIDE	2 OZ JAR		
EXPLOSIVES	4 OZ JAR		
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOUROUS PEST	4 OZ JAR		
TCLP Organics	950 ml	1	
TCLP Inorganics	2 oz	1	

OBSERVATIONS/NOTES

Decon Pads (2)

MAP



QA/QC Applicable

MS/MSD	Duplicate ID No.:
—	—

Signature(s): B. Cee

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NWS CHARLESTON
Project No.: CTO 137/ 0528

Sample ID No.: 17-0-03-0305
Sample Location: 17-0-03
Sampled By: SGS
C.O.C. No.: 4314

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLER DATA

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10 Mar 05 Time: 1643 Method: Grab Monitor Reading (ppm):	0-0.5"	dark brown	moist dirt

COMPOSITE SAMPLE DATA

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

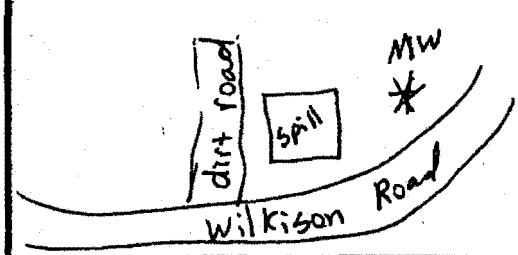
SAMPLE COLLECTION INFORMATION

Analysis	Container Requirements	Collected	Other
TCL VOCS	3 X 5 g ENCORE		
TCL SVOCS/ PEST/ PCBs	8 OZ JAR		
TAL METALS AND CYANIDE	2 OZ JAR		
EXPLOSIVES	4 OZ JAR		
APP. IX VOCS	4 OZ JAR		
APP. IX SVOCS/ PEST/ PCBs	4 OZ JAR		
HERBICIDES	4 OZ JAR		
ORGANOPHOSPHOROUS PEST	4 OZ JAR		
TCLP Inorganics	950 mL jar		
TCLP Organics.	2 oz jar		

OBSERVATIONS/NOTES:

17MW-18S storage drum spill approximately 15 gallons water spilled onto ground surface 9 Mar 05

MAP:



Circle if applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Shly L. Sugl.

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON SWMU16/17 RFI
Project No.: N0528

[] Surface Soil
[] Subsurface Soil
[] Sediment
[X] Other: IDW
[] QA Sample Type:

Sample ID No.: 17-0-04-0305
Sample Location: DRUMS
Sampled By: BRIAN COLE
C.O.C. No.: 4314

Type of Sample:
[] Low Concentration
[X] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 3-11-05			
Time: 1045			
Method: COMPOSITE			
Monitor Reading (ppm): —			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCLP ORGANICS (8260B, 8270C, 8081A 8151A)	2oz	✓	
TCLP INORGANICS 6010B, 7000A	950ml	✓	

OBSERVATIONS / NOTES:

COLLECTED FROM DRUMS W/ SOIL CUTTINGS FROM WELLS 17MW19S AND 17MW06D

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [illegible] FOR BRIAN COLE

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Type: IDW
[] QA Sample Type:

Sample ID No.: 17-0-05-0305
Sample Location: 55-gal drums
Sampled By: BRIAN COLE
C.O.C. No.: 4312, 4313
Type of Sample:
[ ] Low Concentration
[X] High Concentration

SAMPLING DATA:

Date: 3-11-05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1117	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	
TCL SVOC	4°	(2) 1 L Glass amber glass	
TAL Metals	HNO3 4°	HDPE plastic container	
Cyanide	NaOH 4°	HDPE plastic container	
Pest/PCBs	4°	(2) 1 L Glass amber glass	
Explosives	4°	(2) 1 L Glass amber glass	
Organochlor Herb	4°	(2) 1 L Glass amber glass	
Organophos Pest	4°	(2) 1 L Glass amber glass	
APP 9 VOC	HCL 4°	(3) 40-ml vial	
APP 9 SVOC	4°	(2) 1 L Glass amber glass	
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	

OBSERVATIONS / NOTES:

COLLECTED FROM DRUMS CONTAINING DEV. H_2O FROM WELLS: 17MW19S AND 17MW06D. [COMPOSITE SAMPLE]

Circle if Applicable:

MS/MSD | Duplicate ID No.: ___

Signature(s): [signature]
FOR B.C.

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON SWMU16/17 RFI
Project No.: N0528

[] Surface Soil
[] Subsurface Soil
[] Sediment
[X] Other: IDW
[] QA Sample Type:

Sample ID No.: 17-D-06-0305
Sample Location: DRUMS
Sampled By: BRIAN COLE
C.O.C. No.: 4314

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 3-11-05	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1210	NA	GREENISH GRAY + BRN	SAND-SILT + CLAY
Method: COMPOSITE			
Monitor Reading (ppm): —			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCLP ORGANICS (8260B, 8270C, 8081A 8151A)	2oz	✓	
TCLP INORGANICS 6010B, 7000A	950ml	✓	

OBSERVATIONS / NOTES:

COLLECTED FROM DRUMS CONTAINING CUTTINGS FROM 17MW14S+D, 17MW15S+D, 17MW16S+I+D, 17MW17S,I,D AND 17MW18S+D.

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [signature] FOR BRIAN COLE

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Type: IDW
[] QA Sample Type:

Sample ID No.: 17-0-07-0305
Sample Location: 55-gal drums
Sampled By: BRIAN COLE
C.O.C. No.: 4312, 4313
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 3-11-05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1245	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	✓
TCL SVOC	4°	(2) 1 L Glass amber glass	✓
TAL Metals	HNO3 4°	HDPE plastic container	✓
Cyanide	NaOH 4°	HDPE plastic container	✓
Pest/PCBs	4°	(2) 1 L Glass amber glass	✓
Explosives	4°	(2) 1 L Glass amber glass	✓
Organochlor Herb	4°	(2) 1 L Glass amber glass	
Organophos Pest	4°	(2) 1 L Glass amber glass	
APP 9 VOC	HCL 4°	(3) 40-ml vial	
APP 9 SVOC	4°	(2) 1 L Glass amber glass	
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	

OBSERVATIONS / NOTES:

COLLECTED FROM DRUMS CONTAINING DEV. H_2O FROM WELLS: 17MW14S+D, 17MW15S+D, 17MW16S,I+D, 17MW17S/I/D AND 17MW18S+D. (COMPOSITE SAMPLE)

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [illegible] FOR B.C.

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS CHARLESTON SWMU16/17 RFI
Project No.: N0528

[] Surface Soil
[] Subsurface Soil
[] Sediment
[X] Other: IDW
[] QA Sample Type:

Sample ID No.: 17-D-08-0305
Sample Location: DRUMS
Sampled By: BRIAN COLE
C.O.C. No.: 4314

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 3-11-05 Time: 1310 Method: COMPOSITE Monitor Reading (ppm): —	NA	GREENISH GRAY + BRN	SAND + SILT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCLP ORGANICS (8260B, 8270C, 8081A 8151A)	2oz	✓	
TCLP INORGANICS 6010B, 7000A	950ml	✓	

OBSERVATIONS / NOTES:

COLLECTED FROM DRUMS CONTAINING CUTTINGS FROM WELLS: 17MW12S+D, 17MW13S, 17MW20S, 17MW11S, 17MW21S, 17MW22S, 17MW23S.

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [signature] FOR BRIAN COLE

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Type: IDW
[] QA Sample Type:

Sample ID No.: 17-0-09-0305
Sample Location: 55-gal drums
Sampled By: BRIAN COLE
C.O.C. No.: 4312, 4313
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 3-11-05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1345	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative		Container Requirements	Collected
TCL VOC	HCL	4°	(3) 40-ml vial	✓
TCL SVOC		4°	(2) 1 L Glass amber glass	✓
TAL Metals	HNO3	4°	HDPE plastic container	✓
Cyanide	NaOH	4°	HDPE plastic container	✓
Pest/PCBs		4°	(2) 1 L Glass amber glass	✓
Explosives		4°	(2) 1 L Glass amber glass	✓
Organochlor Herb		4°	(2) 1 L Glass amber glass	
Organophos Pest		4°	(2) 1 L Glass amber glass	
APP 9 VOC	HCL	4°	(3) 40-ml vial	
APP 9 SVOC		4°	(2) 1 L Glass amber glass	
APP 9 Pest/PCBs		4°	(2) 1 L Glass amber glass	

OBSERVATIONS / NOTES:

COMPOSITE SAMPLE COLLECTED FROM DRUMS CONTAINING DEV. H_2O FROM WELLS: 17MW12S+D, 17MW13S, 17MW20S 17MW11S, 17MW21S, 17MW22S AND 17MW23S.

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [illegible]
FOR B.C.

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NWS Charleston SWMU 16/17 RFI
Project No.: Job # 0528 CTO 0137

[] Domestic Well Data
[] Monitoring Well Data
[x] Other Type: IDW
[] QA Sample Type:

Sample ID No.: 17-O-10-0305
Sample Location: 55-gal drums
Sampled By: BRIAN COLE
C.O.C. No.: 4312, 4313
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 3-11-05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	TDS
Time: 1155	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Peristaltic								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TDS
Method: Peristaltic								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL 4°	(3) 40-ml vial	✓
TCL SVOC	4°	(2) 1 L Glass amber glass	✓
TAL Metals	HNO3 4°	HDPE plastic container	✓
Cyanide	NaOH 4°	HDPE plastic container	✓
Pest/PCBs	4°	(2) 1 L Glass amber glass	✓
Explosives	4°	(2) 1 L Glass amber glass	✓
Organochlor Herb	4°	(2) 1 L Glass amber glass	
Organophos Pest	4°	(2) 1 L Glass amber glass	
APP 9 VOC	HCL 4°	(3) 40-ml vial	
APP 9 SVOC	4°	(2) 1 L Glass amber glass	
APP 9 Pest/PCBs	4°	(2) 1 L Glass amber glass	

OBSERVATIONS / NOTES:

COMPOSITE SAMPLE COLLECTED FROM 2 DRUMS CONTAINING THE PURGE WATER FROM ALL WELLS IN SWMU 16 + 17.

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [illegible] FOR B.C.

APPENDIX A-11
WATER-LEVEL MEASUREMENTS

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: NWS CHARLESTON
Project No.: N0528
Location: SWMU 16/17
Personnel: WUDKWYCH / RANSER
Weather Conditions: CLOUDY
Measuring Device:
Tidally Influenced: Yes X No ___
Remarks: LOW TIDE @ 0851

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	Comments
17MW01	10-10-01	754	10.51	NA	11.83	NA	-1.32	
16SG01	10-10-01	758	4.00		3.68		0.32	
16MW01		809	7.83		8.63		-0.8	
+1.95 16MW~~03~~ 02		812	4.91-1.95		2.01		0.95	16MW02
16MW03		817	4.92		2.79		2.13	
16MW05		822	4.61		3.02		1.59	
17SG04		900	3.72		~~2.37~~ 3.88' TO G.S.		-0.16	DRY
17MW03		905	8.83		9.26	NA	-0.43	
17MW02		912	7.72		8.19		-0.47	
17MW04		916	7.20		7.16		0.04	
16MW04		923	4.39		2.92		1.47	
16SG02		928	1.69		3.53		-1.84	
16SG03	10-10-01	933	2.47		4.03		-1.56	

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: NWS CHARLESTON
Project No.: N0528
Location: SWMU 16/17
Personnel: WVOKWYCH / RAISER
Weather Conditions: SUNNY
Measuring Device:
Tidally Influenced: Yes X No ___
Remarks: HIGH TIDE @ 1526

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	Comments
17MW01	10-10-01	1415	10.51	NA	11.83	NA	-1.32	
16SG01		1417	4.00		1.42		2.58	
16MW01		1424	7.83		8.62		-0.79	
+1.95 16MW02		1428	4.91 -1.95		0.98 0		2.06	
16MW03		1433	4.92		2.09		2.83	
16MW05		1437	4.61		1.84		2.77	
16MW04		1441	4.39		1.72		2.67	
16SG02		1450	1.69		NM		-	SUBMERGED CANNOT FIND
16SG03		1459	2.47		+0.65		3.12	ABOVE TOP OF S.G
17SG04		1542	3.72		0.70		3.02	
17MW03		1548	8.83		9.30		-0.47	
17MW02		1551	7.72		8.27		-0.55	
17MW04		1554	7.20		7.34		-0.14	

* All measurements to the nearest 0.01 foot

16MW02S +1.95 from TOR ELEVATION

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: NWS CHARLESTON
Project No.: CTO 137/0528
Location: SWMU 16/17
Personnel: LINDA KLINK, FRANK WODKWYCH, KEITH HENN
Weather Conditions: SUNNY 60'S
Measuring Device:
Tidally Influenced: Yes _X_ No ___
Remarks: LOW @ 1625

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	Comments
175G04	12-3-01	1504	3.72	NA	3.62+0.27 3.89	NA	-0.17	
165G03		1522	2.47		3.71+0.27 3.98		-1.51	
165G02		1533	1.69		3.3+0.27 3.57		-1.88	
16MW04S		1538	4.39		2.83		1.56	
16MW05S		1544	4.61		3.04		1.57	
16MW03S		1548	4.92		2.85		2.07	
16MW02S		1554	4.91		3.92		0.99	
16MW01S		1618	7.83		8.77		-0.94	
16SG01		1608	4.00		3.42		0.58	
17MW01S		1613	10.51		12.36		-1.85	
17MW04S		1641	7.20		7.34		-0.14	
17MW02S		1646	7.72		8.30		-0.58	
17MW03S		1653	8.83		9.71		-0.88	
~~[illegible]~~					~~[illegible]~~			

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: NWS CHARLESTON
Project No.: CTO 137/0528
Location: SWMU 16/17
Personnel: LINDA KLINK, FRANK WUDKWICH, KEITH HENN
Weather Conditions: SUNNY 60'S
Measuring Device:
Tidally Influenced: Yes X No ___
Remarks: HIGH TIDE @ 1102

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	Comments
175G04	12-4-01	1005	3.72	NA	0.95	NA	2.77	
165G03		1018	2.47		+0.80 above gauge		3.27	
165G02		1030	1.69		+2.1 above gauge		3.79	
16MW04S		1038	4.39		1.31		3.08	
16MW05S		1042	4.61		1.38		3.23	
16MW03S		1046	4.92		1.57		3.35	
16MW02S		1057	4.91		inside/outside 2.06/1.53 gauge		2.85	3.38
16MW01S		1059	7.83		8.72		-0.89	
165G01		1102	4.00		0.63		3.37	slight mounding @ culvert
17MW01S		1104	10.51		12.34		-1.83	
17MW04S		1122	7.20		7.25		-0.05	
17MW02S		1125	7.72		8.23		-0.51	
17MW03S		1127	8.83		9.67		-0.84	

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: NWS CHARLESTON
Project No.: CTO 137/0528
Location: SWMU 17
Personnel: WUDKWYCH / FOURNIER
Weather Conditions: SUNNY 50'S
Measuring Device:
Tidally Influenced: Yes X No
Remarks: LOW = 0947 / HIGH = 1608

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	Comments
LOW								
MW01	4-23-03	1015	10.51	NA	L 6.24	NA	4.27	
MW02	↓	0925	7.72	↓	3.90	↓	3.82	
MW03	↓	0930	8.83	↓	4.60	↓	4.23	
MW04	↓	0921	7.2	↓	3.54	↓	3.66	
SG04	↓	—			—			
HIGH								GROUND
MW01	4-23-03	1620	10.51	NA	6.36	NA	4.15	7.23
MW02	↓	1555	7.72	↓	4.09	↓	3.63	4.56
MW03	↓	1600	8.83	↓	4.70	↓	4.13	5.95
MW04	↓	1550	7.2	↓	3.72	↓	3.48	4.39

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

SHEET 1 OF 2

Project Name: NWS CHARLESTON
Project No.: N0528
Location: SWMU 16/17
Personnel: FRED WRAMSER
Weather Conditions: SUNNY 70'S
Measuring Device: M-SCOPE
Tidally Influenced: Yes X No ___
Remarks: HARD RAIN YESTERDAY LO TIDE

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	Comments
16PZ01	2-22-05	1345	4.80	7.1	2.95	—	1.85	NEEDS DEVELOPED
17MW01S		1355	10.51	—	7.20	—	3.31	
16MW01S		1440	7.83	NM	4.25	—	3.58	CUT LOCK
16MW02S		1450	4.91		4.33	NA	0.58	
16SG01		1455	4.00		4.17		-0.17	
16MW03S		1500	4.92		2.88		2.04	
16SG02		VERY SOFT + DEEP MUDS PREVENT ACCESS						DAMAGED DRY
16MW05S		1510	4.61	NM	3.13		1.48	
16MW04S		1515	4.39		3.25		1.14	
17MW12S		1535	7.48	16.22	3.40		4.08	
16SG03		VERY SOFT + DEEP MUDS PREVENT ACCESS						
17MW12D		1536	7.30	31.73	4.33		2.97	
17MW20S		1545	7.38	NM	3.90		3.48	
17MW04S		1547	7.20		3.34		3.86	
17MW18S		1550	5.41		2.00		3.41	
17MW18D		1551	5.48		2.71		2.77	
17MW17D		1555	6.00		3.27		2.73	
17MW17S		1557	6.19		2.66		3.53	
17MW17I		1559	6.07		3.42		2.65	
17MW16S		1600	5.83		2.45		3.38	
17MW16D		1601	5.92		3.19		2.73	
17MW16I		1602	6.05		3.31		2.74	
17MW15S		1603	6.01		2.73		3.28	
17MW15D		1604	5.92		3.19		2.73	
17MW14D	2-22-05	1605	6.66	NM	3.98	NA	2.68	

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

SHEET 2 OF 2

Project Name: NWS CHARLESTON
Project No.: N0528
Location: SWMU 16/1
Personnel: PERRO WRAMSER
Weather Conditions: SUNNY
Measuring Device: M-SCOPE
Tidally Influenced: Yes _X_ No ___
Remarks: LO TIDE

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	Comments
17MW02S	2-22-05	1615	7.72	NM	3.37	NA	4.35	
17MW19S		1617	7.81		3.70		4.11	
17MW05S		1618	7.77		3.99		3.78	
17MW06S		1619	7.89		4.35		3.54	
17MW06D		1710	7.69		4.23		3.46	
17MW07S		1620	7.93		4.36		3.57	
17MW23S		1625	7.18		3.08		4.10	
17MW11S		1627	9.78		5.74		4.04	
17MW03S		1632	8.83		4.59		4.24	
17MW22S		1633	10.28		6.34		3.94	
17MW21S		1635	10.47		6.64		3.83	
17MW13S		1636	7.56	NM	3.07	NA	4.49	
17SG04		CAN NOT		LOCATE	1635 HRS	THRU	1705 HRS	
17MW14S		1720	6.27	NM	2.88	NA	3.39	
17SG05	2-22-05	1740	5.75	NM	5.90	NA	-0.15	

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

SHEET 1 OF 2

Project Name: NWS CHARLESTON **Project No.:** N0528
Location: SWMU 16/17 **Personnel:** FRED W RAMSER / BRIAN COLE
Weather Conditions: CLEAR & WINDY GUSTS 20-25 **Measuring Device:** M-SCOPE
Tidally Influenced: Yes X No ___ AND NO HI TIDE **Remarks:** HEAVY RAIN 3" RAIN 24HRS 2/27

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	Comments
17S606 05	3-1-05	1145	5.75	NA	4.4	NA	1.35	
16MW01	3-1-05	1205	4.39	16.45	2.95		1.44	
16MW05S	3-1-05	1206	4.61	16.40	2.94		1.67	
16MW03S		1208	4.92	16.60	2.95		1.97	
16MW02S		1210	4.91	18.55	3.51		1.40	DTW SW 3.68 TPH
16S601		1225	4.00	NA	2.80		1.20	
16MW01S		1228	7.83	17.45	3.57		4.26	
17MW12S		1258	7.48	16.70	2.90		4.58	
17MW12D		1259	7.30	33.65	3.57		3.73	
17MW23S		1300	7.18	21.65	2.44		4.74	
17MW11S		1302	9.78	22.25	4.89		4.89	
17MW22S		1304	10.28	22.50	5.36		4.92	
17MW21S		1305	10.47	20.60	5.60		4.87	
17MW03S		1306	8.83	18.30	3.73		5.10	
17MW20S		1310	7.38	17.70	3.24		4.14	
17MW04S		1313	7.20	18.30	2.98		4.22	
17MW18S		1315	5.41	16.25	1.91		3.50	
17MW18D		1316	5.48	24.75	2.26		3.22	
17MW17D		1318	6.00	40.03	2.80		3.20	
17MW17S		1318	6.19	16.52	2.57		3.62	
17MW17I		1319	6.07	19.99	2.90		3.17	
17MW16S		1321	5.83	17.50	2.34		3.49	
17MW16D		1322	5.92	45.15	2.72		3.20	
17MW16I		1324	6.05	27.65	2.88		3.17	
17MW15S		1326	6.01	22.10	2.40	NA	3.61	

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

SHEET 2 OF 2

Project Name: NWS Charleston **Project No.:** N0528
Location: SWMU 16/17 **Personnel:** Fred Ramser / Brian Cole
Weather Conditions: Clear + windy Gusts 20-25 **Measuring Device:**
Tidally Influenced: Yes X No ___ and No HI TIDE **Remarks:** Hard Rain 3" Rain 24HRS 2/27

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	Comments
17MW15D	3/1/2005	1328	5.92	41.70	2.75	NA	3.17	
17MW14D		1329	6.66	28.14	3.48		3.18	
17MW14S		1329	6.27	17.56	2.68		3.59	
17MW02S		1332	7.72	18.30	3.18		4.54	
17MW19S		1335	7.81	20.65	3.28		4.53	
17MW05S		1336	7.77	20.90	3.36		4.41	
17MW06S		1337	7.89	21.15	3.56		4.33	
17MW06D		1338	7.69	25.60	3.62		4.07	
17MW07S		1339	7.93	21.35	3.59		4.34	
17MW13S		1344	7.56	16.51	2.73		4.83	
17MW01S		1412	10.51	18.00	5.58		4.93	
16PZ01		1416	4.80	11.22	2.56	NA	2.24	

* All measurements to the nearest 0.01 foot

APPENDIX A-12
SURVEY COORDINATES

SURVEY COORDINATES
SWMU 16 AND 17
2001 Through 2005
Naval Weapons Station, Charleston, South Carolina

Location	Location Type	Northing	Easting	Ground Surface	Top of Casing	Top of Riser	Surveyor
16MW01S	MW	397987.2661	2320919.0335	4.89	8.18	7.83	Donaldson Garret & Associates, Inc.
16MW02S	MW	398042.1787	2320606.3007	0.65		4.91	Donaldson Garret & Associates, Inc.
16MW03S	MW	397728.0346	2320274.0672	2.08	5.24	4.92	Donaldson Garret & Associates, Inc.
16MW04S	MW	397189.5322	2320693.8915	1.51	4.59	4.39	Donaldson Garret & Associates, Inc.
16MW05S	MW	397306.6424	2320382.6385	1.63	4.76	4.61	Donaldson Garret & Associates, Inc.
16PZ01	PZ	398348.04	2320845.41	2.58	4.8		Palmetto Land Surveying, Inc.
16SB01	SB	398042.1787	2320606.3007	0.65			Donaldson Garret & Associates, Inc.
16SB02	SB	397716.6267	2320568.3042	3.81			Donaldson Garret & Associates, Inc.
16SB03	SB	397524.7329	2320497.9982	2.84			Donaldson Garret & Associates, Inc.
16SB04	SB	397358.8401	2320896.0244	3.07			Donaldson Garret & Associates, Inc.
16SG01	SG	398263.7482	2320717.0099	NA			Donaldson Garret & Associates, Inc.
16SG02	SG	397356.8102	2320268.5163	NA			Donaldson Garret & Associates, Inc.
16SG03	SG	396959.2215	2320174.9539	NA			Donaldson Garret & Associates, Inc.
16SS01	SS	397487.1053	2320615.9182	3.18			Donaldson Garret & Associates, Inc.
16SS02	SS	397313.9417	2320608.446	3.05			Donaldson Garret & Associates, Inc.
16SS03	SO	397249.15	2320670.12	4.1			Palmetto Land Surveying, Inc.
16SS04	SO	397307.36	2320645.75	4.23			Palmetto Land Surveying, Inc.
16SWSD01	SWSD	398262.3175	2320712.6903	2.15			Donaldson Garret & Associates, Inc.
16SWSD02	SWSD	398114.2713	2320639.2375	-0.1			Donaldson Garret & Associates, Inc.
16SWSD03	SWSD	397969.2593	2320533.9459	0.11			Donaldson Garret & Associates, Inc.
16SWSD04	SWSD	397748.0862	2320174.1691	0.2			Donaldson Garret & Associates, Inc.
16SWSD05	SWSD	397191.5318	2320635.2341	0.78			Donaldson Garret & Associates, Inc.
16SWSD06	SWSD	397384.2283	2320264.8321	0.16			Donaldson Garret & Associates, Inc.
16SWSD07	SWSD	396950.4333	2320183.3749	1.1			Donaldson Garret & Associates, Inc.
17-PS-1*	MW	397239.0561	2321244.2498	5.16		8.04	Palmetto Land Surveying, Inc.
17-PS-2*	MW	397241.5962	2321249.4428	5.3		7.97	Palmetto Land Surveying, Inc.
17-PS-3*	MW	397248.0191	2321247.2223	5.11		5.01	Palmetto Land Surveying, Inc.
17-PSG-1*	MW	397243.802	2321244.9928	6.203		9.25	Palmetto Land Surveying, Inc.
17-PSG-2*	MW	397255.4217	2321203.8996	5.28		7.82	Palmetto Land Surveying, Inc.
17-PSI-1*	MW	397252.4063	2321239.7965	6.183		8.19	Palmetto Land Surveying, Inc.
17-PSI-10*	MW	397244.5505	2321248.2235	5.27		4.88	Palmetto Land Surveying, Inc.
17-PSI-11*	MW	397240.1693	2321247.0062	4.888		6.86	Palmetto Land Surveying, Inc.
17-PSI-12*	MW	397236.2913	2321245.8778	5.11		4.88	Palmetto Land Surveying, Inc.
17-PSI-13*	MW	397248.6439	2321253.8622	5.09		4.74	Palmetto Land Surveying, Inc.
17-PSI-14*	MW	397243.2775	2321253.556	4.902		7.18	Palmetto Land Surveying, Inc.

SURVEY COORDINATES
SWMU 16 AND 17
2001 Through 2005
Naval Weapons Station, Charleston, South Carolina

Location	Location Type	Northing	Easting	Ground Surface	Top of Casing	Top of Riser	Surveyor
17-PSI-15*	MW	397238.4016	2321251.8877	5.28		5.01	Palmetto Land Surveying, Inc.
17-PSI-16*	MW	397234.4705	2321249.8904	4.717		6.79	Palmetto Land Surveying, Inc.
17-PSI-2*	MW	397247.779	2321238.5213	5.11		4.81	Palmetto Land Surveying, Inc.
17-PSI-3*	MW	397242.9505	2321237.2324	4.785		6.86	Palmetto Land Surveying, Inc.
17-PSI-4*	MW	397237.4408	2321236.3025	5.22		4.9	Palmetto Land Surveying, Inc.
17-PSI-5*	MW	397251.7482	2321244.718	5.14		4.86	Palmetto Land Surveying, Inc.
17-PSI-6*	MW	397247.4348	2321244.172	4.836		7.15	Palmetto Land Surveying, Inc.
17-PSI-7*	MW	397241.6953	2321242.3244	5.36		5.1	Palmetto Land Surveying, Inc.
17-PSI-8*	MW	397236.8438	2321241.237	4.945		6.89	Palmetto Land Surveying, Inc.
17-PSI-9*	MW	397249.9361	2321249.3224	6.037		8.07	Palmetto Land Surveying, Inc.
17-PSTW-10*	MW	397224.6968	2321237.5799	NA			Palmetto Land Surveying, Inc.
17-PSTW-11*	MW	397215.4853	2321233.906	NA			Palmetto Land Surveying, Inc.
17-PSTW-12*	MW	397196.6083	2321225.878	NA			Palmetto Land Surveying, Inc.
17-PSTW-13*	MW	397237.5473	2321264.718	NA			Palmetto Land Surveying, Inc.
17-PSTW-14*	MW	397234.8894	2321274.783	NA			Palmetto Land Surveying, Inc.
17-PSTW-15*	MW	397229.6844	2321293.756	NA			Palmetto Land Surveying, Inc.
17-PSTW-4*	MW	397263.5123	2321250.2773	NA			Palmetto Land Surveying, Inc.
17-PSTW-5*	MW	397272.6894	2321252.9023	NA			Palmetto Land Surveying, Inc.
17-PSTW-6*	MW	397291.415	2321256.826	NA			Palmetto Land Surveying, Inc.
17-PSTW-7*	MW	397248.2661	2321226.5505	NA			Palmetto Land Surveying, Inc.
17-PSTW-8*	MW	397250.7106	2321216.9624	NA			Palmetto Land Surveying, Inc.
17-PSTW-9*	MW	397257.0743	2321198.2484	NA			Palmetto Land Surveying, Inc.
17MIP01-TW31	MPTW	397603.4518	2321085.1959	8.399			Palmetto Land Surveying, Inc.
17MIP02-TW30-MW22S	MPTW	397554.2938	2321071.043	7.712			Palmetto Land Surveying, Inc.
17MIP03-TW29-MW11S	MPTW	397507.789	2321057.2739	7.179			Palmetto Land Surveying, Inc.
17MIP04-TW28	MPTW	397460.575	2321043.7298	6.382			Palmetto Land Surveying, Inc.
17MIP05-TW27	MPTW	397412.8475	2321029.3244	5.257			Palmetto Land Surveying, Inc.
17MIP06-TW26	MPTW	397539.2926	2321149.913	6.109			Palmetto Land Surveying, Inc.
17MIP07-TW24	MPTW	397453.8257	2321124.3363	5.931			Palmetto Land Surveying, Inc.
17MIP08-TW23	MPTW	397406.3765	2321110.0234	5.59			Palmetto Land Surveying, Inc.
17MIP09-TW21	MPTW	397361.97	2321097.4283	5.247			Palmetto Land Surveying, Inc.
17MIP10-TW25SD	MPTW	397487.2806	2321179.1859	6.184			Palmetto Land Surveying, Inc.
17MIP11-TW11	MPTW	397507.5383	2321286.5571	6.39			Palmetto Land Surveying, Inc.
17MIP12-TW12	MPTW	397428.3918	2321251.421	5.74			Palmetto Land Surveying, Inc.
17MIP13-TW16	MPTW	397348.7641	2321190.7555	5.54			Palmetto Land Surveying, Inc.

SURVEY COORDINATES
SWMU 16 AND 17
2001 Through 2005
Naval Weapons Station, Charleston, South Carolina

Location	Location Type	Northing	Easting	Ground Surface	Top of Casing	Top of Riser	Surveyor
17MIP14-TW22	MPTW	397350.108	2321140.9012	5.996			Palmetto Land Surveying, Inc.
17MIP15-TW15	MPTW	397318.4417	2321201.9339	5.361			Palmetto Land Surveying, Inc.
17MIP16-TW14	MPTW	397294.2477	2321220.8292	4.971			Palmetto Land Surveying, Inc.
17MIP17-TW20	MPTW	397273.3748	2321160.7475	5.631			Palmetto Land Surveying, Inc.
17MIP18-TW17	MPTW	397291.6376	2321185.6954	6.098			Palmetto Land Surveying, Inc.
17MIP19-TW18	MPTW	397268.3657	2321200.3809	5.779			Palmetto Land Surveying, Inc.
17MIP20-TW19	MPTW	397240.7929	2321180.7286	5.526			Palmetto Land Surveying, Inc.
17MIP21-TW13	MPTW	397284.6711	2321272.7467	4.596			Palmetto Land Surveying, Inc.
17MIP22	MIP	398017.9037	2321219.425	7.349			Palmetto Land Surveying, Inc.
17MIP23-TW32	MPTW	397368.67	2321021.94	4.66			Palmetto Land Surveying, Inc.
17MIP24-TW33	MPTW	397326.58	2321017.19	3.97			Palmetto Land Surveying, Inc.
17MIP25-TW34	MPTW	397293.86	2321003.19	4.77			Palmetto Land Surveying, Inc.
17MIP26-TW35	MPTW	397244.93	2320988.76	4.36			Palmetto Land Surveying, Inc.
17MIP27-TW36	MPTW	397202.31	2320980.53	4.95			Palmetto Land Surveying, Inc.
17MIP28-TW37	MPTW	397337.16	2321086.14	5.6			Palmetto Land Surveying, Inc.
17MIP29-TW38-MW12S	MPTW	397266.93	2321063.13	4.86			Palmetto Land Surveying, Inc.
17MIP30-TW39	MPTW	397221.27	2321056.49	5.14			Palmetto Land Surveying, Inc.
17MIP31-TW40	MPTW	397139.93	2321034.47	4.47			Palmetto Land Surveying, Inc.
17MIP32-TW41	MPTW	397530.03	2321237.19	5.95			Palmetto Land Surveying, Inc.
17MIP33-TW42	MPTW	397369.46	2321272.88	4.55			Palmetto Land Surveying, Inc.
17MIP34-TW43	MPTW	397248.8	2321156.32	6.18			Palmetto Land Surveying, Inc.
17MIP35-TW44	MPTW	397490.1	2321356.9	4.93			Palmetto Land Surveying, Inc.
17MIP36-TW45	MPTW	397401.34	2321341.4	4.6			Palmetto Land Surveying, Inc.
17MIP37-TW46	MPTW	397279.09	2321302.81	4.06			Palmetto Land Surveying, Inc.
17MIP38-TW47-MW14S	MPTW	397531.03	2321501.93	4.03			Palmetto Land Surveying, Inc.
17MIP39-TW48-MW15S	MPTW	397436.43	2321465.86	3.29			Palmetto Land Surveying, Inc.
17MIP40-TW49-MW16I	MPTW	397351.82	2321420.13	3.22			Palmetto Land Surveying, Inc.
17MIP41-TW50-MW17I	MPTW	397292.88	2321384.73	3.46			Palmetto Land Surveying, Inc.
17MIP42-TW51-MW18S	MPTW	397208.09	2321366.85	3.37			Palmetto Land Surveying, Inc.
17MIP43-TW52-MW19S	MPTW	397334.39	2321196.79	5.5			Palmetto Land Surveying, Inc.
17MIP44-TW53	MPTW	397187.03	2321212.2	4.72			Palmetto Land Surveying, Inc.
17MIP45-TW54	MPTW	397211.58	2321198.88	4.72			Palmetto Land Surveying, Inc.
17MIP46-TW55	MPTW	397208.41	2321281.01	4.07			Palmetto Land Surveying, Inc.
17MIP47-TW56	MPTW	397229.46	2321175.6	5.78			Palmetto Land Surveying, Inc.
17MIP48-TW57-MW20S	MPTW	397173.68	2321216.05	4.68			Palmetto Land Surveying, Inc.

SURVEY COORDINATES
SWMU 16 AND 17
2001 Through 2005
Naval Weapons Station, Charleston, South Carolina

Location	Location Type	Northing	Easting	Ground Surface	Top of Casing	Top of Riser	Surveyor
17MIP49-TW58	MPTW	397212.47	2321211.45	4.58			Palmetto Land Surveying, Inc.
17MIP50-TW59	MPTW	397311.74	2321181.41	6.33			Palmetto Land Surveying, Inc.
17MIP51-TW60	MPTW	397309.48	2321263.33	4.57			Palmetto Land Surveying, Inc.
17MIP52-TW61	MPTW	397328.22	2321270.19	4.66			Palmetto Land Surveying, Inc.
17MIP53-TW62	MPTW	397271.27	2321278.42	4.15			Palmetto Land Surveying, Inc.
17MIP54-TW63	MPTW	397250.46	2321304.37	4.32			Palmetto Land Surveying, Inc.
17MIP55-TW64	MPTW	397299.07	2321301.81	4.14			Palmetto Land Surveying, Inc.
17MW01	MW	398024.2675	2321221.2723	7.23	11.21	10.51	Donaldson Garret & Associates, Inc.
17MW02S	MW	397442.5013	2321322.9797	4.56	8.02	7.72	Donaldson Garret & Associates, Inc.
17MW03S	MW	397501.9857	2321135.3097	5.95	9.13	8.83	Donaldson Garret & Associates, Inc.
17MW04S	MW	397023.706	2321129.466	4.39	7.51	7.2	Donaldson Garret & Associates, Inc.
17MW05S	MW	397272.7887	2321215.29	5.31		7.83	Palmetto Land Surveying, Inc.
17MW06D	MW	397246.08	2321206.63	5.37	7.69		Palmetto Land Surveying, Inc.
17MW06S	MW	397253.9852	2321209.3903	5.49		7.95	Palmetto Land Surveying, Inc.
17MW07S	MW	397234.3491	2321203.959	5.44		7.99	Palmetto Land Surveying, Inc.
17MW11S	MW	397501.23	2321062.28	7.36	9.78		Palmetto Land Surveying, Inc.
17MW12D	MW	397266.21	2321064.86	5.38	7.3		Palmetto Land Surveying, Inc.
17MW12S	MW	397256.37	2321070.34	5.41	7.48		Palmetto Land Surveying, Inc.
17MW13S	MW	397847.74	2321436.38	5.39	7.56		Palmetto Land Surveying, Inc.
17MW14D	MW	397530.54	2321499.6	4.05	6.66		Palmetto Land Surveying, Inc.
17MW14S	MW	397539.42	2321498.64	3.95	6.27		Palmetto Land Surveying, Inc.
17MW15D	MW	397436.19	2321462.83	3.45	5.92		Palmetto Land Surveying, Inc.
17MW15S	MW	397434.77	2321457.71	3.76	6.01		Palmetto Land Surveying, Inc.
17MW16D	MW	397350.51	2321425.29	3.48	5.92		Palmetto Land Surveying, Inc.
17MW16I	MW	397350.2	2321420.68	3.66	6.05		Palmetto Land Surveying, Inc.
17MW16S	MW	397351.01	2321430.67	3.52	5.83		Palmetto Land Surveying, Inc.
17MW17D	MW	397284.48	2321379.32	3.52	6		Palmetto Land Surveying, Inc.
17MW17I	MW	397295.98	2321382.43	3.42	6.07		Palmetto Land Surveying, Inc.
17MW17S	MW	397290.49	2321381.1	3.37	6.19		Palmetto Land Surveying, Inc.
17MW18D	MW	397201.33	2321365.9	3.59	5.48		Palmetto Land Surveying, Inc.
17MW18S	MW	397198.18	2321362.01	3.76	5.41		Palmetto Land Surveying, Inc.
17MW19S	MW	397336.43	2321197.09	0	7.81		Palmetto Land Surveying, Inc.
17MW20S	MW	397173.63	2321216.51	4.89	7.38		Palmetto Land Surveying, Inc.
17MW21S	MW	397615.39	2321095.35	7.99	10.47		Palmetto Land Surveying, Inc.
17MW22S	MW	397557.42	2321078.76	7.77	10.28		Palmetto Land Surveying, Inc.

SURVEY COORDINATES
SWMU 16 AND 17
2001 Through 2005
Naval Weapons Station, Charleston, South Carolina

Location	Location Type	Northing	Easting	Ground Surface	Top of Casing	Top of Riser	Surveyor
17MW23S	MW	397369.78	2321023.35	4.76	7.18		Palmetto Land Surveying, Inc.
17SB01	SB	397876.8341	2321221.1757	9.08			Donaldson Garret & Associates, Inc.
17SB02	SB	397891.1434	2321278.2105	8.08			Donaldson Garret & Associates, Inc.
17SB03	SB	397737.6092	2321215.0182	10.47			Donaldson Garret & Associates, Inc.
17SB04	SB	397810.7376	2321281.6432	9.16			Donaldson Garret & Associates, Inc.
17SB05	SB	397784.8966	2321382.7422	5.59			Donaldson Garret & Associates, Inc.
17SB06	SB	397776.3262	2321435.3009	4.78			Donaldson Garret & Associates, Inc.
17SB07	SB	397669.9475	2321187.9003	7.52			Donaldson Garret & Associates, Inc.
17SB08	SB	397660.5895	2321311.1256	6.61			Donaldson Garret & Associates, Inc.
17SB09	SB	397649.1367	2321349.2255	5.48			Donaldson Garret & Associates, Inc.
17SB10	SB	397488.2866	2321307.4932	4.86			Donaldson Garret & Associates, Inc.
17SB11	SB	397557.7062	2321152.1	6.21			Donaldson Garret & Associates, Inc.
17SB12	SB	397481.2824	2321168.3113	5.56			Donaldson Garret & Associates, Inc.
17SB13	SB	397584.1559	2321384.7141	4.42			Donaldson Garret & Associates, Inc.
17SB14	SB	397311.8523	2321181.2176	6.14			Donaldson Garret & Associates, Inc.
17SB15	SB	397405.7999	2321248.6993	4.67			Donaldson Garret & Associates, Inc.
17SB16	SB	397391.9617	2321312.2383	4.22			Donaldson Garret & Associates, Inc.
17SB17	SB	397266.0136	2321177.3451	3.43			Donaldson Garret & Associates, Inc.
17SB18	SB	397259.1042	2321235.9732	4.51			Donaldson Garret & Associates, Inc.
17SB19	SB	397198.1659	2321116.2789	4.98			Donaldson Garret & Associates, Inc.
17SB20	SB	397247.67	2321167.5068	5.071			Palmetto Land Surveying, Inc.
17SB21	SB	397273.3752	2321160.7445	5.631			Palmetto Land Surveying, Inc.
17SB22	SB	397289.3461	2321178.4587	5.856			Palmetto Land Surveying, Inc.
17SB23	SB	397261.8769	2321197.7044	5.427			Palmetto Land Surveying, Inc.
17SB24	SB	397242.533	2321166.8769	5.478			Palmetto Land Surveying, Inc.
17SB25	SB	397406.4022	2321110.0271	5.59			Palmetto Land Surveying, Inc.
17SB26	SB	397542.0522	2321169.673	5.955			Palmetto Land Surveying, Inc.
17SB27	SB	397313.1331	2321191.9157	5.329			Palmetto Land Surveying, Inc.
17SB28	SB	397385.9172	2321188.1483	5.83			Palmetto Land Surveying, Inc.
17SB29	SB	397512.5594	2321195.6577	6.126			Palmetto Land Surveying, Inc.
17SB30	SB	397260.76	2321173.71	3.94			Palmetto Land Surveying, Inc.
17SB31	SB	397266.52	2321187.99	4.68			Palmetto Land Surveying, Inc.
17SB32	SB	397252.48	2321179.64	4.33			Palmetto Land Surveying, Inc.
17SG04	SG	397358.4668	2321730.9826	NA			Donaldson Garret & Associates, Inc.
17SG05	SG	396685.95	2321583.84	0	5.75		Palmetto Land Surveying, Inc.

SURVEY COORDINATES
SWMU 16 AND 17
2001 Through 2005
Naval Weapons Station, Charleston, South Carolina

Location	Location Type	Northing	Easting	Ground Surface	Top of Casing	Top of Riser	Surveyor
17SWSD01	SWSD	397353.1267	2321728.6835	1.46			Donaldson Garret & Associates, Inc.
17TW01S	TW	397293.5292	2321216.0388	5.8			Hoggard-Eure Associates, Inc.
17TW02S	TW	397480.6117	2321277.7459	5.31			Hoggard-Eure Associates, Inc.
17TW03	TW	397592.8545	2321322.4958	5.77			Hoggard-Eure Associates, Inc.
17TW04S	TW	397755.6598	2321393.7863	5.82			Hoggard-Eure Associates, Inc.
17TW05S	TW	397939.679	2321379.1477	6.61			Hoggard-Eure Associates, Inc.
17TW06D	TW	397165.3775	2321344.9127	4.06			Hoggard-Eure Associates, Inc.
17TW06S	TW	397165.3775	2321344.9127	4.06			Hoggard-Eure Associates, Inc.
17TW07D	TW	397369.2304	2321469.574	3.94			Hoggard-Eure Associates, Inc.
17TW07S	TW	397369.2304	2321469.574	3.94			Hoggard-Eure Associates, Inc.
17TW08D	TW	397506.479	2321496.3308	4.05			Hoggard-Eure Associates, Inc.
17TW08S	TW	397506.479	2321496.3308	4.05			Hoggard-Eure Associates, Inc.
17TW09D	TW	397690.4458	2321581.6572	4.26			Hoggard-Eure Associates, Inc.
17TW09S	TW	397690.4458	2321581.6572	4.26			Hoggard-Eure Associates, Inc.
17TW10D	TW	397863.153	2321609.8282	3.94			Hoggard-Eure Associates, Inc.
17TW10S	TW	397863.153	2321609.8282	3.94			Hoggard-Eure Associates, Inc.

* Solutions-IES locations in support of treatability study.

MIP = Membrane Interface Probe.
MPTW = Membrane Interface Probe/Temporary Well.
MW = Monitoring Well.
PZ = Piezometer.
SB = Soil Boring.
SG = Staff Gauge.
SO = Surface Soil.
SW/SD = Surface Water/Sediment.
TW = Temporary Well.

Horizontal Datum (Easting) reference is North American Datum (NAD83).
Vertical Datum (Northing) reference is North American Vertical Datum (NAVD 88).

SURVEY COORDINATES
SWMU 16
Field Mapping of Historic Trench Locations from Aerial Photos 03/04
and Historic Monitoring Well NWS-2-6
Naval Weapons Station,Charleston, South Carolina

VERTICAL DATUM: North American Vertical Datum (NAVD 88)
HORIZONTAL DATUM: North American Datum (NAD 83)

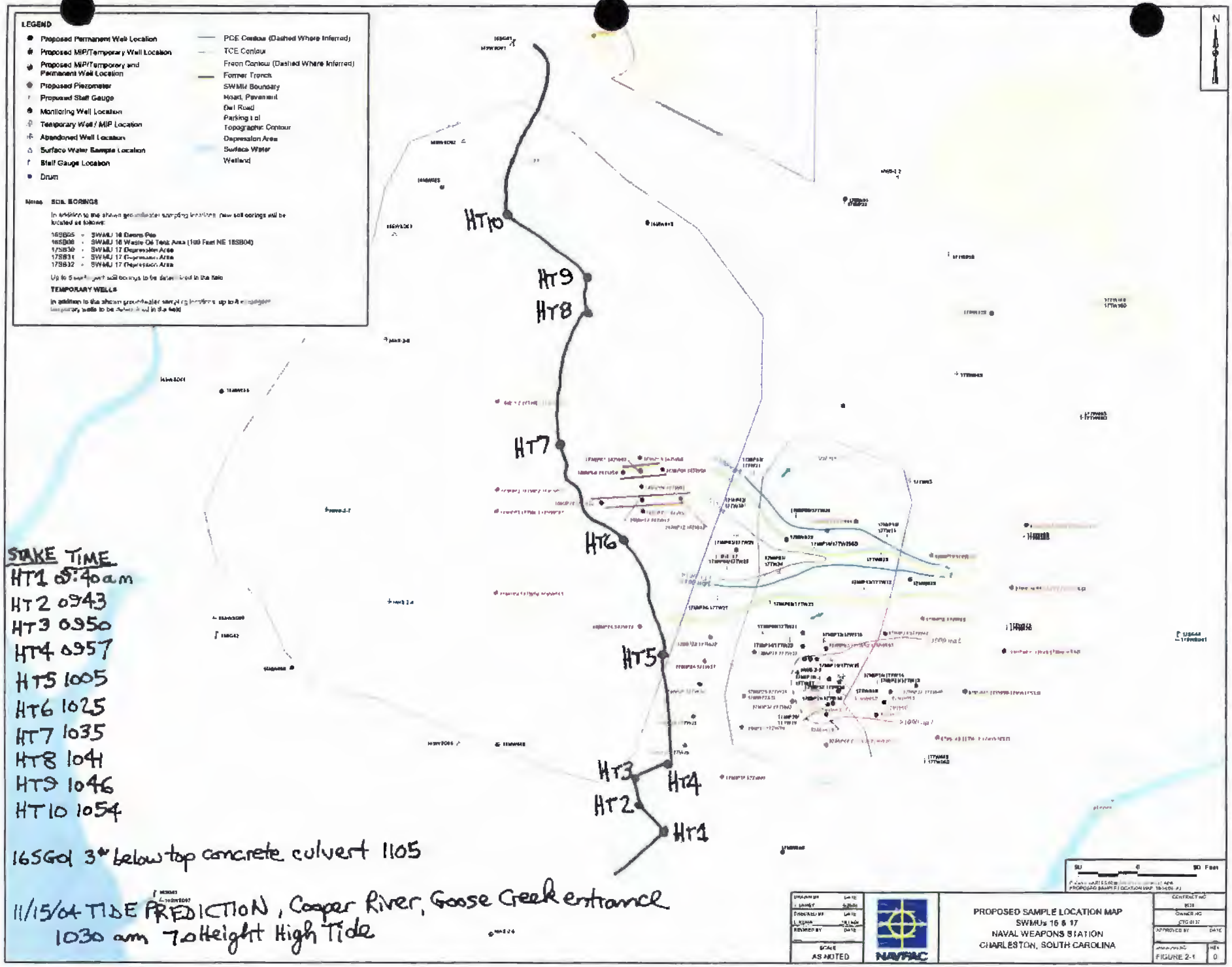
Description	Easting	Northing
Northern Trench Corners		
NORTH - NW	2320884.64871	397614.25843
NORTH - SW	2320879.44305	397596.54623
NORTH - NE	2320940.90669	397619.47876
NORTH - SE	2320951.32833	397602.81149
Southern Trench Corners		
SOUTH - NW	2320836.73407	397565.28275
SOUTH - SW	2320856.53159	397551.74284
SOUTH - NE	2320987.79809	397574.68921
SOUTH - SE	2320977.38285	397559.05964
Historic Monitoring Well		
NWS-2-6	2320684.59250	396897.22240

SURVEY COORDINATES
SWMU 16
Naval Weapons Station, Charleston, South Carolina

VERTICAL DATUM: North American Vertical Datum (NAVD 88)
HORIZONTAL DATUM: North American Datum (NAD 83)

Field Mapping of SWMU 16 High Tide Water Line of 2004

Description	Northing	Easting	Ground Surface
HT-1	397142.8	2320951	3.09
HT-2	397143.6	2320898	3.59
HT-3	397169.7	2320811	3.42
HT-4	397190.4	2320889	3.51
HT-5	397269.9	2320921	3.26
HT-6	397499.8	2320866	3.35
HT-7	397696.5	2320771	3.56
HT-8	397812.7	2320678	3.49
HT-9	397886.4	2320731	3.7
HT-10	398063.1	2320713	4.14



11/15/04 HI-TIDE FIELD MAPPING SWMU 16

APPENDIX A-13
IDW DISPOSAL DOCUMENTATION

IDW DRUMS

NON HAZ AQUEOUS 2001

WATER RECOVERY SYSTEMS LLC

No. 01836

MANIFEST - NON-HAZARDOUS WASTEWATER

1. Generator's EPA ID# (if applicable) — Waste ID Number

2. Generator's Name and Mailing Address: — Phone (843) 764-4010
NAVAL WEAPONS STATION
2316 RED BANK ROAD, BLDG 32
GOOSE CREEK, SC 29445
SC8170022620
SWMU 16/17

3. Agent of Generator and Mailing Address: — Phone ( )
SAME AS TRANSPORTER

4. Transporter Company Name: — Phone (843) 552-8306
FENN-VAC, INC.
141 FENNEL ROAD
N. CHARLESTON, SC 29419

5. Transporter U.S. EPA ID#:
SCD 980837504

6. Designated Facility Name and Site Address:
Water Recovery Systems, LLC, PO Box 70971, Charleston, SC 29415
Site address: 1500 Greenleaf Street, Charleston, SC 29405
(843) 566-7067
(843) 566-7068 - FAX

7. Designated Facility U.S. EPA ID#:

8. U.S. DOT Description (including proper shipping name, hazard class, generator name, address & contact)	9. Container No.	9. Container Type	10. Total Quantity	11. Unit
a. Non-Regulated Non-Hazardous Wastewater	10	DM	400	Gallons
b.				
c.				
d.				

12. Generator's Certification: I hereby declare that the contents of this consignment are not hazardous by definition or listing and are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and the laws of the State of South Carolina. I further certify that the contents of this consignment are as represented by the description contained on the Waste Profile Form previously submitted to and approved by the Designated Facility.

Printed/Typed Name: Barry K Lewis — Signature — Month Day Year: 9/20/01

13. Transporter Acknowledgement of Receipt of Materials
Printed/Typed Name: LAMAR CROMWELL — Signature — Month Day Year: 9 20-01

14. Discrepancy Indication Space

Facility Owner or Operator: Certification of Receipt of Materials
Printed/Typed Name: ROBERT E. CARTER — Signature — Month Day Year: 9-21-01

WHITE - FACILITY YELLOW - TRANSPORTER PINK - GENERATOR

SWMU 16/17 IDW DRUMS | NON HAZ SOLID 2001

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. SC817002262 0 | Manifest Doc. No. 01837 | 2. Page 1 of 1 | 01837

3. Generator's Name and Mailing Address: NAVAL WEAPONS STATION, 2312 RED BANK ROAD, BLDG 32, GOOSE CREEK, SC 29445 SWMU 16/17

4. Generator's Phone: (843) 764-4010

5. Transporter 1 Company Name: FENN-VAC | 6. US EPA ID Number: SCD980837504 | A. Transporter's Phone: 843-552-8306

7. Transporter 2 Company Name | 8. US EPA ID Number | B. Transporter's Phone

9. Designated Facility Name and Site Address: FENNELL PROCESSING & TRANSFER FACILITY, 141 FENNELL ROAD, N. CHAS., SC 29418 | 10. US EPA ID Number | C. Facility's Phone: 843-552-4751

11. Waste Shipping Name and Description	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a. WASTE, NON-HAZARDOUS SOLID, NOS (IDW)	008	DM	2800	LBS
b.				
c.				
d.				

D. Additional Descriptions for Materials Listed Above

E. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

16. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Printed/Typed Name: Barry K Lewis | Signature | Month Day Year: 09 20 01

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: LAMAR CROMWELL | Signature | Month Day Year: 09 20 01

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in Item 19.

Printed/Typed Name: Jennifer Crim | Signature | Month Day Year: 09 20 01

GENERATOR — TRANSPORTER — FACILITY

ORIGINAL – RETURN TO GENERATOR

WATER RECOVERY SYSTEMS LLC

SWM0 16/17
IDW DRUMS
NON HAZ AQUEOUS
2001

No. W21184

MANIFEST - NON-HAZARDOUS WASTEWATER

1. Generator's EPA ID# (if applicable) — Waste ID Number

2. Generator's Name and Mailing Address: — Phone (843) 764-4010
NAVAL WEAPONS STATION
2316 RED BANK ROAD
GOOSE CREEK, SC 29445

3. Agent of Generator and Mailing Address: — Phone ( )
SAME AS TRANSPORTER

4. Transporter Company Name: — Phone (843) 552-8306
FENN-VAC, INC.
141 FENNEL ROAD
N. CHARLESTON, SC 29419

5. Transporter U.S. EPA ID#:
SCD 980837504

6. Designated Facility Name and Site Address:
Water Recovery Systems, LLC, PO Box 70971, Charleston, SC 29415
Site address: 1500 Greenleaf Street, Charleston, SC 29405
(843) 566-7067
(843) 566-7068 - FAX

7. Designated Facility U.S. EPA ID#:

8. U.S. DOT Description (including proper shipping name, hazard class, generator name, address & contact)	9. Container No.	9. Container Type	10. Total Quantity	11. Unit
a. Non-Regulated Non-Hazardous Wastewater	1	DM	55	Gallons
b.				
c.				
d.				

12. Generator's Certification: I hereby declare that the contents of this consignment are not hazardous by definition or listing and are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and the laws of the State of South Carolina. I further certify that the contents of this consignment are as represented by the description contained on the Waste Profile Form previously submitted to and approved by the Designated Facility.

Printed/Typed Name: Barry K Lewis — Signature — Month Day Year: 12-19-01

13. Transporter Acknowledgement of Receipt of Materials
Printed/Typed Name: ALBERT RUSSELL — Signature — Month Day Year: 12 19 01

Discrepancy Indication Space

Facility Owner or Operator: Certification of Receipt of Materials
Printed/Typed Name: Kevin Rivers — Signature — Month Day Year: 12 19 01

WHITE - FACILITY YELLOW - TRANSPORTER PINK - GENERATOR

SWMU 16/17
IDW DRUMS
NON HAZ SOLID
2002

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. SC 817 0 0 22 6 20
Manifest Doc. No. 0 1 9 5 9
2. Page 1 of 1

GENERATOR

3. Generator's Name and Mailing Address NAVAL WEAPONS STATION
2316 RED BANK ROAD, BLDG 32
GOOSE CREEK, SC 29445

4. Generator's Phone (843) 764-4010

5. Transporter 1 Company Name FENN-VAC
6. US EPA ID Number SCD 9 8 0 8 7 7 5 0 4
A. Transporter's Phone 843-552-8306

7. Transporter 2 Company Name
8. US EPA ID Number
B. Transporter's Phone

9. Designated Facility Name and Site Address FENNELL PROCESSING
1141 FENNELL ROAD
N. CHAS., SC 29418
10. US EPA ID Number
C. Facility's Phone 843-552-4751

11. Waste Shipping Name and Description	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a. (IDW SOIL) WASTE, NON-HAZ SOLID, N.O.S.	004	DM	001.50	G
b.				
c.				
d.				

D. Additional Descriptions for Materials Listed Above
FUW-40A

E. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

16. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Printed/Typed Name Barry K Lewis
Signature
Month 04 Day 08 Year 02

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name CHRIS MAAZ
Signature
Month 04 Day 08 Year 02

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in Item 19.

Printed/Typed Name Emily Crim
Signature
Month 04 Day 10 Year 02

ORIGINAL – RETURN TO GENERATOR

SWMU 16/17
IDW DRUMS
NON HAZ AQUEOUS
2002

WATER RECOVERY SYSTEMS LLC

W21351

No. 01960

MANIFEST - NON-HAZARDOUS WASTEWATER

1. Generator's EPA ID# (if applicable) SC8170022620 — Waste ID Number

2. Generator's Name and Mailing Address: NAVAL WEAPONS STATION, 2316 RED BANK ROAD, BLDG 32, GOOSE CREEK, SC 29445 — Phone (843) 714-4010 — Barry Lewis POC

3. Agent of Generator and Mailing Address: FENN-VAC — Phone ( )

4. Transporter Company Name: FENN-VAC, INC., 141 FENNEL ROAD, N. CHARLESTON, SC 29419 — Phone (843) 552-8306

5. Transporter U.S. EPA ID#: SCD 980837504

6. Designated Facility Name and Site Address: Water Recovery Systems, LLC, PO Box 70971, Charleston, SC 29415
Site address: 1500 Greenleaf Street, Charleston, SC 29405
(843) 566-7067
(843) 566-7068 - FAX

7. Designated Facility U.S. EPA ID#:

8. U.S. DOT Description (including proper shipping name, hazard class, generator name, address & contact)	9. Container No.	9. Container Type	10. Total Quantity	11. Unit
a. Non-Regulated Non-Hazardous Wastewater	6	DM	250	Gallons
b.				
c.				
d.				

12. Generator's Certification: I hereby declare that the contents of this consignment are not hazardous by definition or listing and are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and the laws of the State of South Carolina. I further certify that the contents of this consignment are as represented by the description contained on the Waste Profile Form previously submitted to and approved by the Designated Facility.

Printed/Typed Name: Barry K Lewis — Signature: [signature] — Month Day Year: 04 08 02

13. Transporter Acknowledgement of Receipt of Materials
Printed/Typed Name: PRESTON PINCKNEY — Signature: [signature] — Month Day Year: 04-08-02

14. Discrepancy Indication Space

Facility Owner or Operator: Certification of Receipt of Materials
Printed/Typed Name: Kevin Rivers — Signature: Kevin Rivers — Month Day Year: 4-8-02

WHITE - FACILITY YELLOW - TRANSPORTER PINK - GENERATOR

CLIENT	SouthDiv	JOB NUMBER	0528
SUBJECT	Calculation of Final Concentration Of Purge Water IDW Drum		
BASED ON	Attached Sample Data Summary Package	DRAWING NUMBER	
BY CJH	CHECKED BY	APPROVED BY	DATE 3/26/02

Objective: Calculate final concentration of purge water drum.

Assumptions: Purge water volume from all sampling points was 3 gallons.

$$\text{Concentration (final)} \times \text{Volume (total)} = \sum_{i=1}^{15} C_i V_i$$

Sample ID	Concentration	Purge Volume
17-Q-01-0302	31000 (µg/L)	3 gallons
17-Q-02-0302	7 (µg/L)	3 gallons
17-Q-03-0302	0 (µg/L)	3 gallons
17-Q-04-0302	0 (µg/L)	3 gallons
17-Q-07S-0302	0 (µg/L)	3 gallons
17-Q-07D-0302	0 (µg/L)	3 gallons
17-Q-06D-0302	0 (µg/L)	3 gallons
17-Q-06S-0302	0 (µg/L)	3 gallons
17-Q-10S-0302	0 (µg/L)	3 gallons
17-Q-05-0302	0 (µg/L)	3 gallons
17-Q-10D-0302	0 (µg/L)	3 gallons
17-Q-08D-0302	0 (µg/L)	3 gallons
17-Q-08S-0302	0 (µg/L)	3 gallons
17-Q-09D-0302	0 (µg/L)	3 gallons
17-Q-09S-0302	0 (µg/L)	3 gallons
	Total Volume	45 gallons
	Final Concentration	2067.1333 (µg/L)

Conclusion: Final TCE Concentration for Drum is 2,067 µg/L.

SWMU 17, CTO 137, FILE 0528
NON HAZ. SOLID & AQUEOUS WASTE
2003

11241

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. SC8170022620 — Manifest Document No.
2. Page 1 of — Job # 4431

3. Generator's Name and Mailing Address: Naval Weapons Station Charleston, Build 36, 2316 Red Bank Road, Goose Creek, SC 29445
4. Generator's Phone (843) 764-4010 — (843) 764-4010

5. Transporter 1 Company Name: Freehold Cartage, Inc
6. US EPA ID Number: NJD054126164
A. Transporter's Phone: 941-533-4599

7. Transporter 2 Company Name
8. US EPA ID Number
B. Transporter's Phone

9. Designated Facility Name and Site Address: U.S. Waste Logistics, Inc., 938 Hall Park Road, Green Cove Springs, FL 32043
10. US EPA ID Number: FL0000081943
C. Facility's Phone: 904-284-5675

11. Waste Shipping Name and Description	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a. NON-REGULATED MATERIAL—Solid	001	DM	150 ~~155~~	P
b. NON-REGULATED MATERIAL—Liquid	001	DM	55 ~~55~~	G
c.				
d.				

D. Additional Descriptions for Materials Listed Above
a.) Drill Cuttings
b.) Development Water

E. Handling Codes for Wastes Listed Above
A. 03-2694-1
C3-2581-3

15. Special Handling Instructions and Additional Information

Transport approximately 02 drums

16. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.
Printed/Typed Name: Barry K Lewis — Signature — Month Day Year: 07 28 03

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: CARL HAWKINS — Signature — Month Day Year: 07 28 03

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: [redacted]ie Buchanan — Signature: Jessie Buchanan — Month Day Year: 8 16 03

GENERATOR

ORIGINAL - RETURN TO GENERATOR

Jul 28 03 01:24p

SWMU 17, CTO137, File 0528 p.2
HAZ. AQUEOUS WASTE 2003

SC8170022620

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. [redacted]
Manifest Document No. 02203
2. Page 1 of
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Naval Weapons Station Charleston
Bldg 36, 2316 Red Bank Road
Goose Creek, SC 29445

4. Generator's Phone (843) 764-4010

5. Transporter 1 Company Name: Freehold Cartage, Inc.
6. US EPA ID Number: NJD054126164
7. Transporter 2 Company Name
8. US EPA ID Number

9. Designated Facility Name and Site Address
Fisher Industrial Service, Inc.
402 Webster Chapel Rd.
Glencoe, AL 35905
10. US EPA ID Number: ALD981020894

A. State Manifest Document Number
B. State Generator's ID
C. State Transporter's ID
D. Transporter's Phone (863) 533-4599
E. State Transporter's ID
F. Transporter's Phone
G. State Facility's ID: ALD981020889
H. Facility's Phone: (256) 492-8340

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Waste Hazardous Liquid (Trichloroethene), N.O.S., 9, NA3082, PG III, (D040).		1	DM	55	G	D040
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above: FL

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

24 Hr. Emergency Response Name/Number
Rusty Baker 904-284-5675

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

GENERATOR

Printed/Typed Name: Barry K Lewis
Signature: Barry Lewis
Month Day Year: 07 28 03

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: CARL HAWKINS
Signature: Carl Hawkins
Month Day Year: 07 28 03

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name: John LITTIC
Signature: John Littic
Month Day Year: 07 28 03

ORIGINAL – RETURN TO GENERATOR

Sum 16/17 2004/2005

Emergency Contact Telephone Number

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. S.C.8.1.7.0.0.2.2.6.2.0

Manifest Document No. 026-16

2. Page 1 of 1.

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Naval Weapons Station-Charleston
WPNSSTACHASN Bldg. 2332 2316 Red Bank Rd. Ste 100 Goose Creek SC29445-8601

4. Generator's Phone (843) 764-4240 ATTN: Marsha Singleton

A. State Manifest Document Number 026-16

B. State Generator's ID

5. Transporter 1 Company Name: Action Resources

6. US EPA ID Number: A.L.R.0.0.0.0.0.7.2.3.7

C. State Transporter's ID

D. Transporter's Phone 256-352-6537

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
C-Mac Environmental Group, Inc
402 Webster Chapel Road
Glencoe, AL 35905

10. US EPA ID Number: A.L.D.9.8.1.0.2.0.8.9.4

G. State Facility's ID

H. Facility's Phone 800-739-9156

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Hazardous waste liquid, n.o.s.,9,NA3082,PG III D040,D043,F002 (IDW Waste c/w Vinyl Chloride,Trichloroethylene)	X	010	DM	0·4·0·6·9	P	D040,D043 F002
b. Hazardous waste liquid, n.o.s.,9,NA3082,PG III D040 (IDW Waste c/w Trichloroethylene)	X	037 ~~00~~	DM	1·5·5·5·0	P	D040
c. Hazardous waste solid, n.o.s.,9,NA3077,PG III D040 (IDW Soil c/w Trichloroethylene)	X	0·36	DM	2·3·4·5·5	P	D040
d.						

J. Additional Descriptions for Materials Listed Above
67146 ERG# 171 ITEM#-2,3,4,5,6,7,81,82,83,84
67146 ERG# 171 ITEM#-15,16,17,18,19,20,21,22,37-45,59-78
67138 ERG# 171 ITEM#-8,9,10,11,12,13,~~14~~,23-36,46-58,79,80

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
Forward all invoices and CD's to Tri State Government Services, Inc.
24 Hour Emergency # 1-800-673-6604
P.O.C. Michael Johnson Agent for Generator
SP4400-02-D-0017
Delivery Order # 0192
129845

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Marsha R. Singleton | Signature: Marsha R. Singleton | Month Day Year: 08 10 05

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: LARRY E Wise | Signature: Larry E Wise | Month Day Year: 08 10 05

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name: M.N. Brock | Signature: M.N. Brock | Month Day Year: 8 11 05

ORIGINAL — RETURN TO GENERATOR

APPENDIX A-14
SITE RESTORATION CERTIFICATIONS

Environmental Enterprise Group, Inc.
1345 Barracks Road
N. Charleston, SC 29405

From: **ALLEN JAMES**
Phone: (843) 202 – 8031 Cell: (843) 696-5901
Fax: (843) 202 - 8001

To: [redacted] Fax: (412) 921-4040
TASK ORDER MANAGER Date: 17 May, 2005

Number of Sheets Including Cover Sheet: 1

CONTENTS

Per paragraph 4.3 of the statement of work for the site restoration at SWMU 16 and 17 at Charleston N. W. S, I am forwarding the affidavit for the topsoil.

Please CALL ME WITH ANY QUESTIONS.

Allen James

BUTLER WARE TRUCKING INC.

May 11, 2005

Mr. Wayne Hardwick
Environmental Enterprise Group
1345 Barracks Rd.
N. Charleston, SC 29405

Dear Wayne;

Pursuant to our recent telephone conversation regarding the Naval Weapons Station Job; this is to certify that the screened topsoil that will be provided is organic with no roots or debris.

I certainly appreciate working with you on this project and look forward to a continued relationship with EEG.

Sincerely,

Butler Ware Trucking Inc.

Robert C. Welborn
General Manager

P.O. Box 1558 • Moncks Corner, South Carolina 29461
Business: (803) 761-6640 • Charleston: (803) 723-1166
Toll Free: (800) 772-7625 • Fax: (803) 899-4882

Environmental Enterprise Group, Inc.
1345 Barracks Road
N. Charleston, SC 29405

From: **ALLEN JAMES**
Phone: (843) 202 – 8031 Cell: (843) 696-5109
Fax: (843) 202 - 8001

To: **LINDA KLINK** Date: 24 May, 2005
FAX: 412-921-4040
Number of Sheets Including Cover Sheet: 2

COMENTS
Attached' please find the suppliers documentation for the gravel supplied for —Site Restoration at SWMU 16 and 17. If you have any questions or comments, please do not hesitate to call

Martin Marietta Aggregates

Southeast Region - South Carolina
246 Stonecridge Drive, Suite 102
Columbia, South Carolina 29210-8000
Telephone: (803) 779-6500
Facsimile: (803) 771-4200

May 19, 2005

Environmental Group
Attn: Allen James
Fax: (843) 899-4882

Re: Naval Weapon Station

Dear Mr. James:

This is to certify that the MBC stone produced at and when checked by our Cayce Quarry will meet or exceed the requirements and specifications of the South Carolina Department of Transportation regarding quality and gradation.

Sincerely,

Frank Manos
Sales Representative
South Carolina District

May.20. 2005 9:26AM Butler Ware Trucking Inc. No.3921 P. 1
05/24/2005 07:49 8432028131 EEG INC PAGE 02

APPENDIX B
MIP REPORTS BY COLUMBIA TECHNOLOGIES

APPENDIX B-1
2003 MIP REPORT

COLUMBIA TECHNOLOGIES

SmartData Solutions™

Subsurface Characterization Using Membrane Interface Probe (MIP) and Soil Conductivity (SC) Technologies SWMU 17 Charleston Weapons Station Charleston, South Carolina

PREPARED FOR

Tetra Tech NUS
661 Anderson Drive
Pittsburgh, Pennsylvania 15220

PREPARED BY

COLUMBIA Technologies, LLC
1450 South Rolling Rd.
Baltimore, Maryland 21227
410-536-9911

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TABLE OF CONTENTS

Page

Introduction 4

Objectives 4

Equipment Description 4

Performance Test 6

Investigation Method 7

MIP Log Interpretation 7

FIGURES

Figure 1. Base Map and MIP Sample Locations

Figure 2. Plan View, ECD Response, 1.0E+06uV and Above

Figure 3. Plan View, FID Response, 2.5E+05uV and Above

Figure 4. Oblique View Looking North, ECD Response, 4.0E+05uV and Above

Figure 5. Oblique View Looking North, ECD Response, 1.0E+06uV and Above, With Soil Conductivity, 50 mS and Above

Figure 6. Oblique View Looking West, ECD Response, 1.0E+06uV and Above, With Soil Conductivity, 50 mS and Above

Figure 7. Oblique View Looking North, ECD Response, 5.0E+06uV and Above, With Soil Conductivity, 30 mS and Above

Figure 8. Oblique View Looking East, ECD Response, 5.0E+06uV and Above, With Soil Conductivity, 30 mS and Above

Figure 9. Oblique View Looking South, ECD Response, 5.0E+06uV and Above, With Soil Conductivity, 30 mS and Above

Figure 10. Oblique View Looking West, ECD Response, 5.0E+06uV and Above, With Soil Conductivity, 30 mS and Above

Figure 11. Oblique View Looking North, ECD Response, 5.0E+06uV and Above, With Soil Conductivity, 50 mS and Above

Figure 12. Oblique View Looking West, ECD Response, 5.0E+06uV and Above, With Soil Conductivity, 50 mS and Above

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APPENDIXES

Appendix A: MIP Logs (Best Fit Scale)

Appendix B: MIP Logs (Standardized Scale)

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Introduction

Tetra Tech NUS (TTNUS) contracted **COLUMBIA Technologies, LLC (COLUMBIA)** to conduct an investigation of subsurface contamination at SWMU 17, Charleston Weapons Station, located in Charleston, South Carolina. This investigation involved delineating the depth and horizontal extent of contamination using Membrane Interface Probe (MIP) and Soil Conductivity (SC) technologies. The purpose of this investigation was to characterize subsurface soils in the vadose and saturated zones, and delineate the nature and extent of soil contamination.

The investigation was conducted from April 22nd, 2003 through April 30th, 2003. COLUMBIA personnel on-site during the investigation included Randy Brand, Southeast Regional Manager, and Bryan Muller, MIP Specialist.

Objectives

The objectives of the MIP/SC investigation were to:

1. Characterize subsurface soils in the vadose and saturated zones.
2. Delineate the lateral boundaries of the contaminant.
3. Delineate the vertical extent of contamination.

Equipment Description

The MIP/SC probe is approximately 12-inches (30 cm) in length and 1.5-inches (3.8 cm) in diameter. The probe is driven into the ground at the nominal rate of one foot per minute using a Geoprobe® or similar direct push rig.

Soil conductivity, the inverse of soil resistivity, is measured using a dipole arrangement. In this process, an alternating electrical current is transmitted through the soil from the center, isolated pin of the probe. This current is then passed back to the probe body. The voltage response of the imposed current to the soil is measured across these same two points. Conductivity is measured in Siemens/meter, and due to the low conductivity of earth materials, the SC probe uses milliSiemens/meter (mS/m). The probe is reasonably accurate in the range of 5 to 400 mS/m. In general, at a given location, lower conductivity values indicate

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larger particles such as sands, while higher conductivities are representative of finer sized particles such as silts and clays.

The MIP portion of the probe was developed and patented by Geoprobe Systems, Inc. The operating principle is based on heating the soil and/or water around a semi-permeable polymer membrane to 121°C, which allows volatile organic compounds (VOCs) to partition across this membrane. The MIP can be used in saturated or unsaturated soils, as water does not pass through the membrane. Using nitrogen as a carrier gas, which sweeps across the back of the membrane, the VOCs are carried to the installed detectors. It takes approximately 37 seconds for the nitrogen gas stream to travel through 100 feet of inert tubing and reach the detectors.

COLUMBIA utilizes three detectors: a Photo Ionization Detector (PID), a Flame Ionization Detector (FID) and an Electron Capture Detector (ECD), mounted on a laboratory grade Shimadzu Model 14A gas chromatograph. The output signal from the detectors is captured by a MIP data logging system installed on a MIP Field Computer or laptop computer. Conductivity, speed, detector data and temperature are displayed continuously in real time during each push of the probe. In addition, the data logs can be printed for display and analysis following the data logging run or exported to common spreadsheet software for further analysis using COLUMBIA's ***SmartData Solutions***™ technology.

The PID detector consists of a special UV lamp mounted on a thermostat controlled, low volume, flow-through cell. The temperature is adjustable from ambient temperature to 250°C. The 10.2 electron volt (eV) UV lamp emits energy at a wavelength of 120 nanometers, which is sufficient to ionize most aromatics (benzene, toluene, xylene, etc.) and many other molecules (H_2S, hexane, ethanol) whose ionization potential is below 10.2 eV. The PID also emits a lower response for chlorinated compounds such as TCE and PCE. Methanol and water, which have ionization potentials greater than 10.2 eV, do not respond on the PID. Detection limits for aromatics are in the low picogram range. Since the PID is non-destructive, it is often run first in series with other detectors for multiple analyses

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from a single injection. Use of the PID is mandated in several EPA methods (8021, TO-14 etc.) because of its sensitivity and selectivity.

The most commonly used GC detector is the FID, which responds linearly from its minimum detectable quantity of about 100 picograms. The FID response is very stable from day to day, and is not susceptible to contamination from dirty samples or column bleed. This detector responds to any molecule with a carbon-hydrogen bond, but poorly to compounds such as H_2S, CCl_4, or NH_3. The carrier gas effluent from the GC column is mixed with hydrogen and burned. Hydrogen supports a flame and ionizes the analyte molecules. A collector electrode attracts the negative ions to the electrometer amplifier, producing an analog signal, which is directed to the data system input.

The ECD detector consists of a sealed stainless steel cylinder containing radioactive Nickel-63. The Nickel-63 emits beta particles (electrons), which collide with the carrier gas molecules, ionizing them in the process. This forms a stable cloud of free electrons in the ECD cell. When electro-negative compounds (especially chlorinated, fluorinated or brominated molecules) such as carbon tetrachloride or TCE enter the cell, they immediately combine with the free electrons, temporarily reducing the number remaining in the electron cloud. The detector electronics, which maintain a constant current of about 1 nanoampere through the electron cloud, are forced to pulse at a faster rate to compensate for the decreased number of free electrons. The pulse rate is converted to an analog output, which is transmitted to the data system.

Performance Test

Prior to logging each MIP location, performance tests with specific compounds are conducted to evaluate the sensitivity of the particular probe, transfer line and detector suite to be used. Using neat benzene to test the PID, and neat TCE to test the ECD, the headspace vapors are introduced to the membrane of the probe for four seconds. To test the FID, butane is released on the membrane for four seconds. These values are compared to predetermined values and recorded.

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Investigation Methods

MIP/SC profiling was conducted at 22 locations along a fence line, and in the neighboring wooded area. Drilling was completed using a Geoprobe® 54DT track mounted rig. Termination of MIP logging was determined by refusal (bedrock), or by TTNUS's representative on site. The results from each location are shown in Appendixes A and B. Maps and 3D graphics of the site have been prepared for easier visualization of the subsurface.

MIP Log Interpretation

The MIP logs include six graphs. The first graph is conductivity and is measured in mS/M. In general, lower conductivities are indicative of coarser grained particles, such as sands, and higher conductivities indicate finer grained particles, such as silts and clays. The second graph is the rate of penetration (speed of the probe) and is measured in feet/min. This information can be used to determine how hard the subsurface is. The next three graphs are chemical data: PID, FID, and ECD, measured in microvolts (uV). These graphs are a linear scale, and give relative concentrations of contamination. The last graph displays the temperature of the probe as it is advanced in the subsurface. This graph can be useful to determine where the groundwater table is located.

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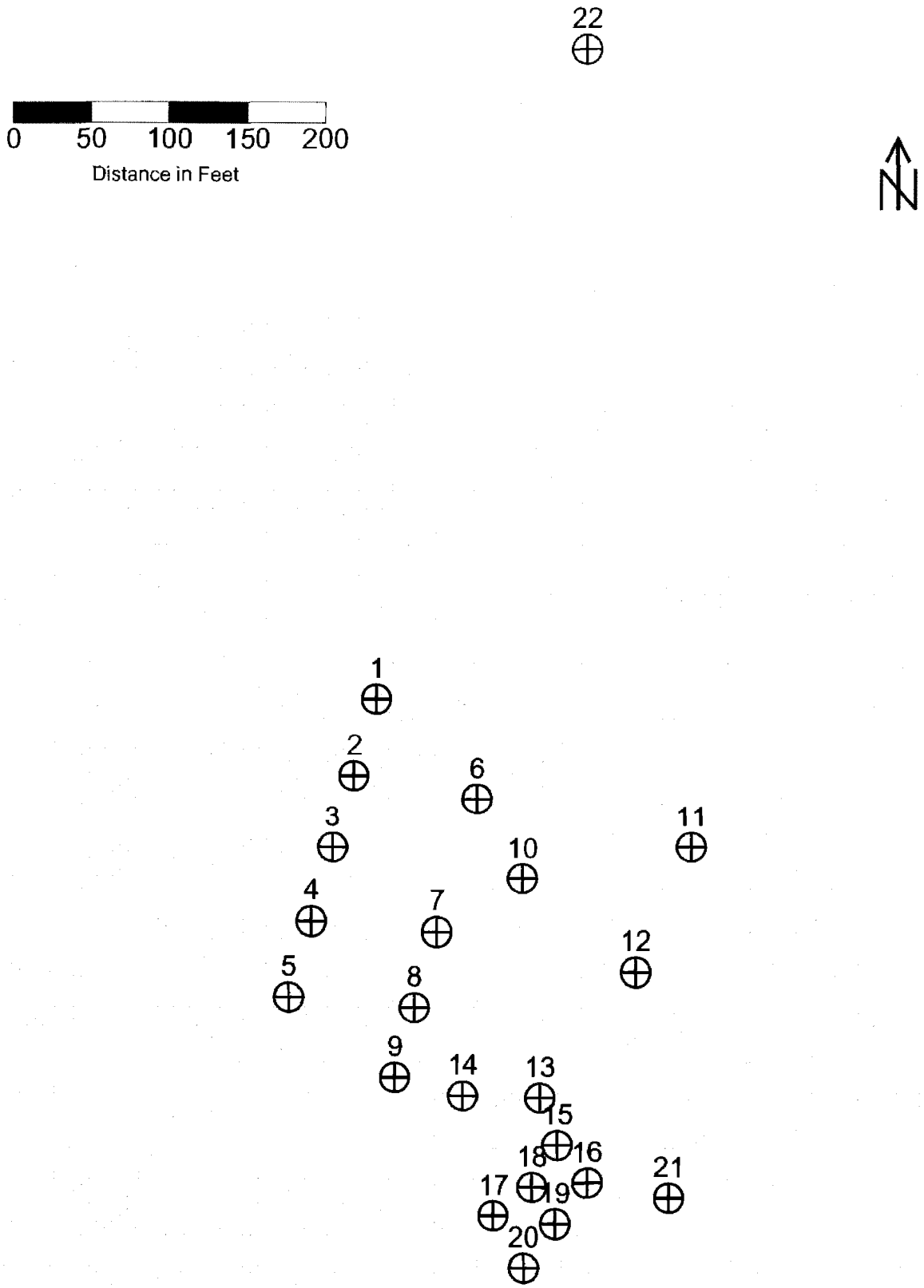

Figure 1
Basemap and MIP Locations
TTNUS
SWMU 17, Charleston Weapons Station
April 22nd, 2003 - April 30th, 2003

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COLUMBIA TECHNOLOGIES
WWW.COLUMBIADATA.COM

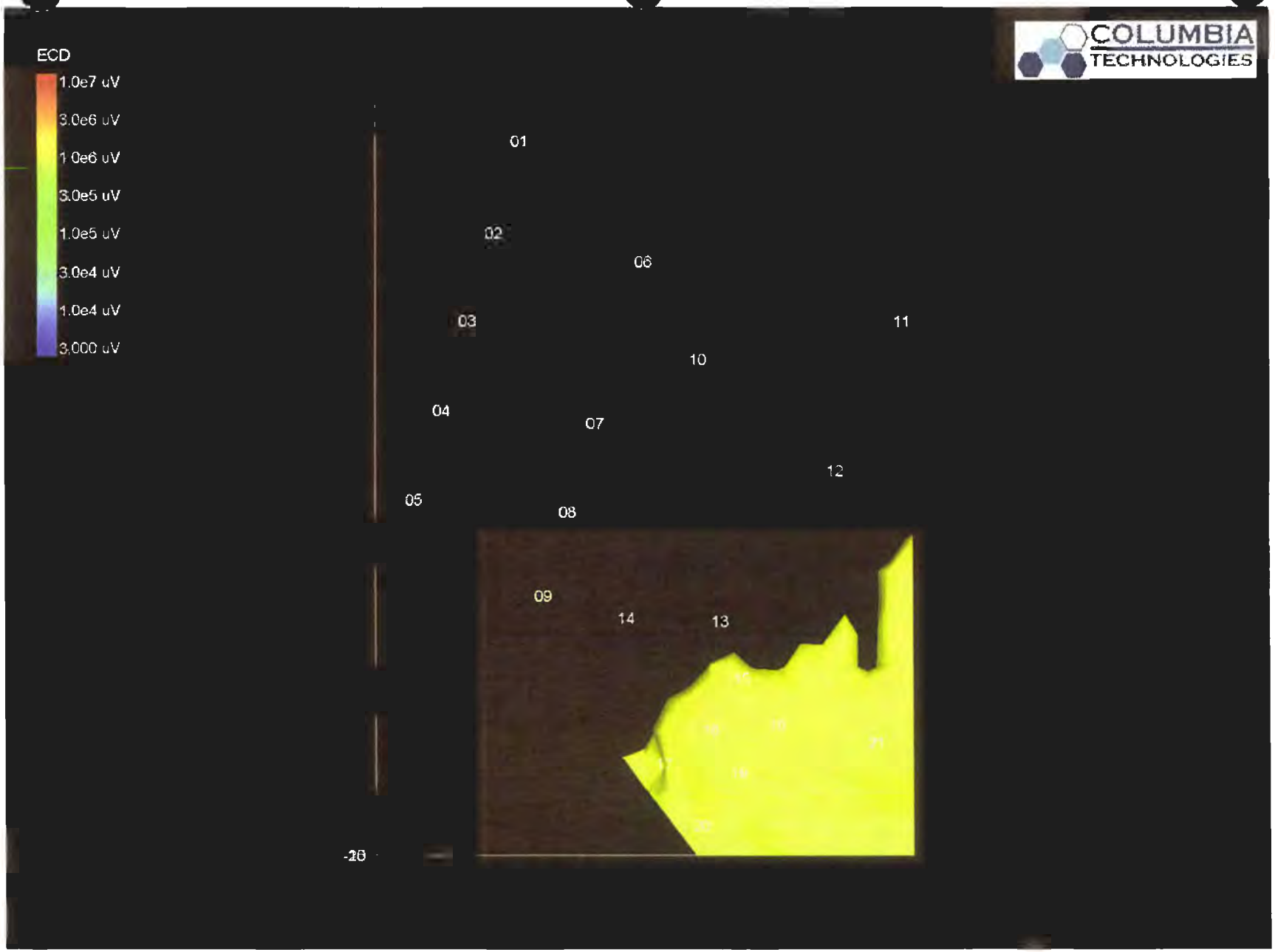

Figure 2, Plan View Looking North
ECD Response (green), 1.0E+06 uV and Above

Tetra Tech, Inc.
SWMU 17, Naval Weapons Station
April 22nd 2003 – April 30th , 2003

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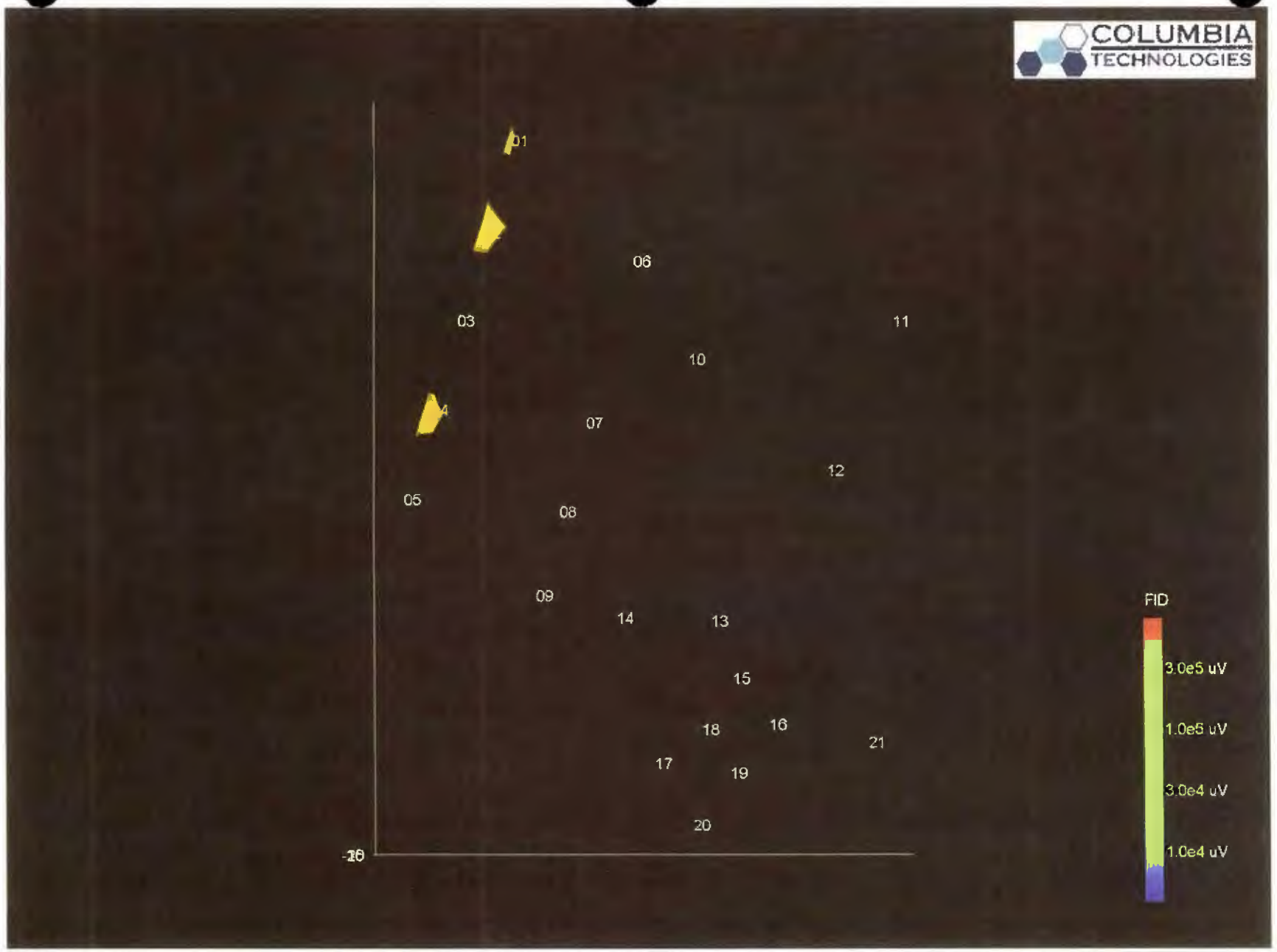

Figure 3, Plan View Looking North
FID Response 2.5E+05 uV and Above

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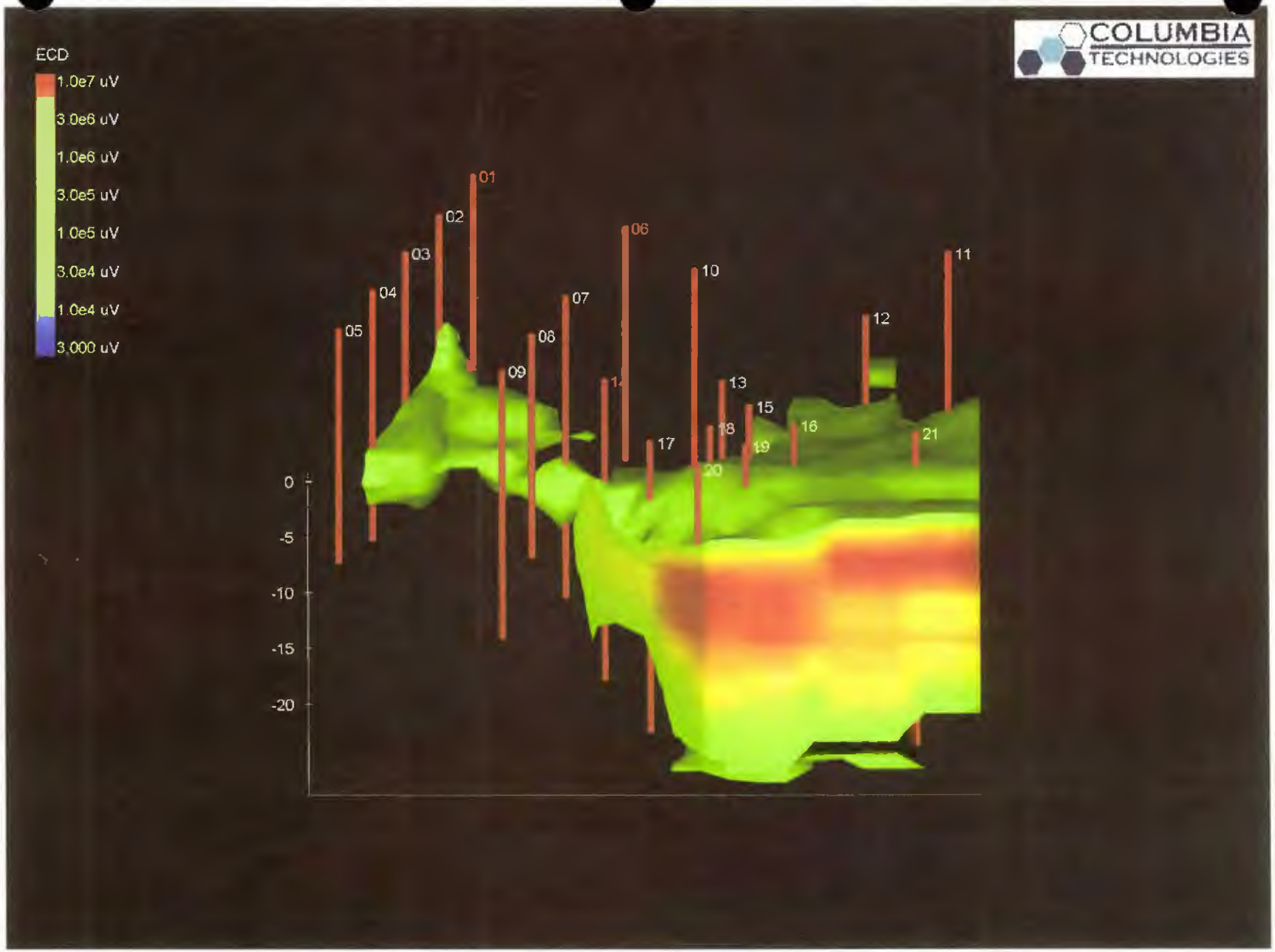

Figure 4, Oblique View Looking North
ECD Response (green), 4.0E+05 uV and Above

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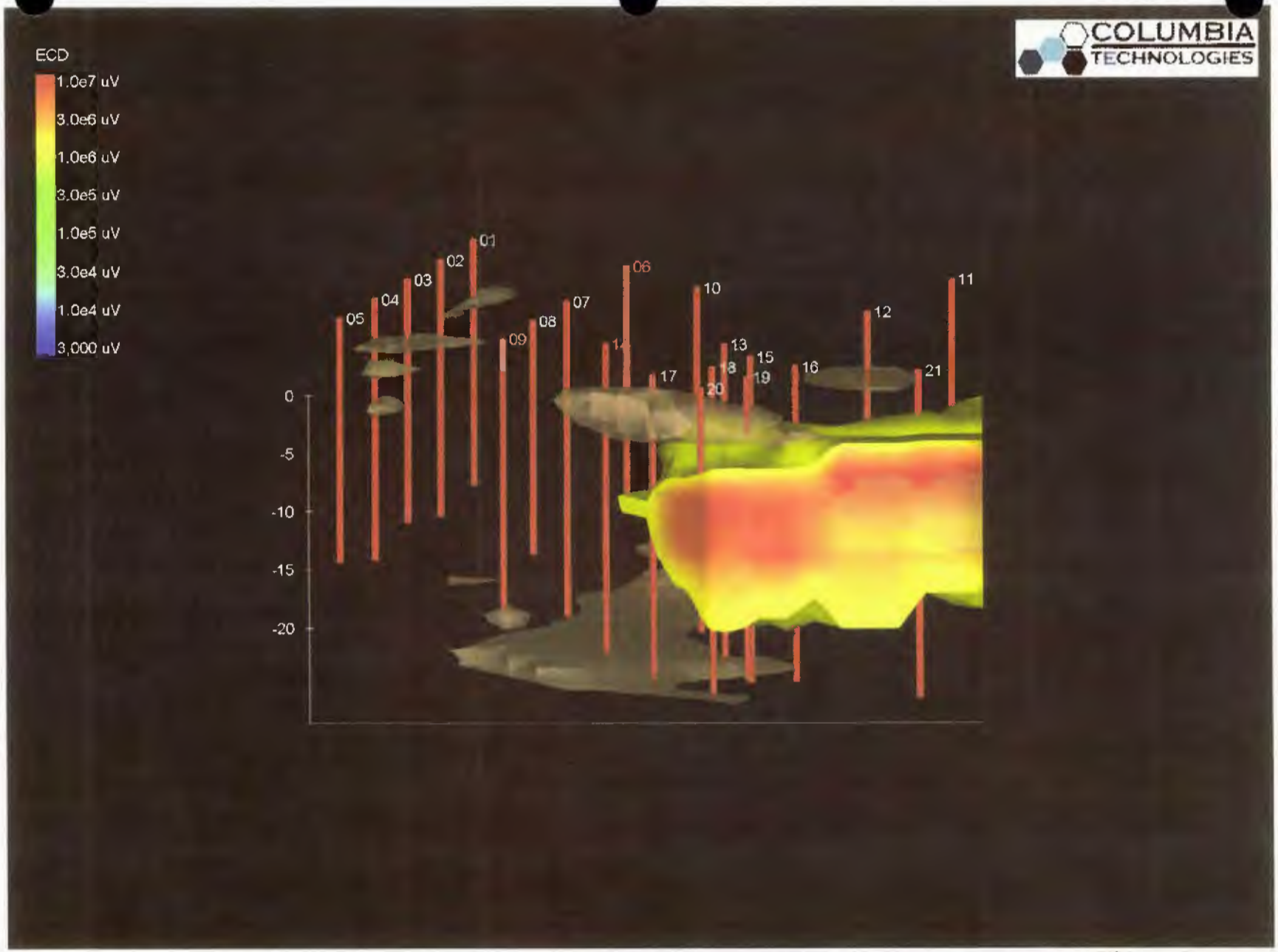

Figure 5, Oblique View Looking North
ECD Response (yellow) 1.0E+06 uV and Above
With Soil Conductivity (tan), 50 mS and Above
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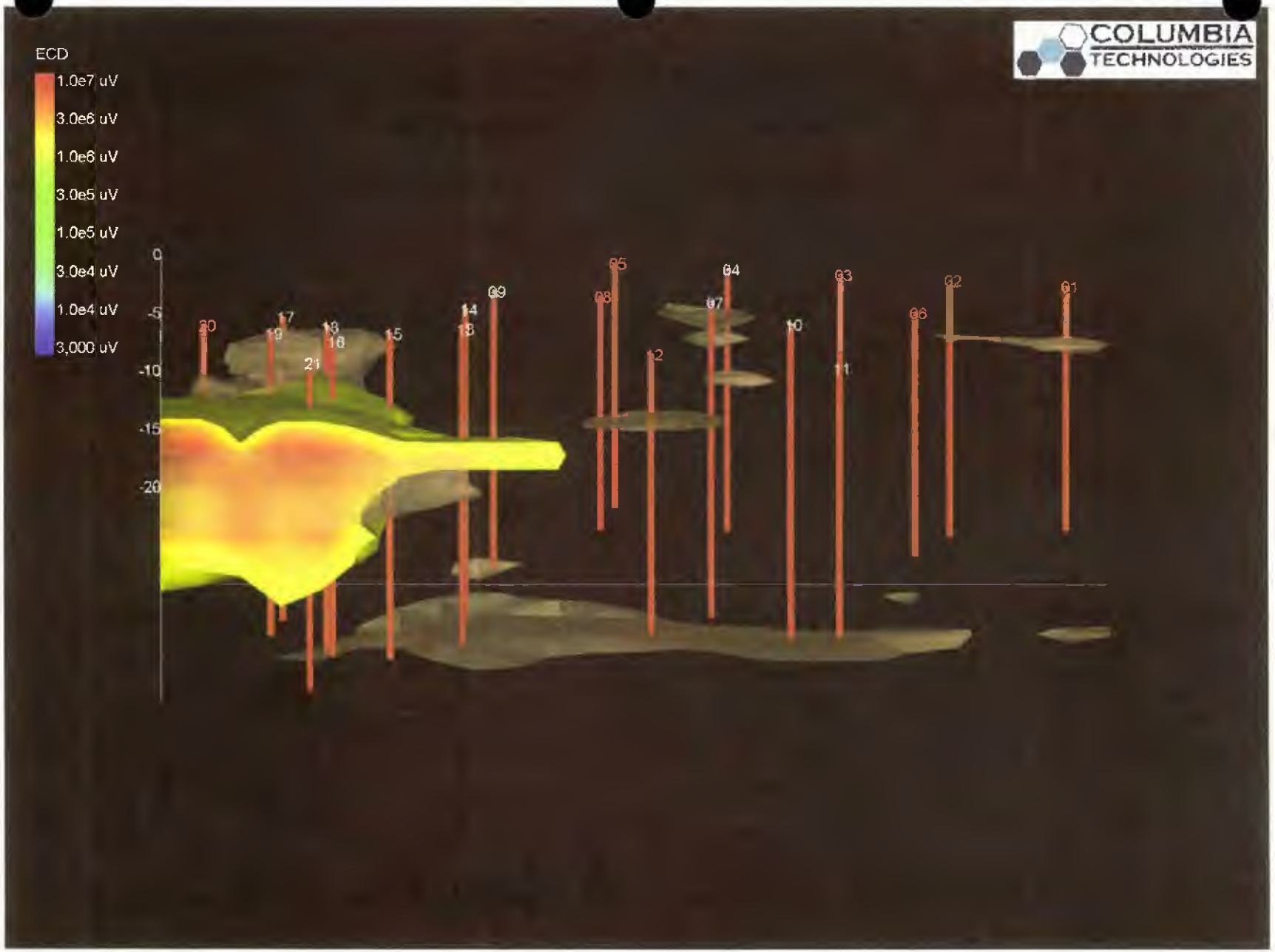

Figure 6, Oblique View Looking West
ECD Response (yellow), 1.0E+06 uV and Above
With Soil Conductivity (tan), 50 mS and Above
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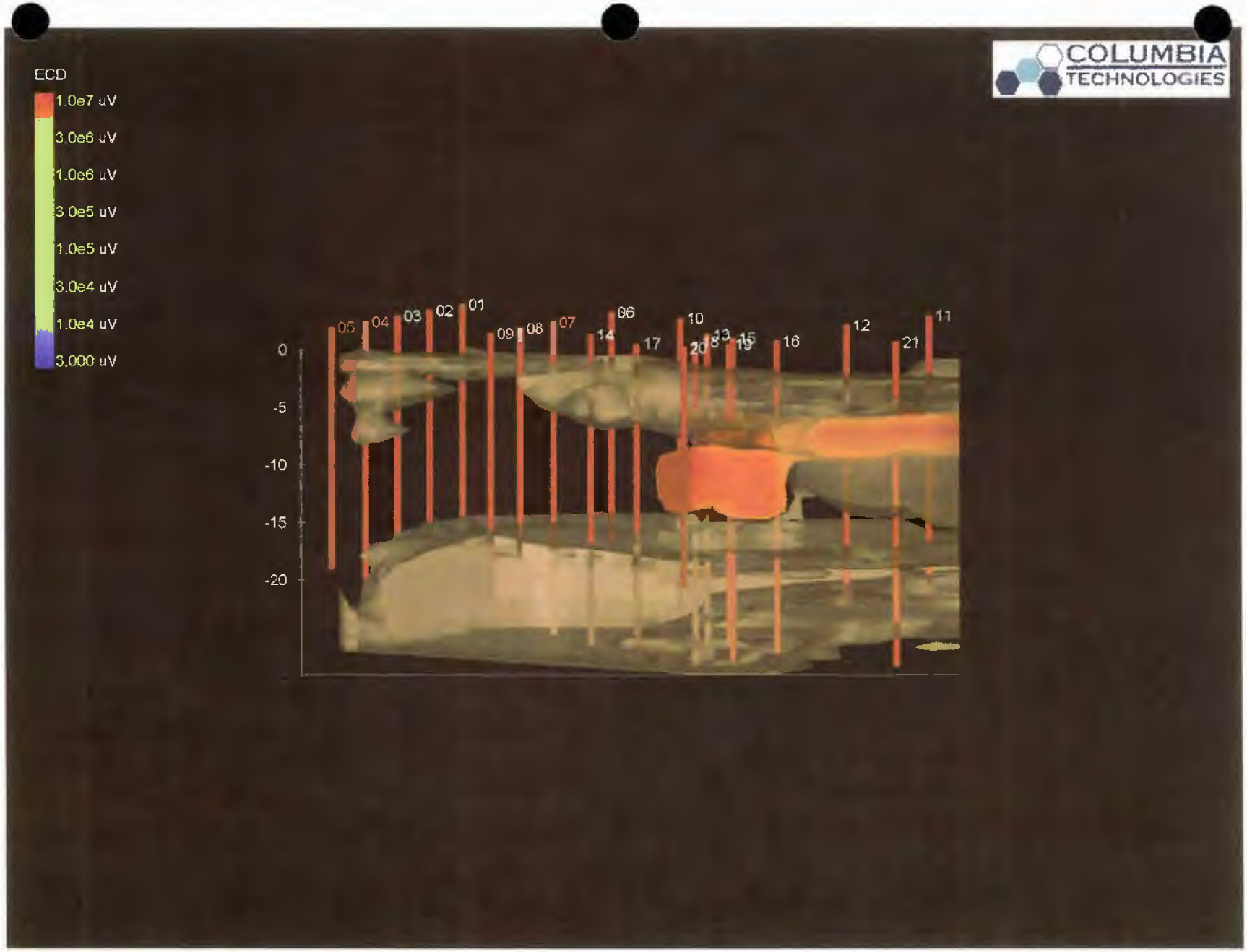

Figure 7, Oblique View Looking North
ECD Response (orange), 5.0E+06 uV and Above
With Soil Conductivity (tan), 30 mS and Above
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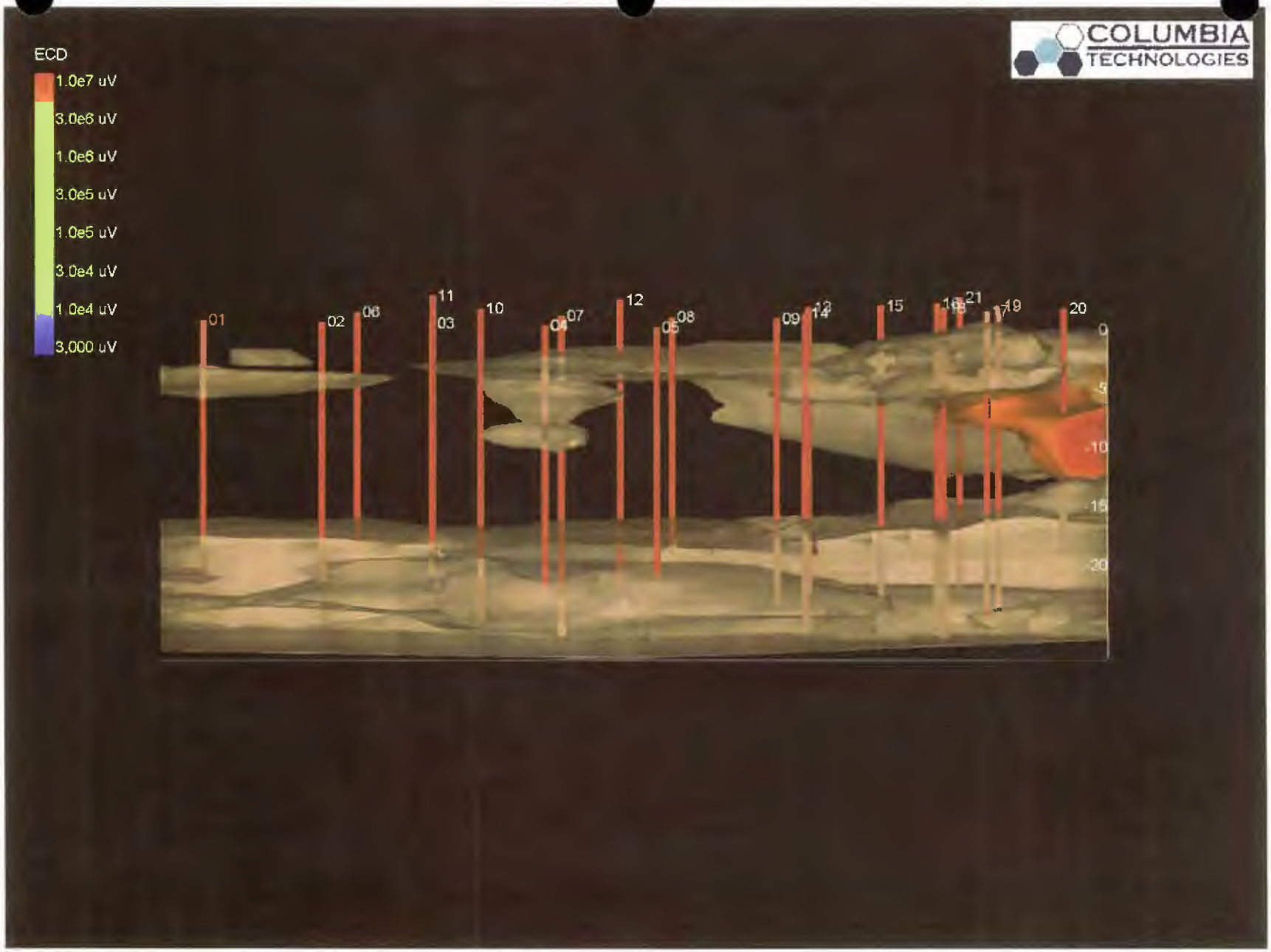

Figure 8, Oblique View Looking East
ECD Response (orange), 5.0E+06 uV and Above
With Soil Conductivity (tan), 30 mS and Above
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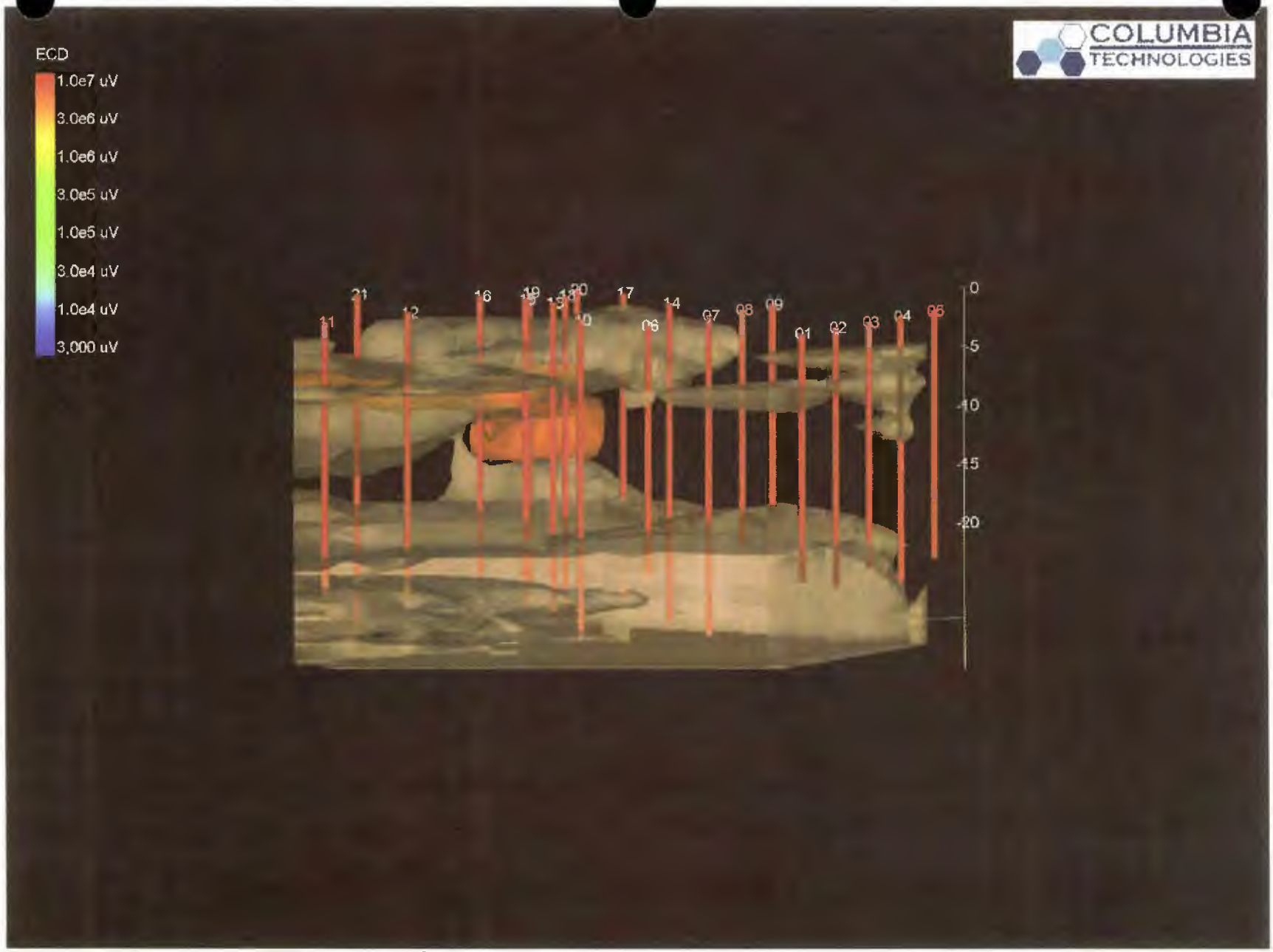

Figure 9, Oblique View Looking South
ECD Response (orange), 5.0E+06 uV and Above
With Soil Conductivity (tan), 30 mS and Above
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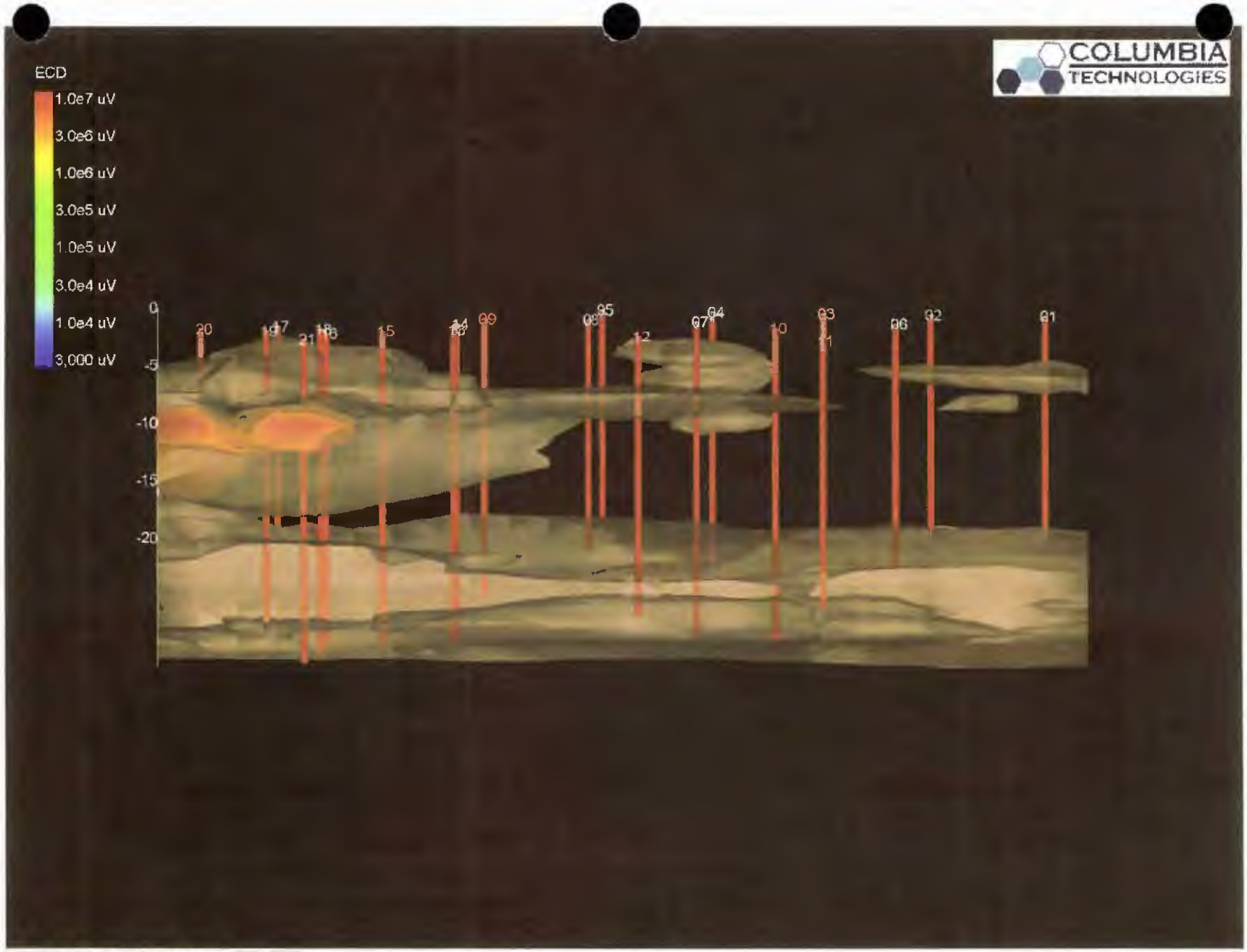

Figure 10, Oblique View Looking West
ECD Response (orange), 5.0E+06 uV and Above
With Soil Conductivity (tan), 30 mS and Above
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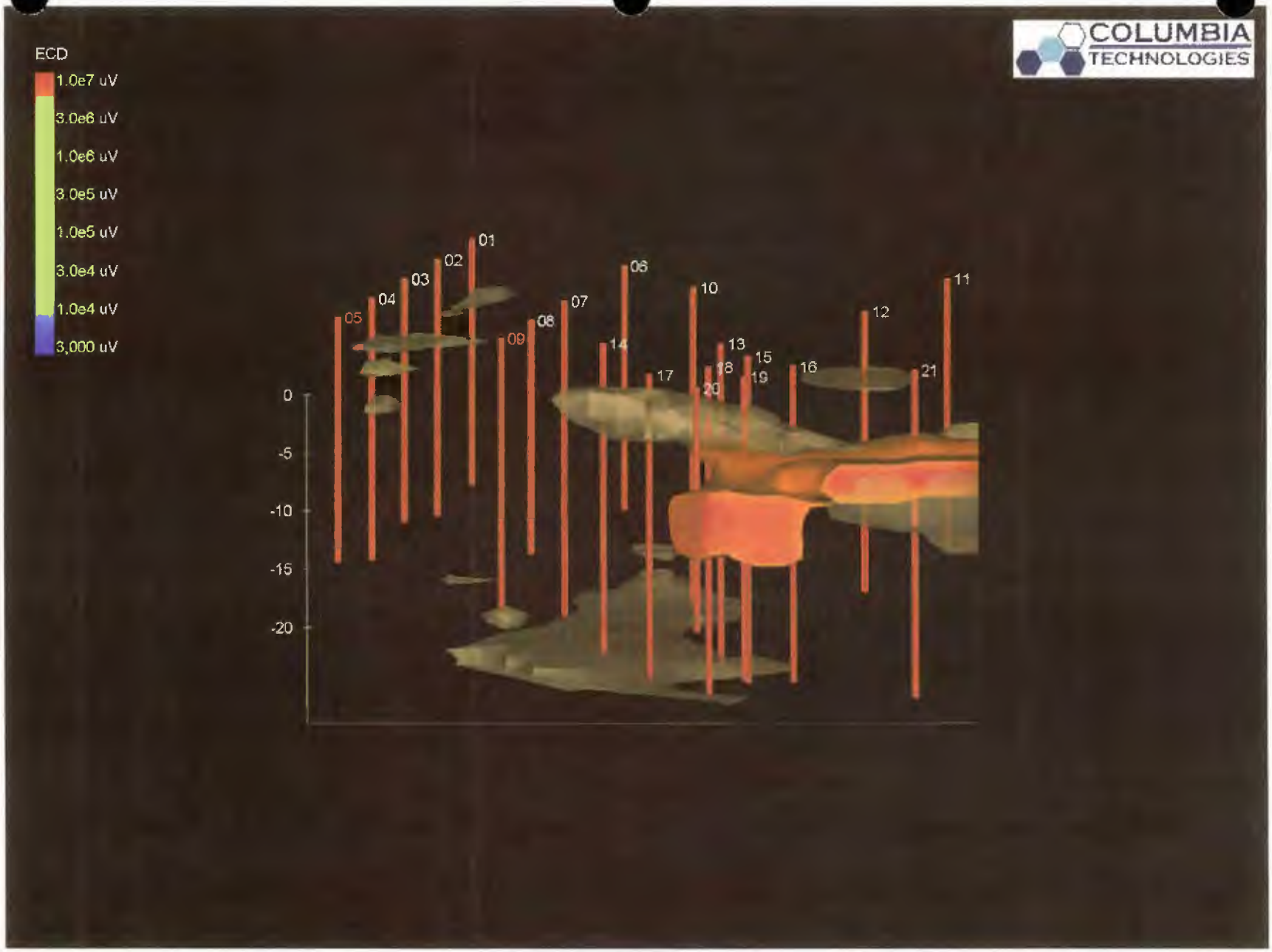

Figure 11, Oblique View Looking North
ECD Response (orange), 5.0E+06 uV and Above
With Soil Conductivity (tan), 50 mS and Above
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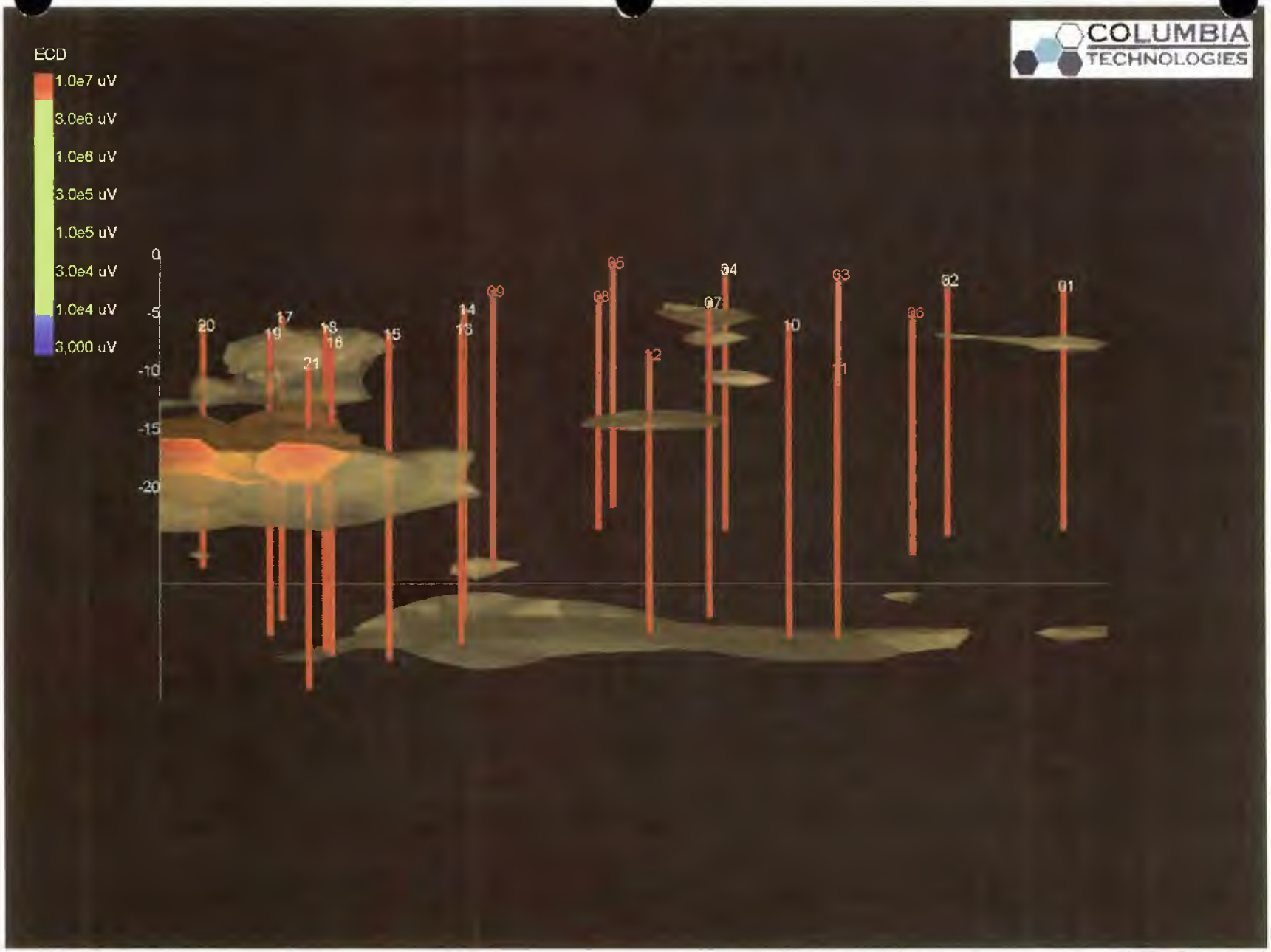

Figure 12, Oblique View Looking West
ECD Response (orange), 5.0E+06 uV and Above
With Soil Conductivity (tan), 50 mS and Above
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Appendix A: MIP Logs

(Best Fit Scale)

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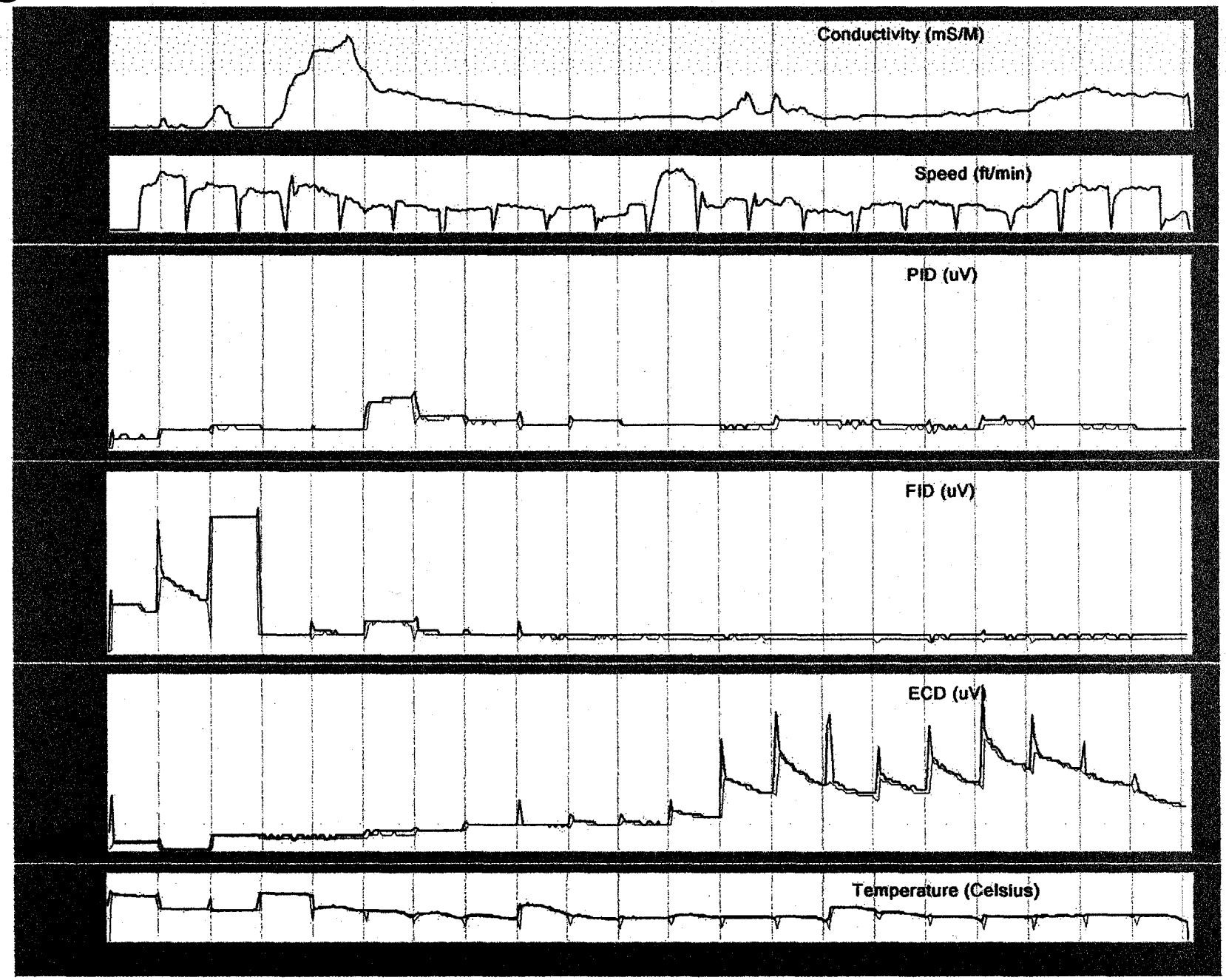

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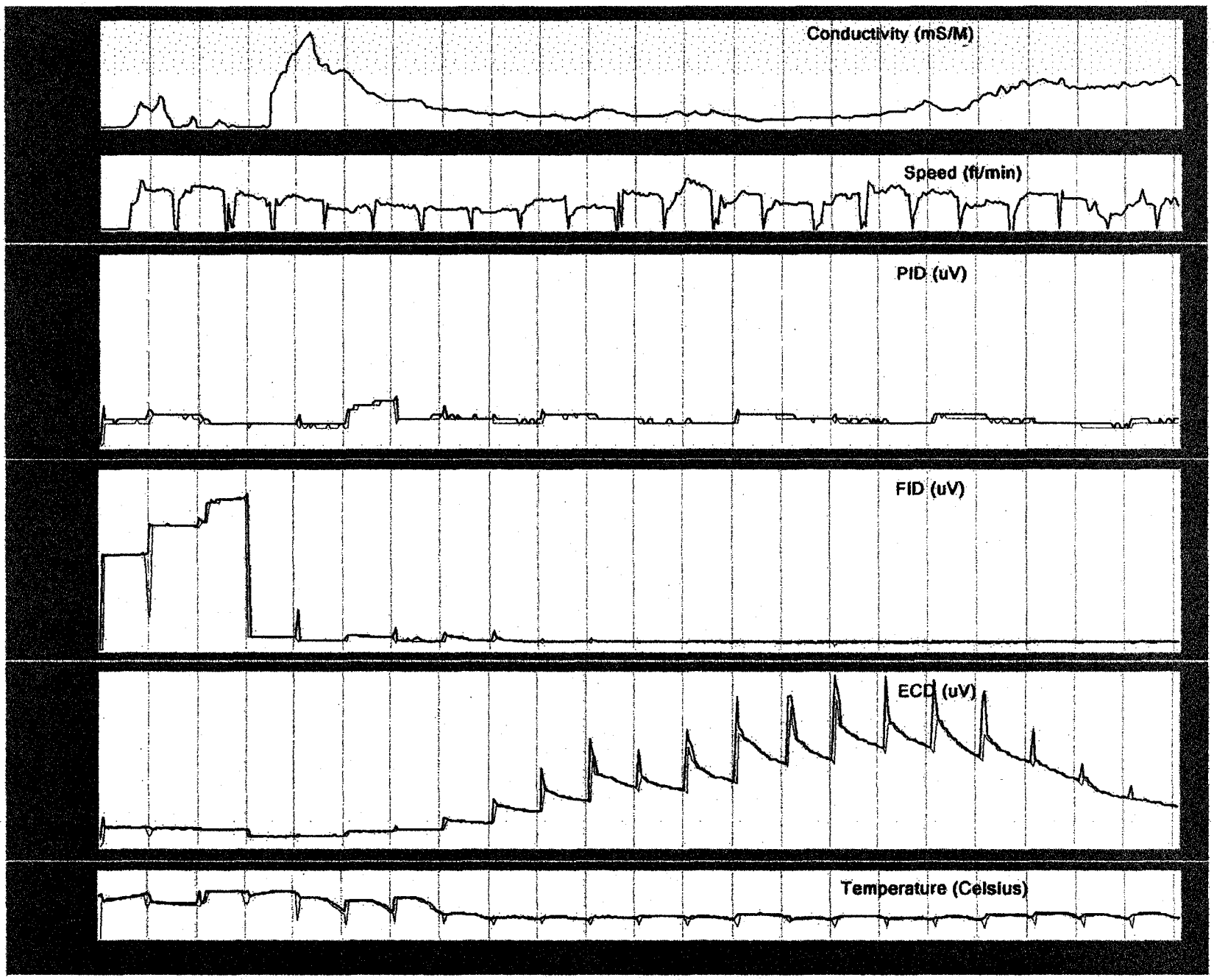
MIP_02



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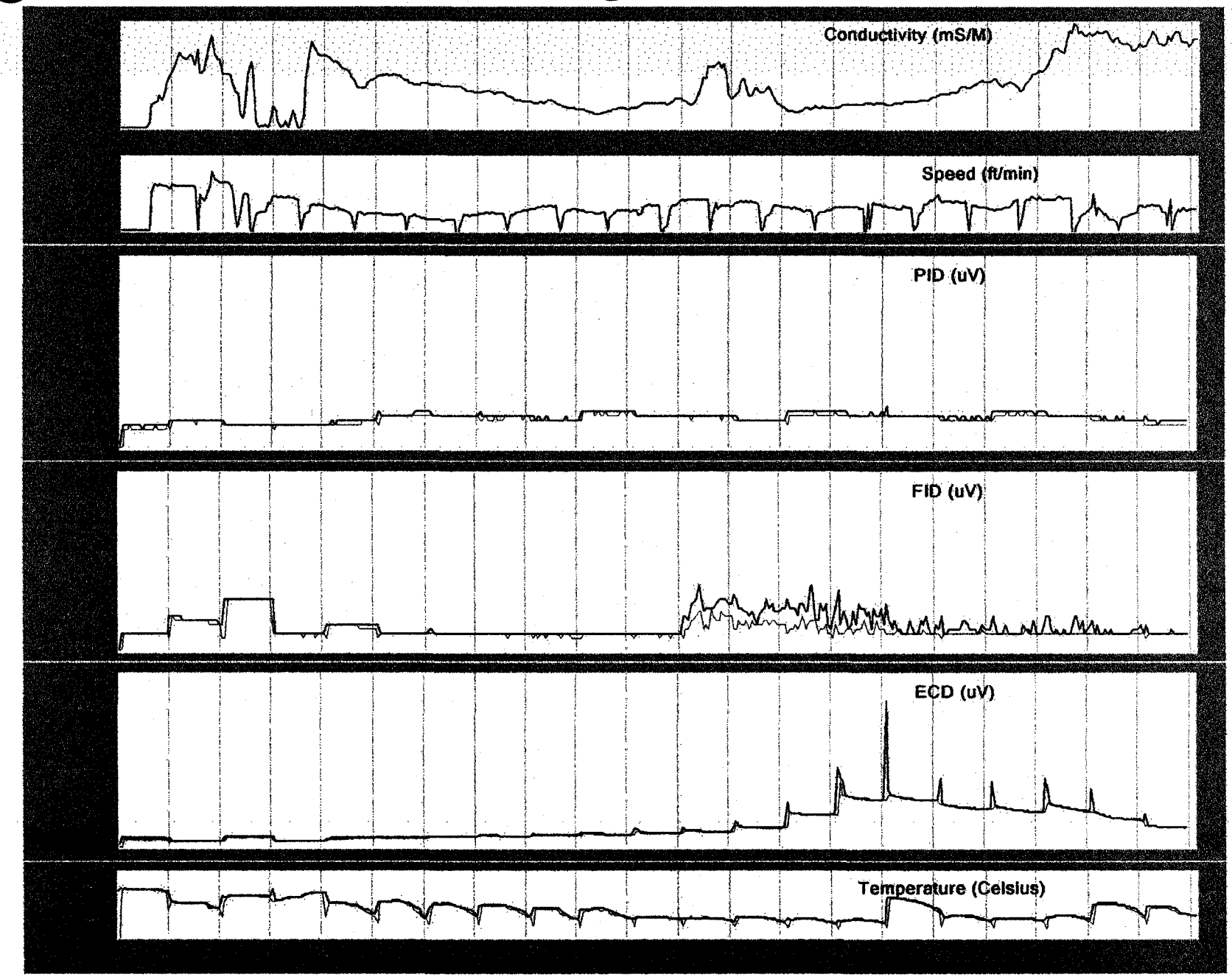

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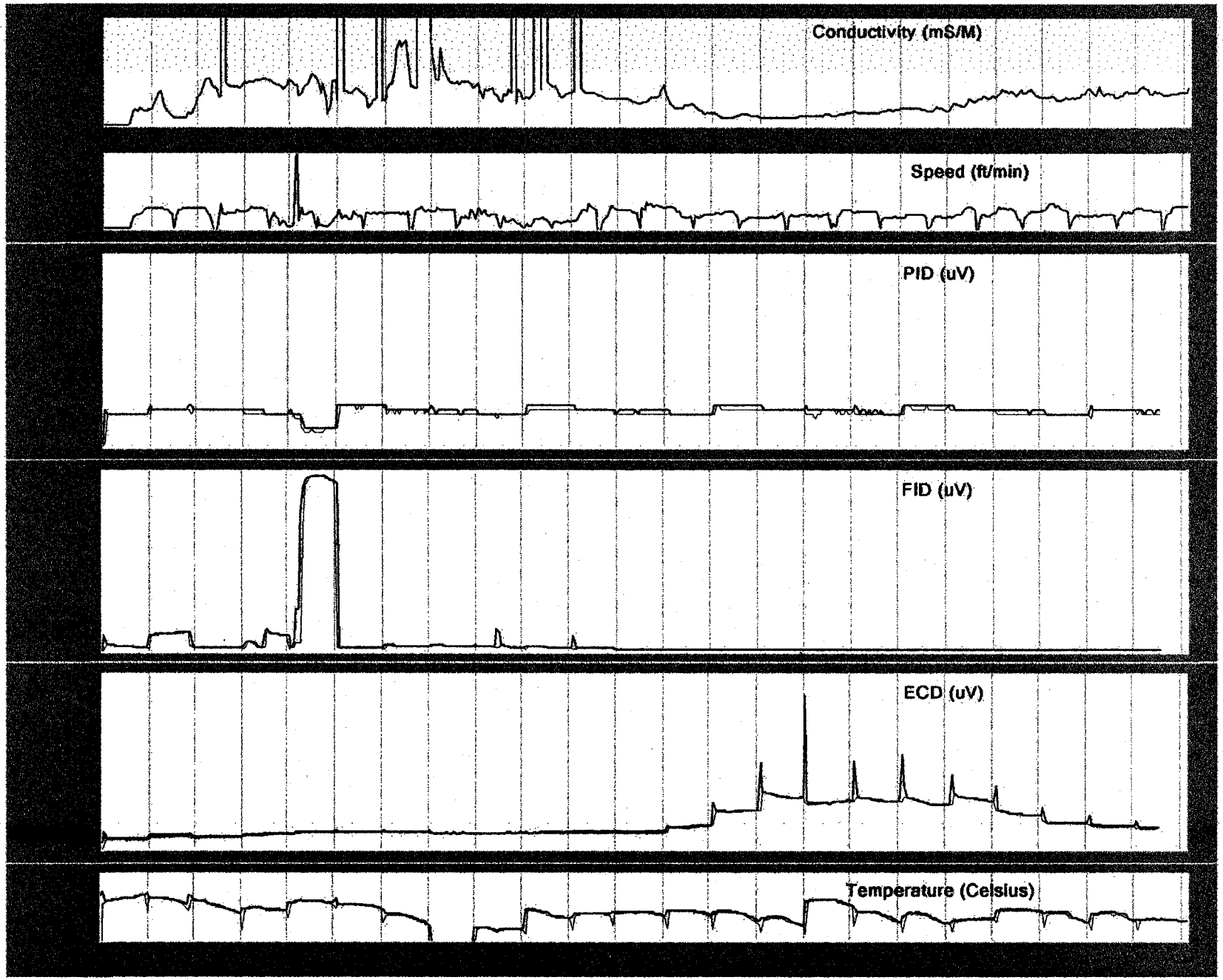
MIP_04



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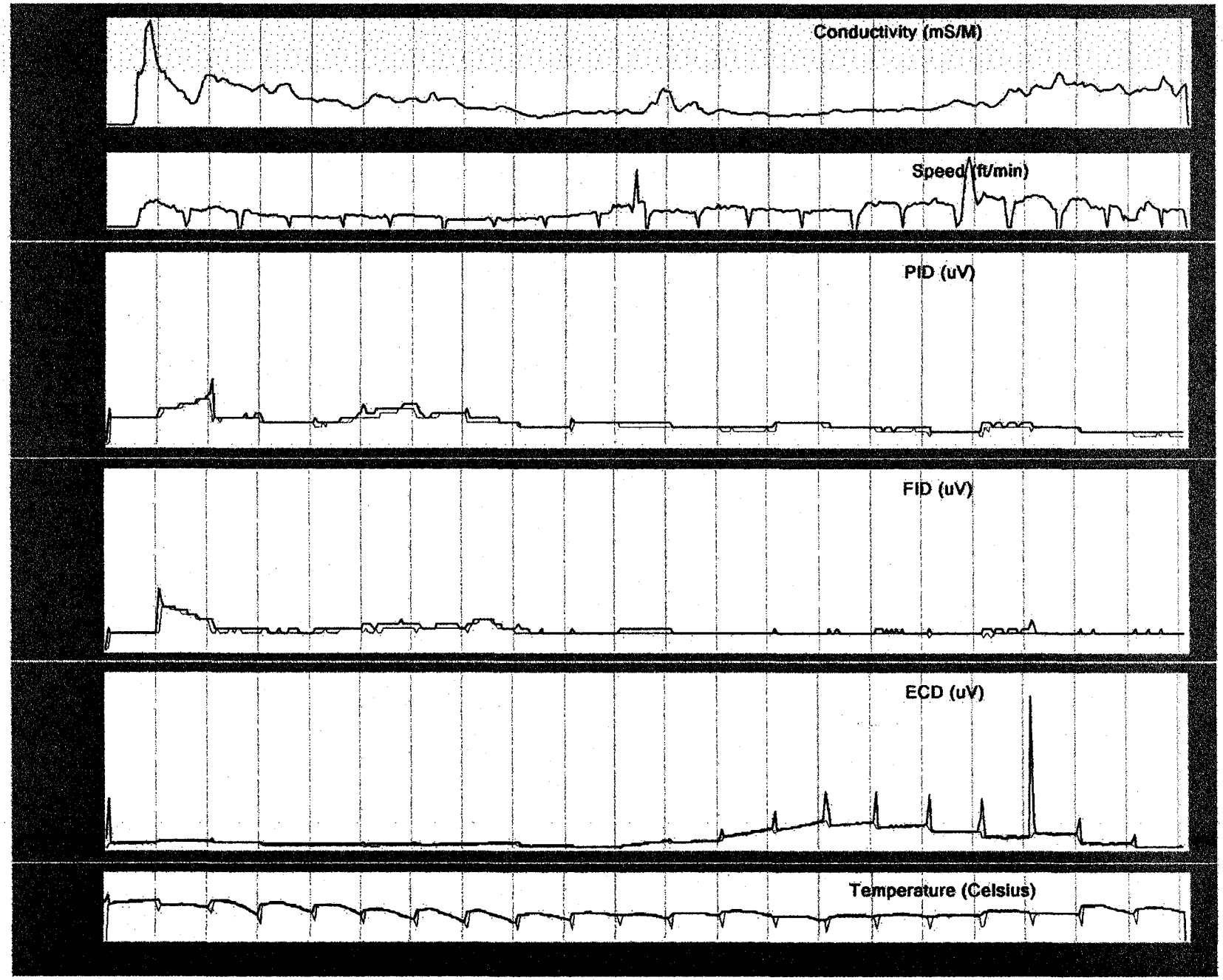

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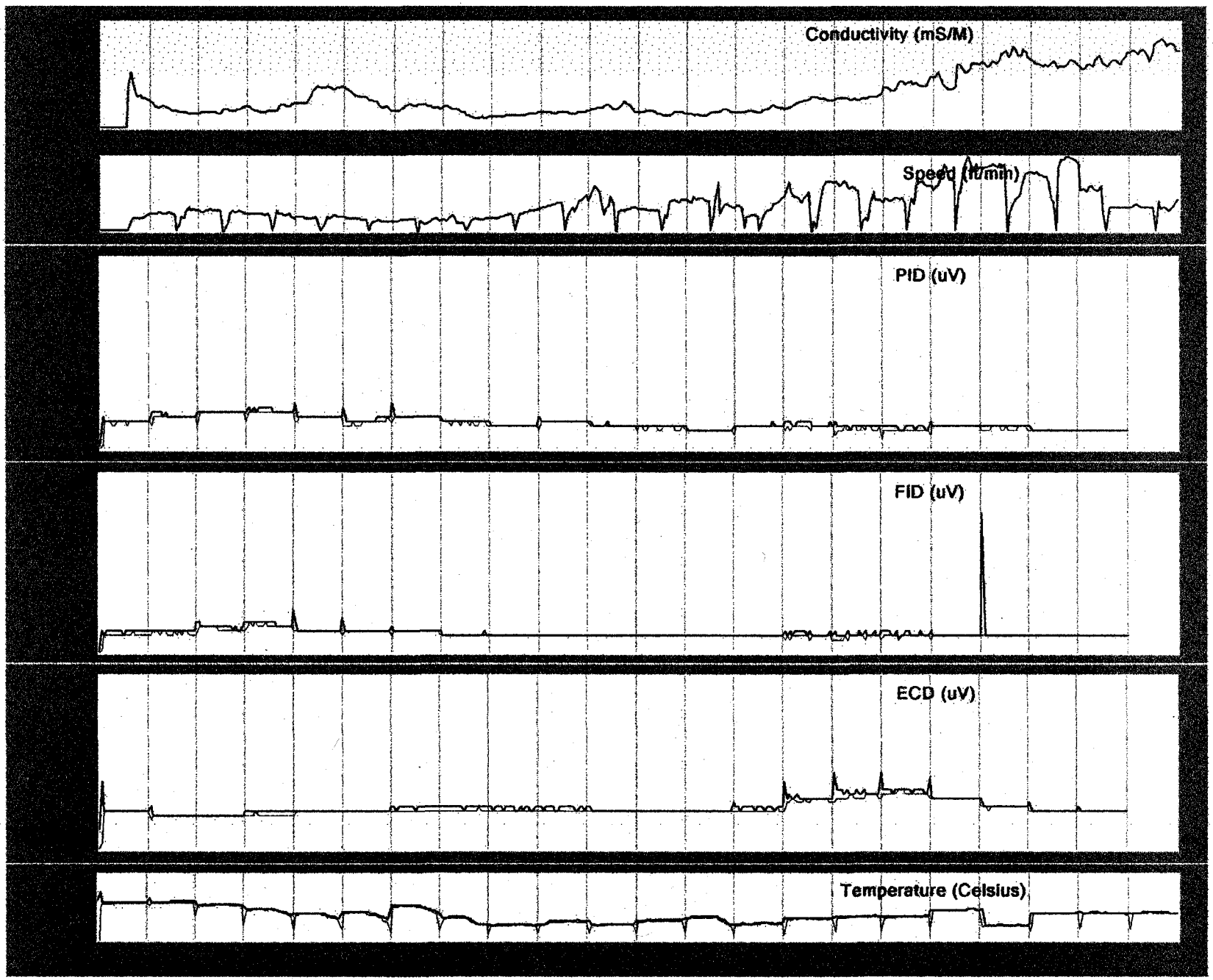
MIP_06



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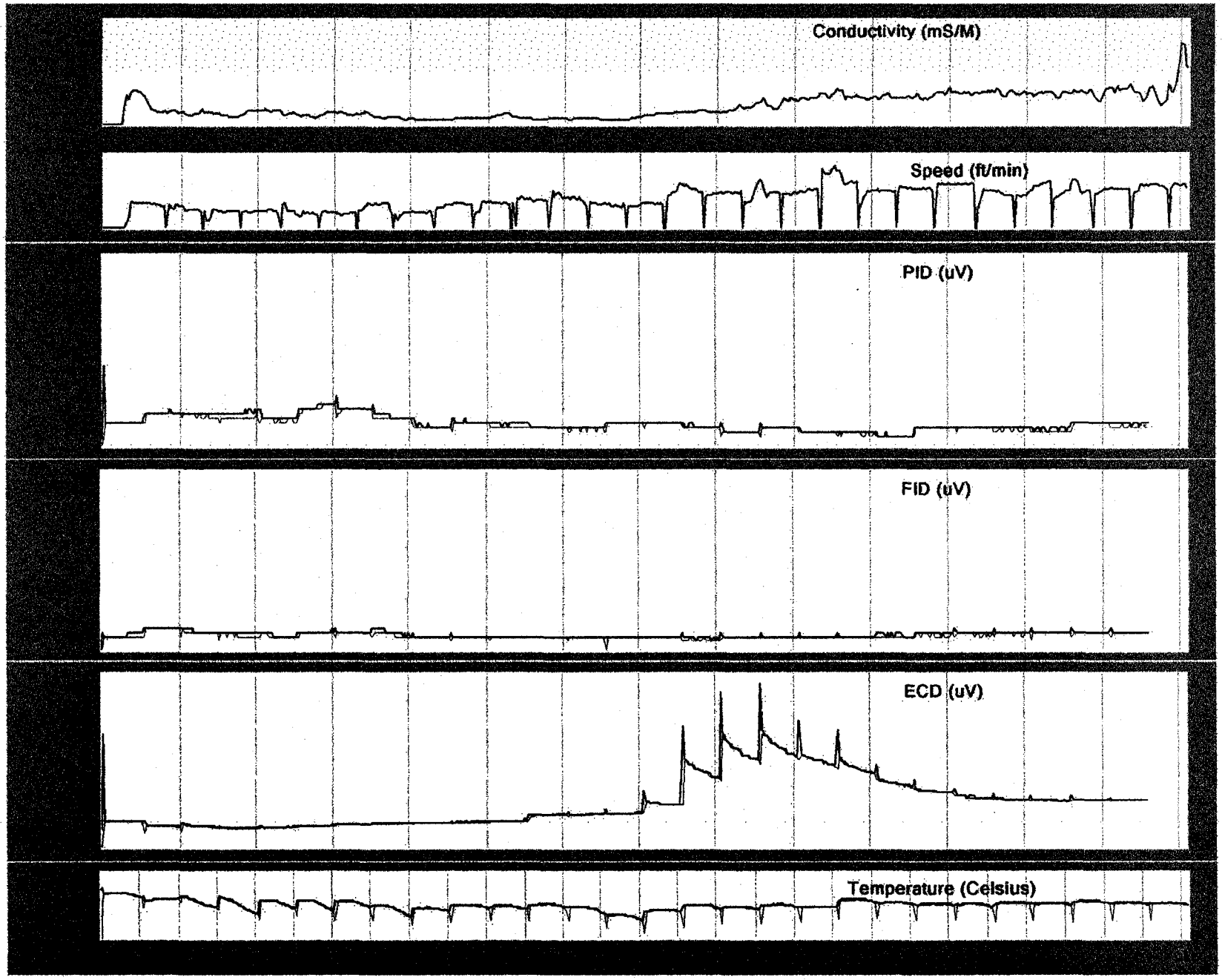

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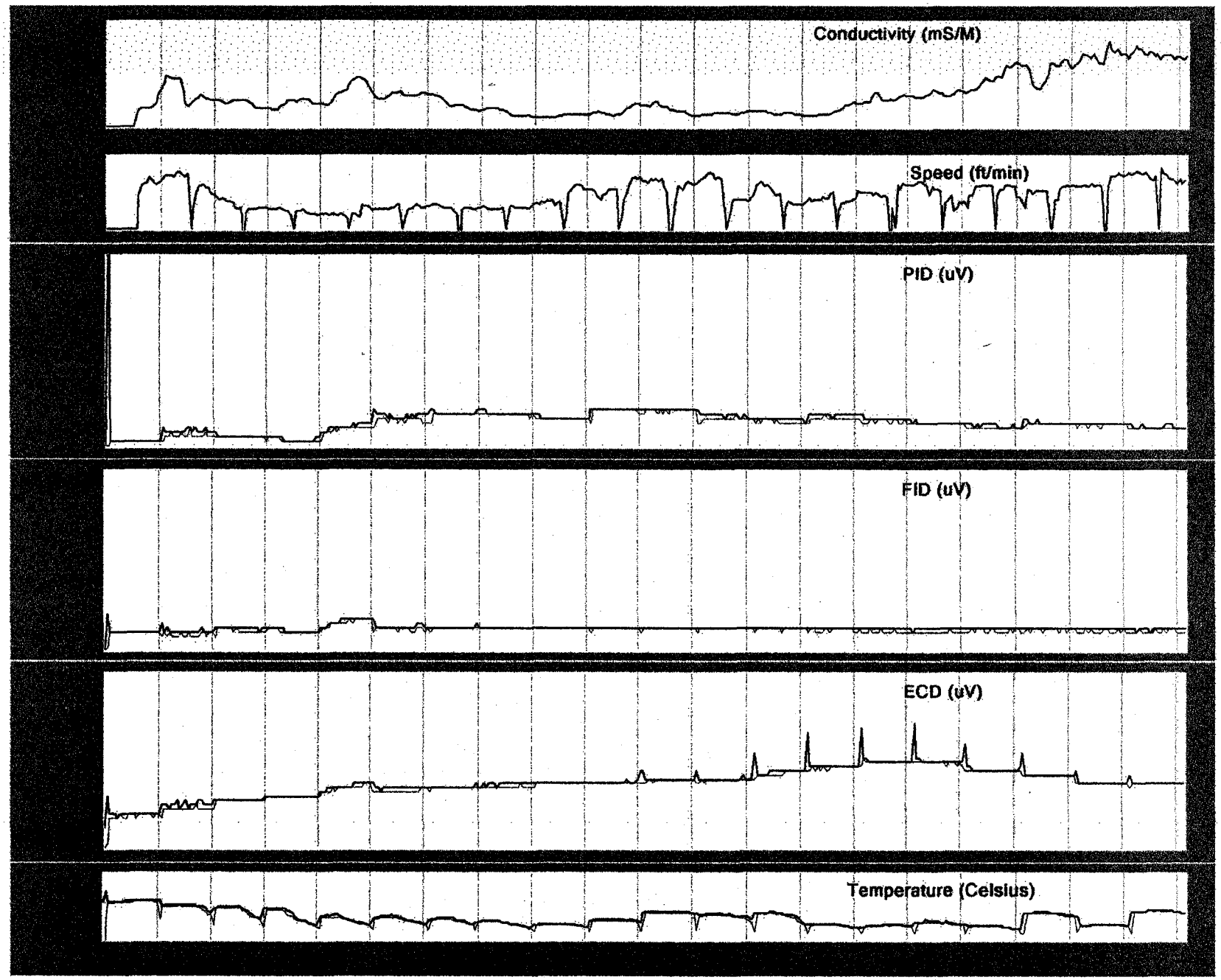
MIP_08



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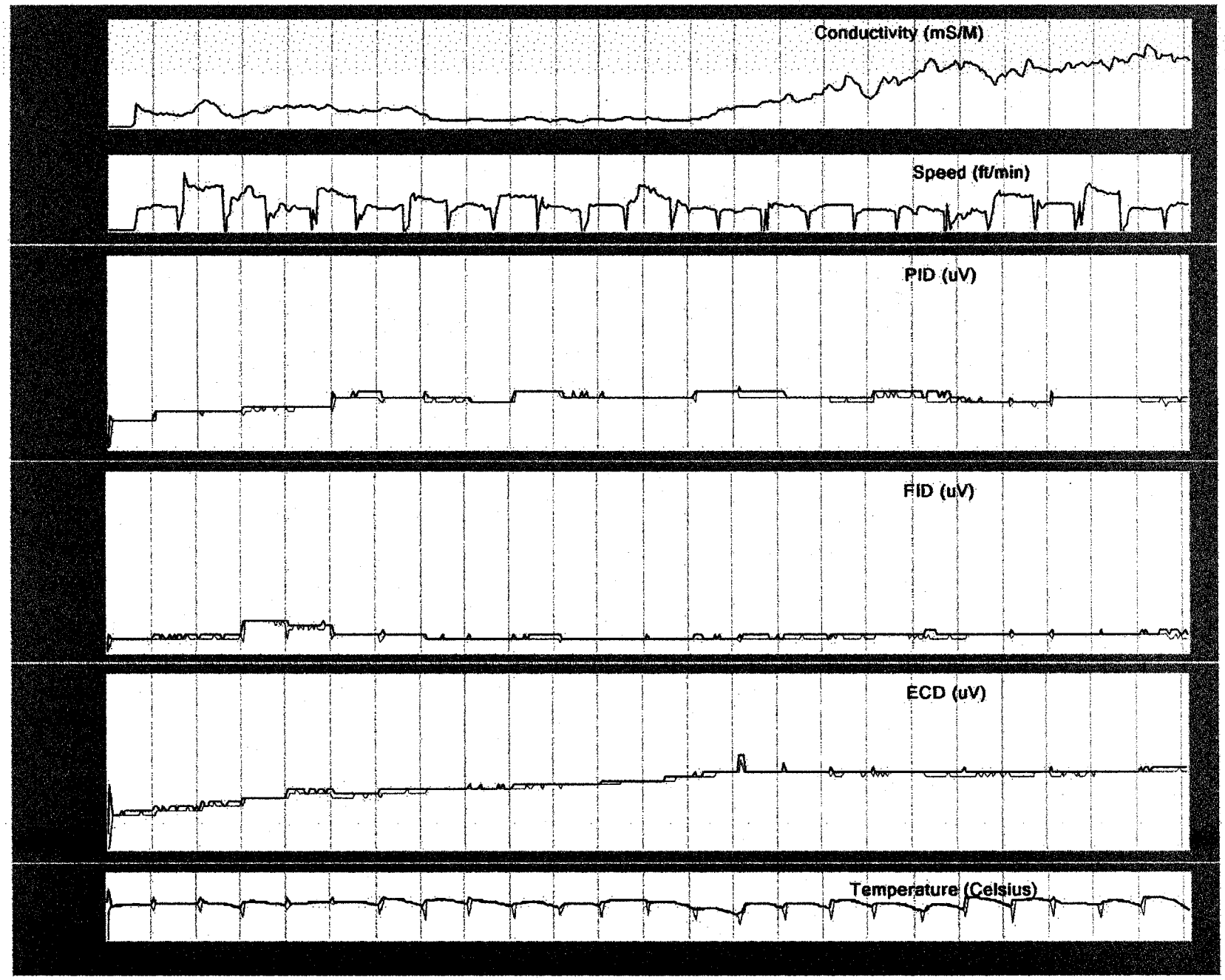

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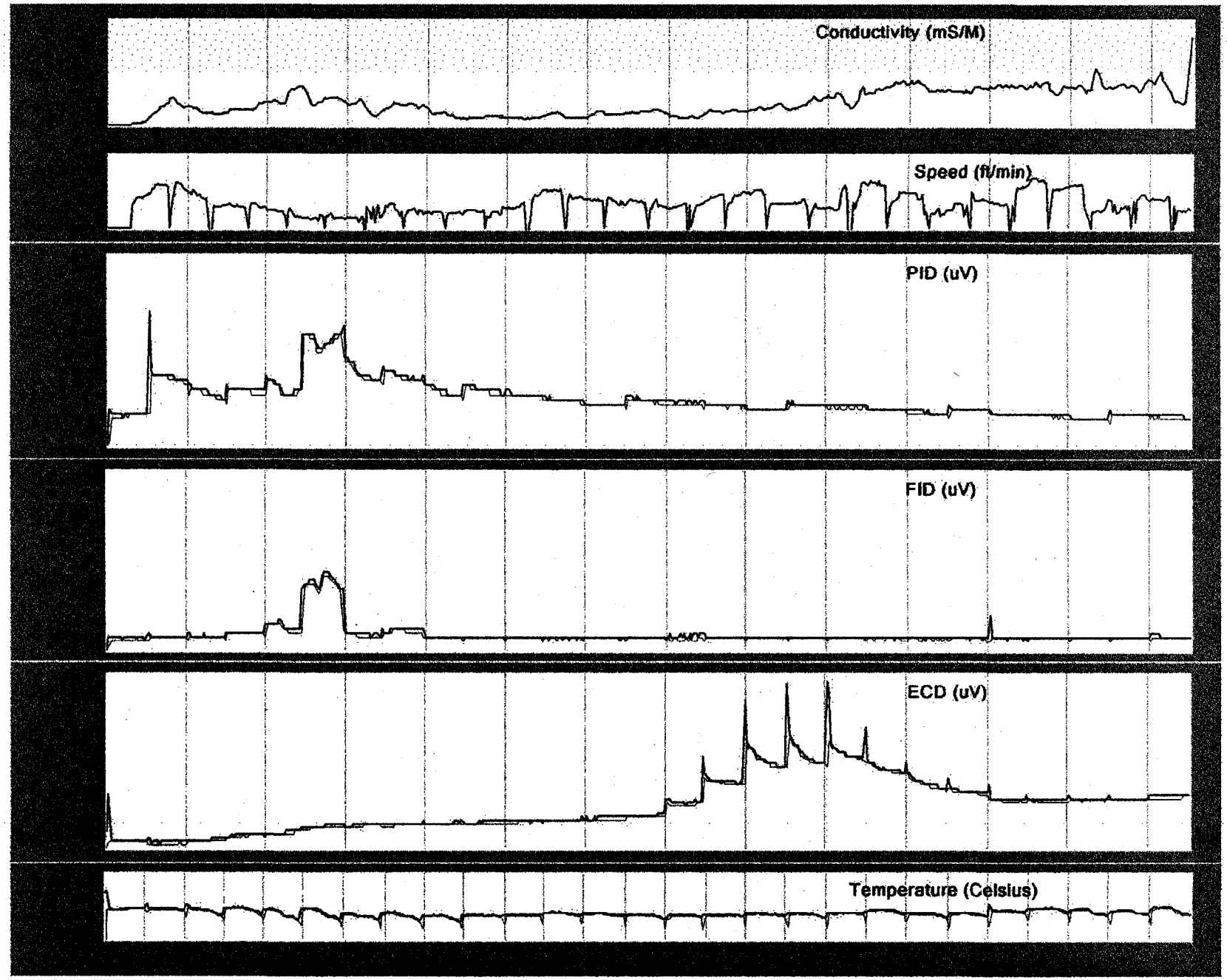
MIP_10



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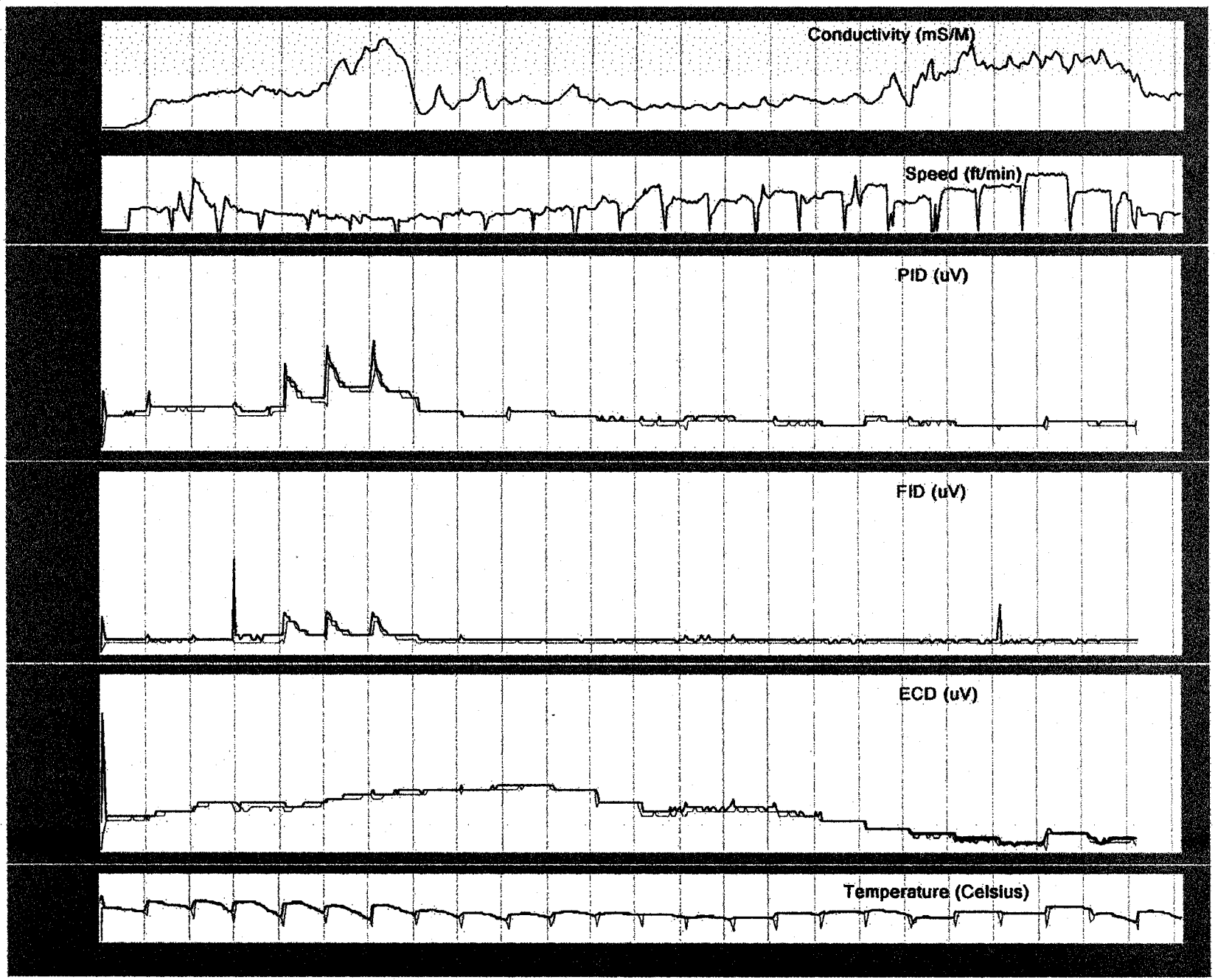

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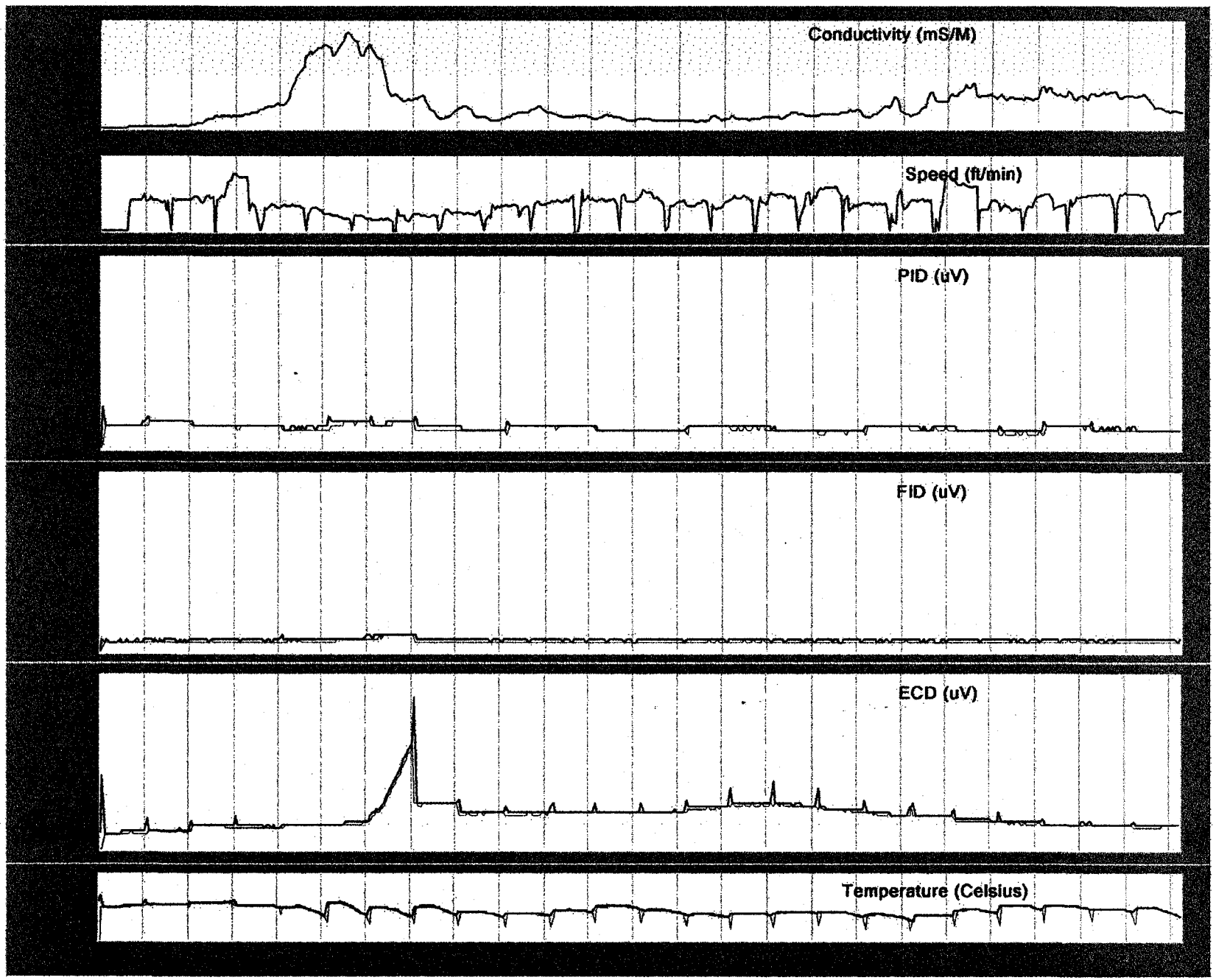

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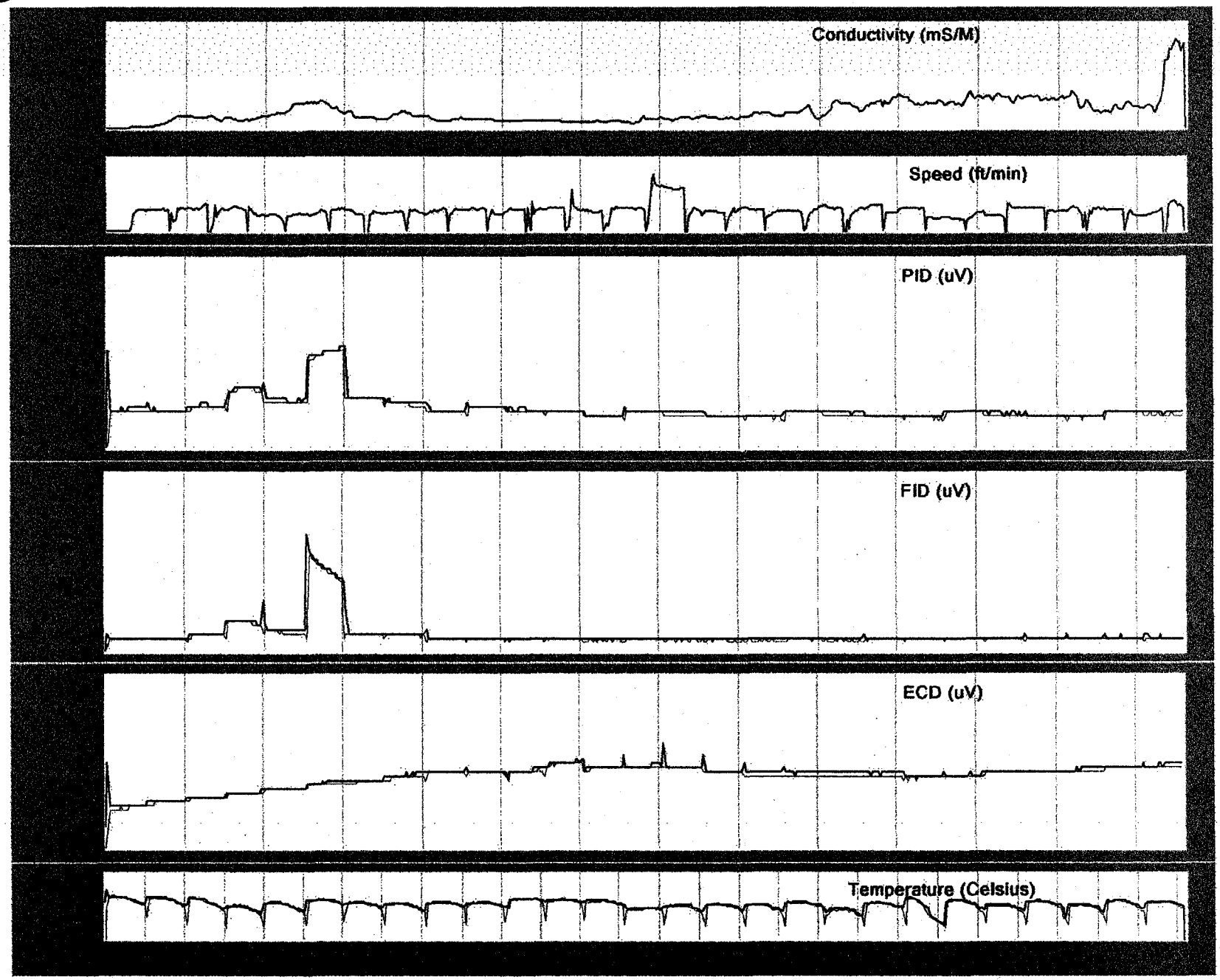

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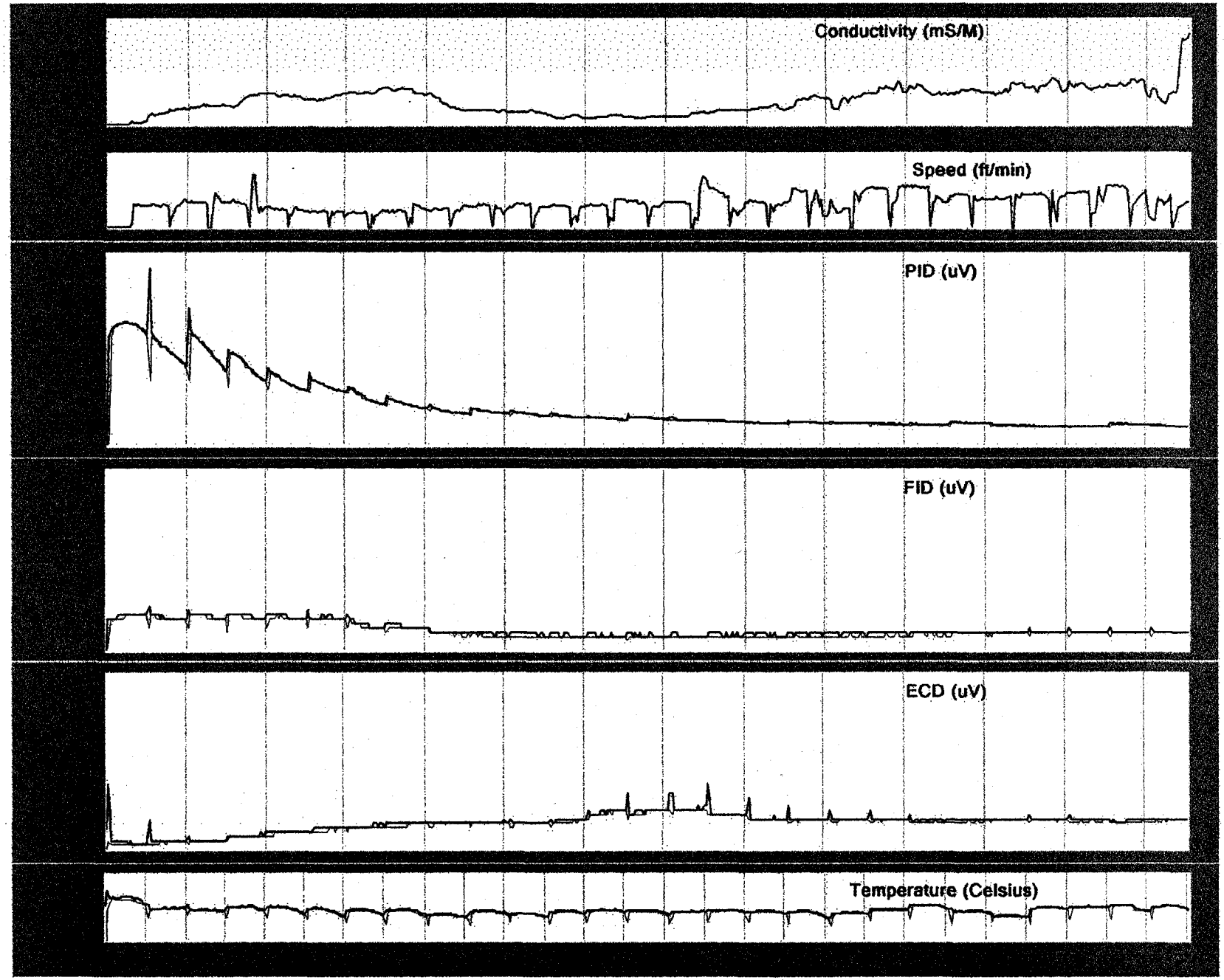

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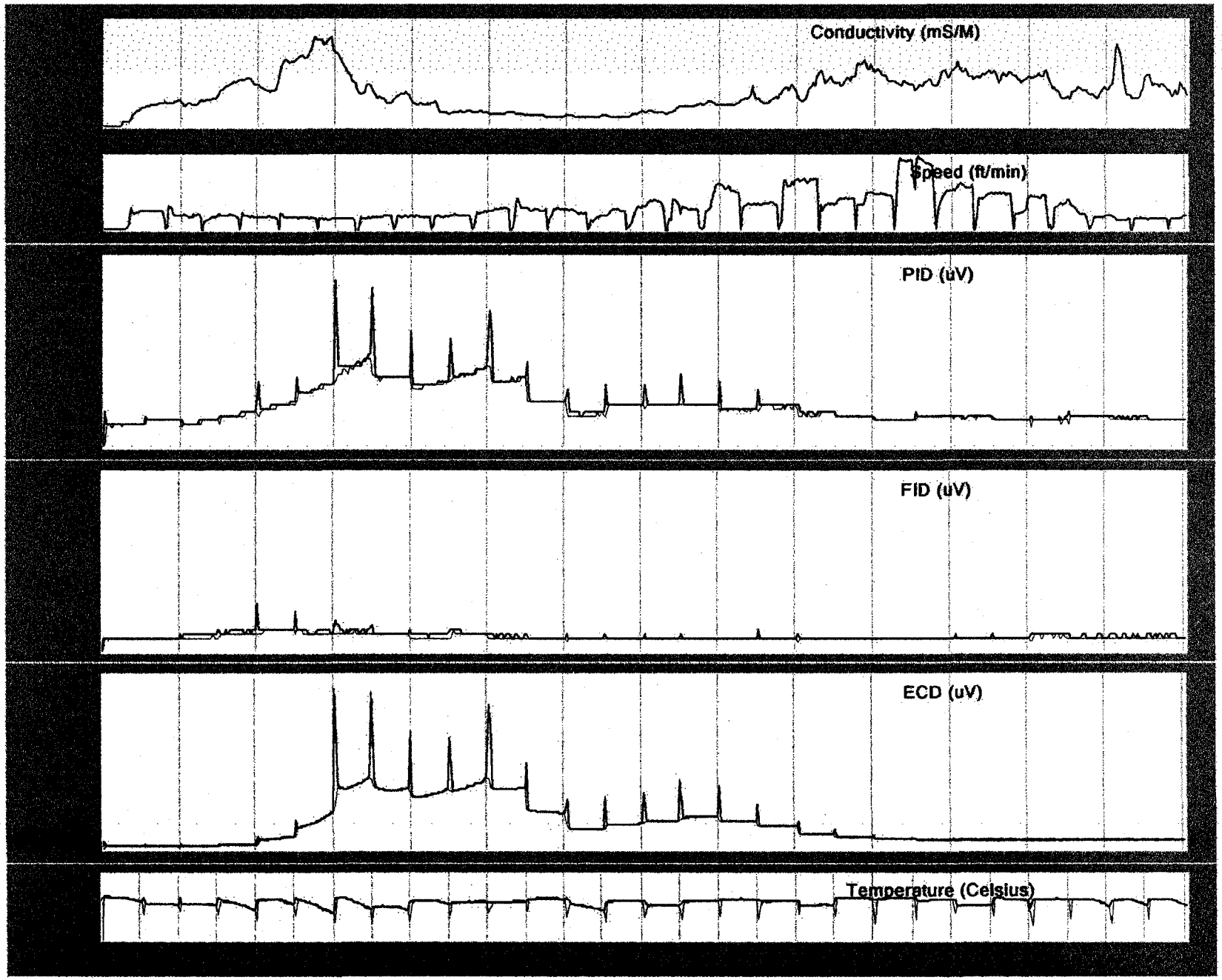

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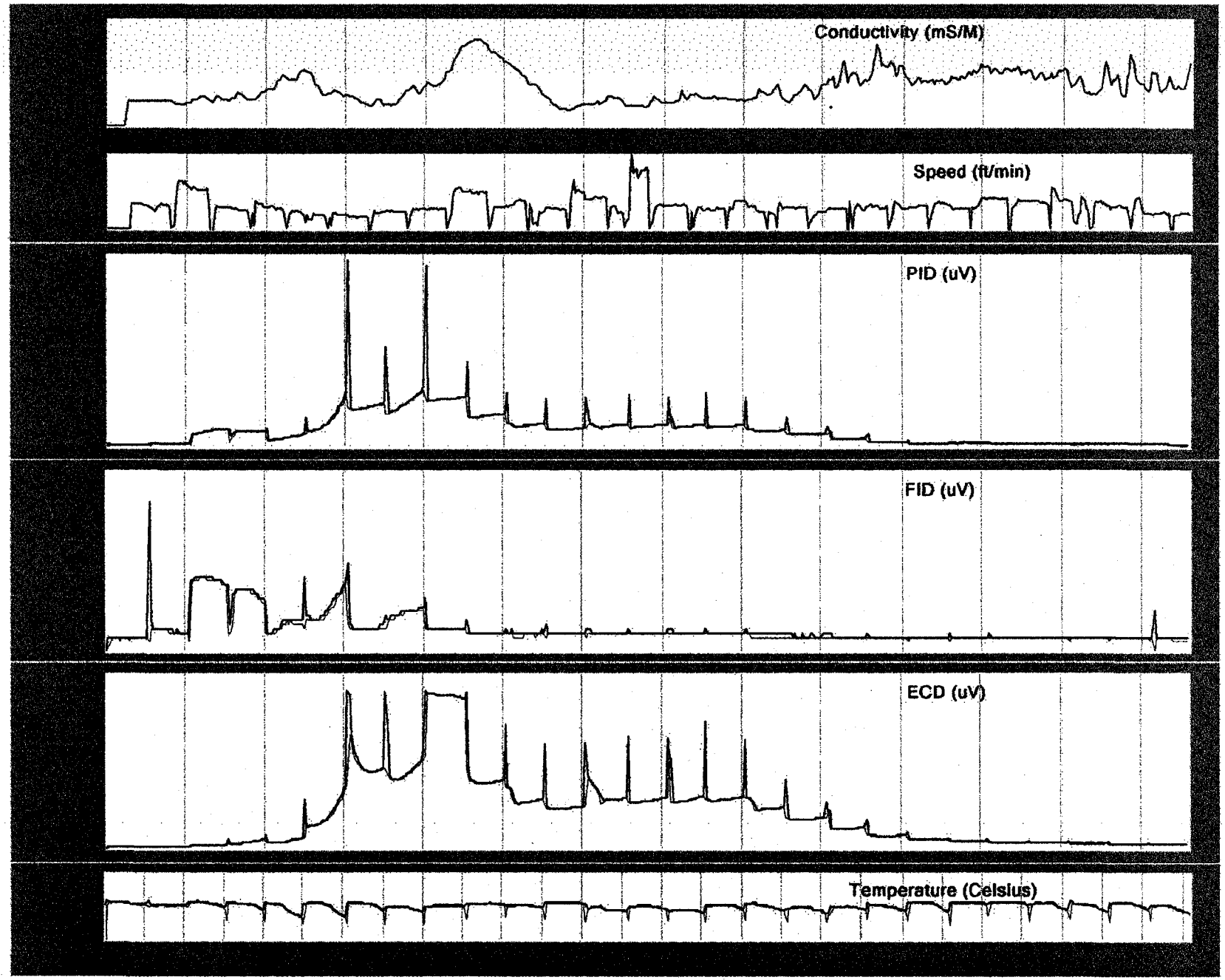

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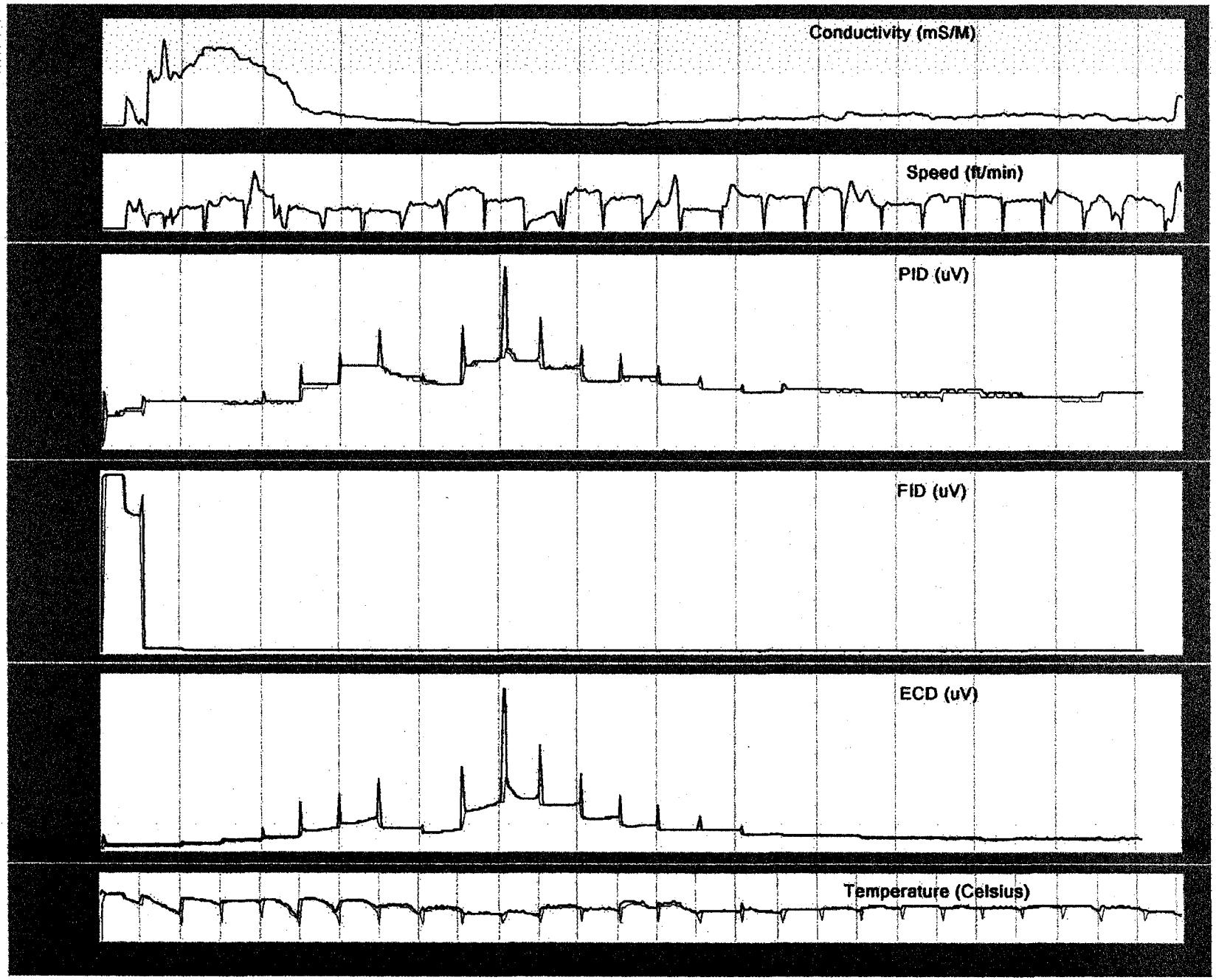

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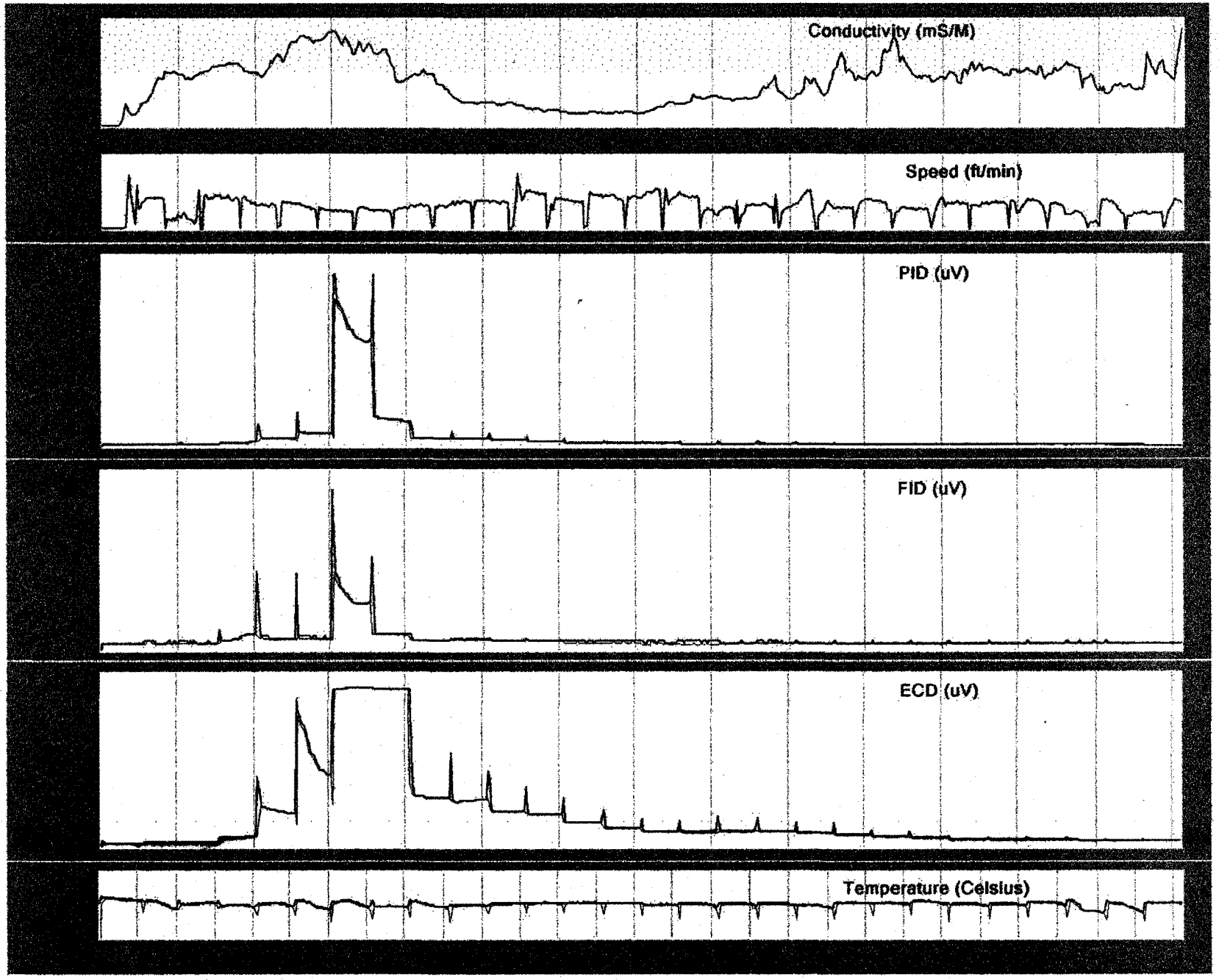

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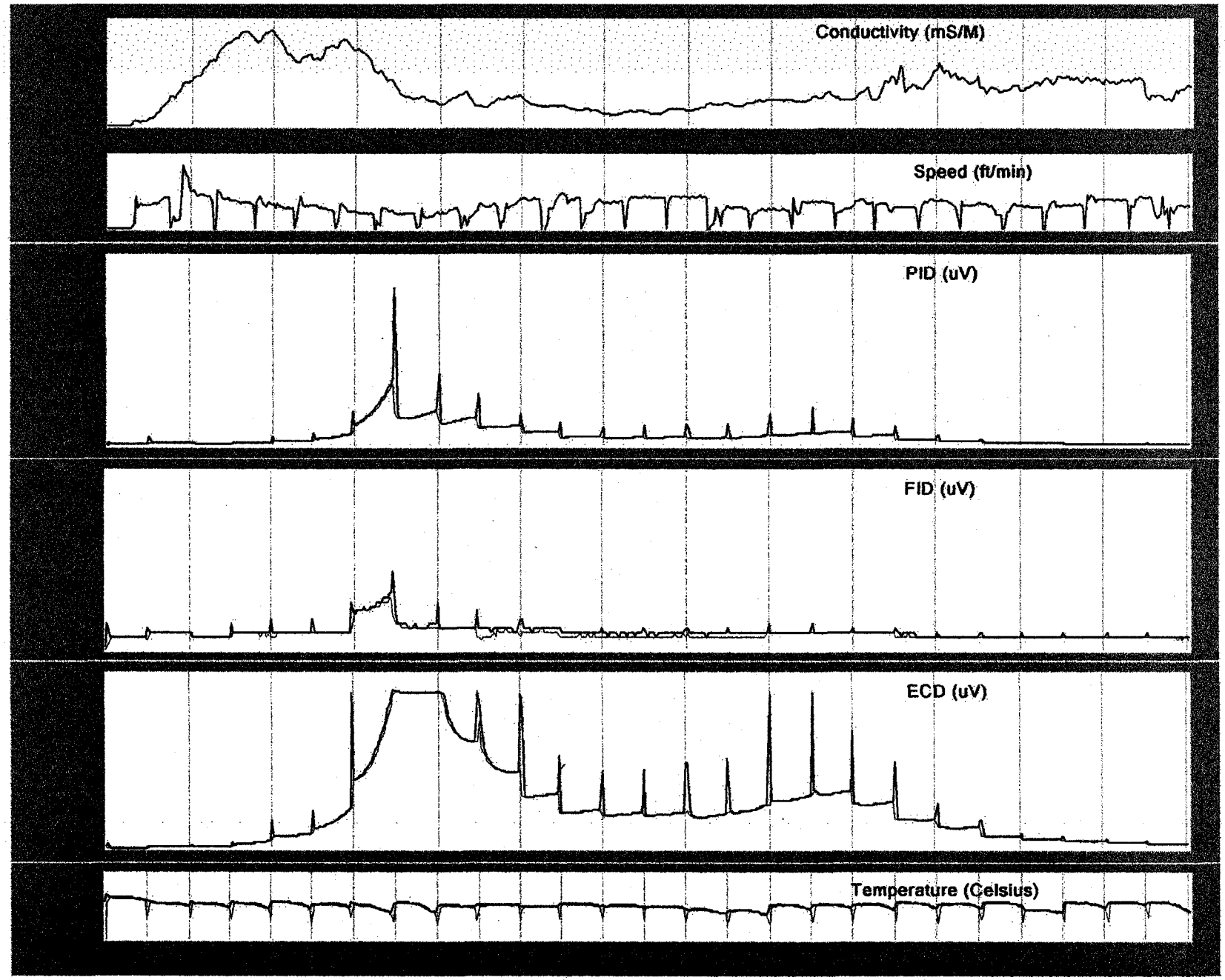

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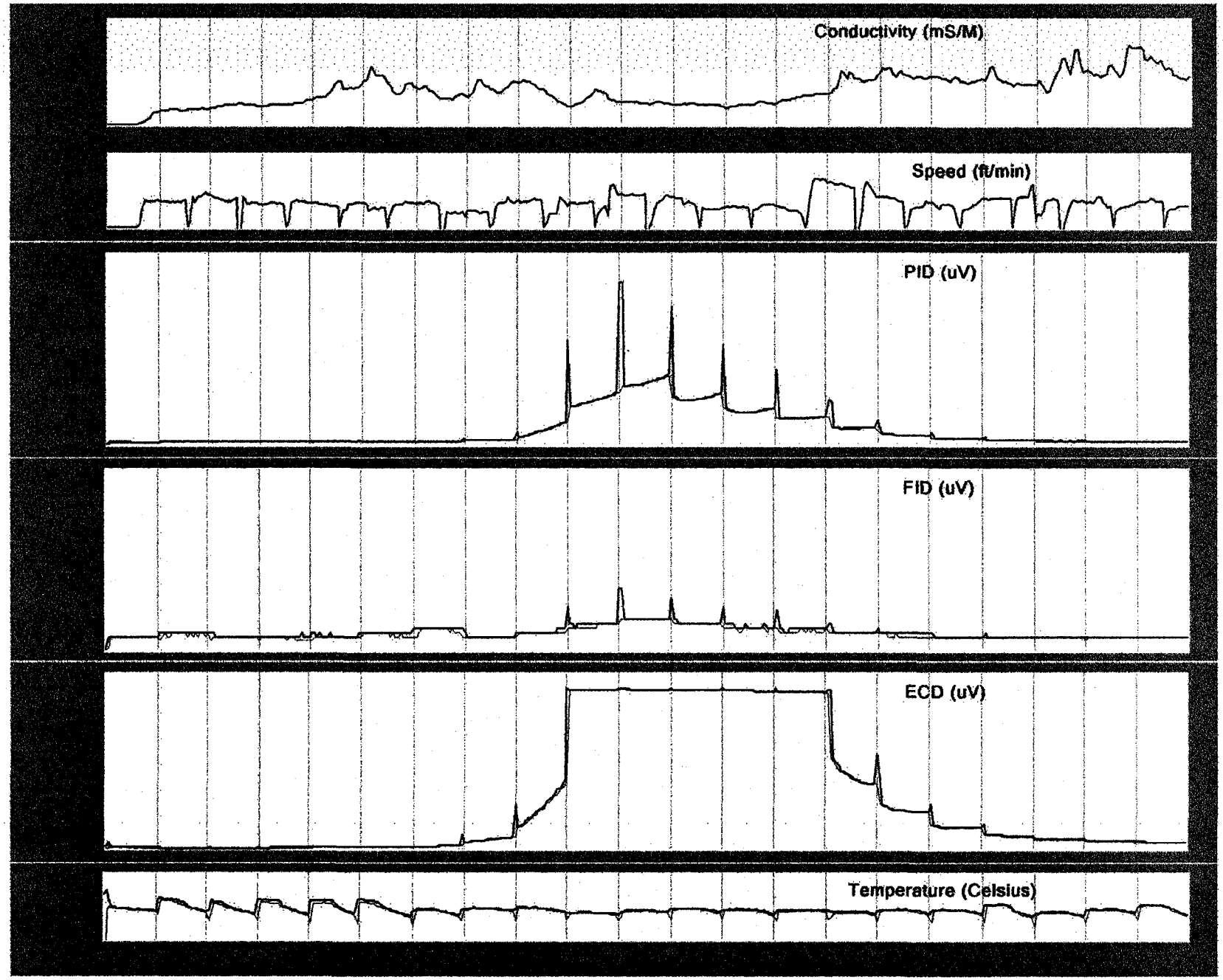

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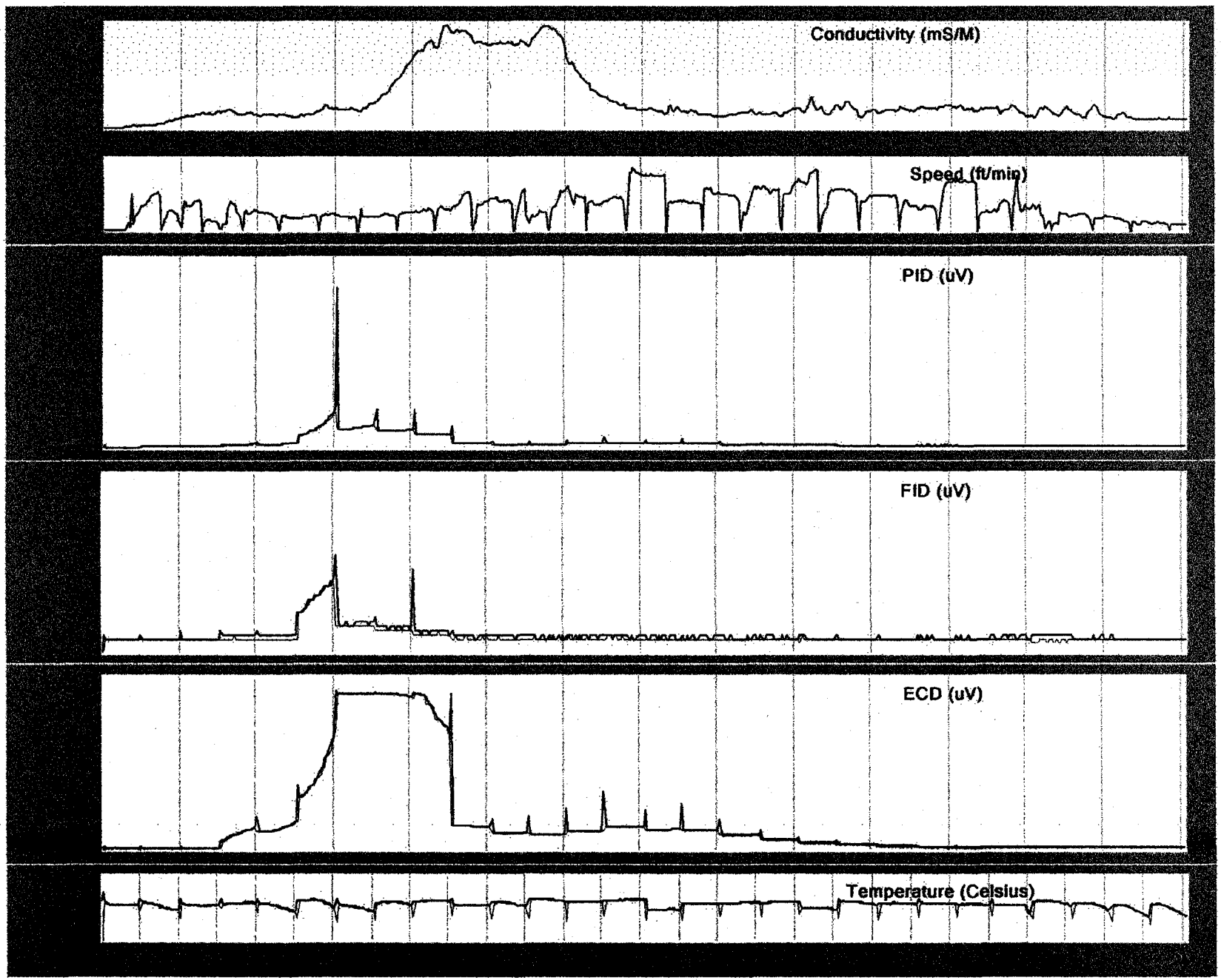

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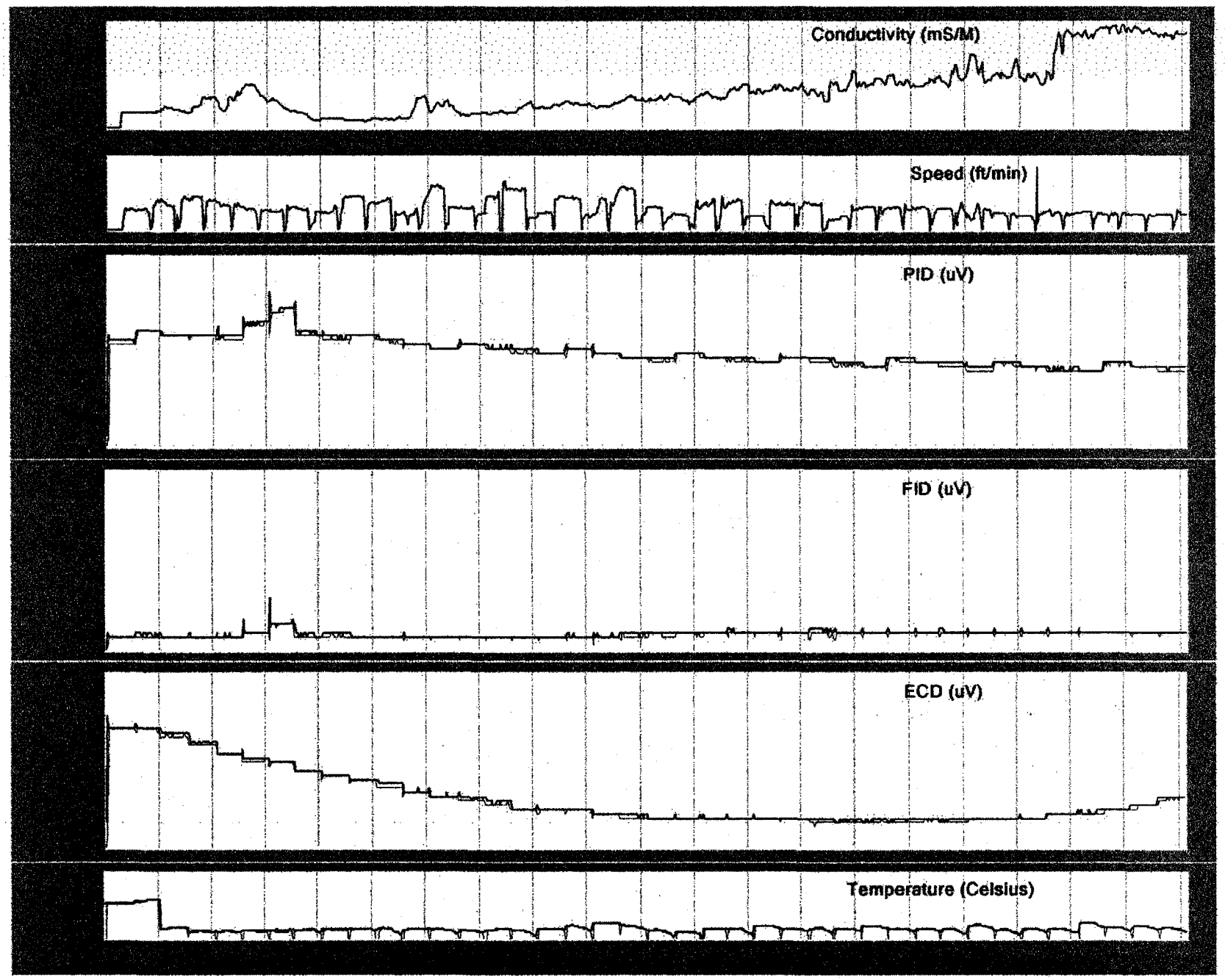

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Appendix B: MIP Logs

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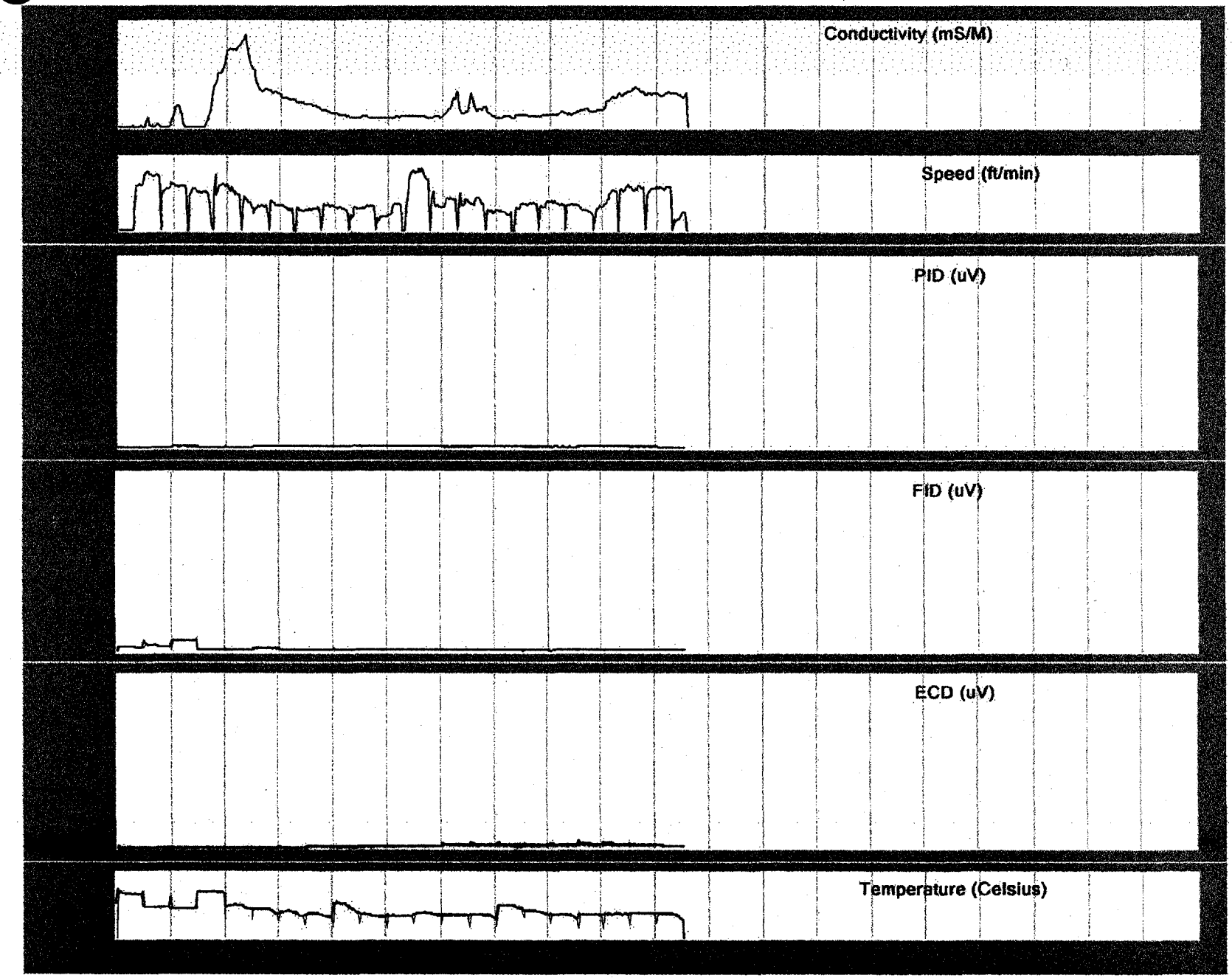

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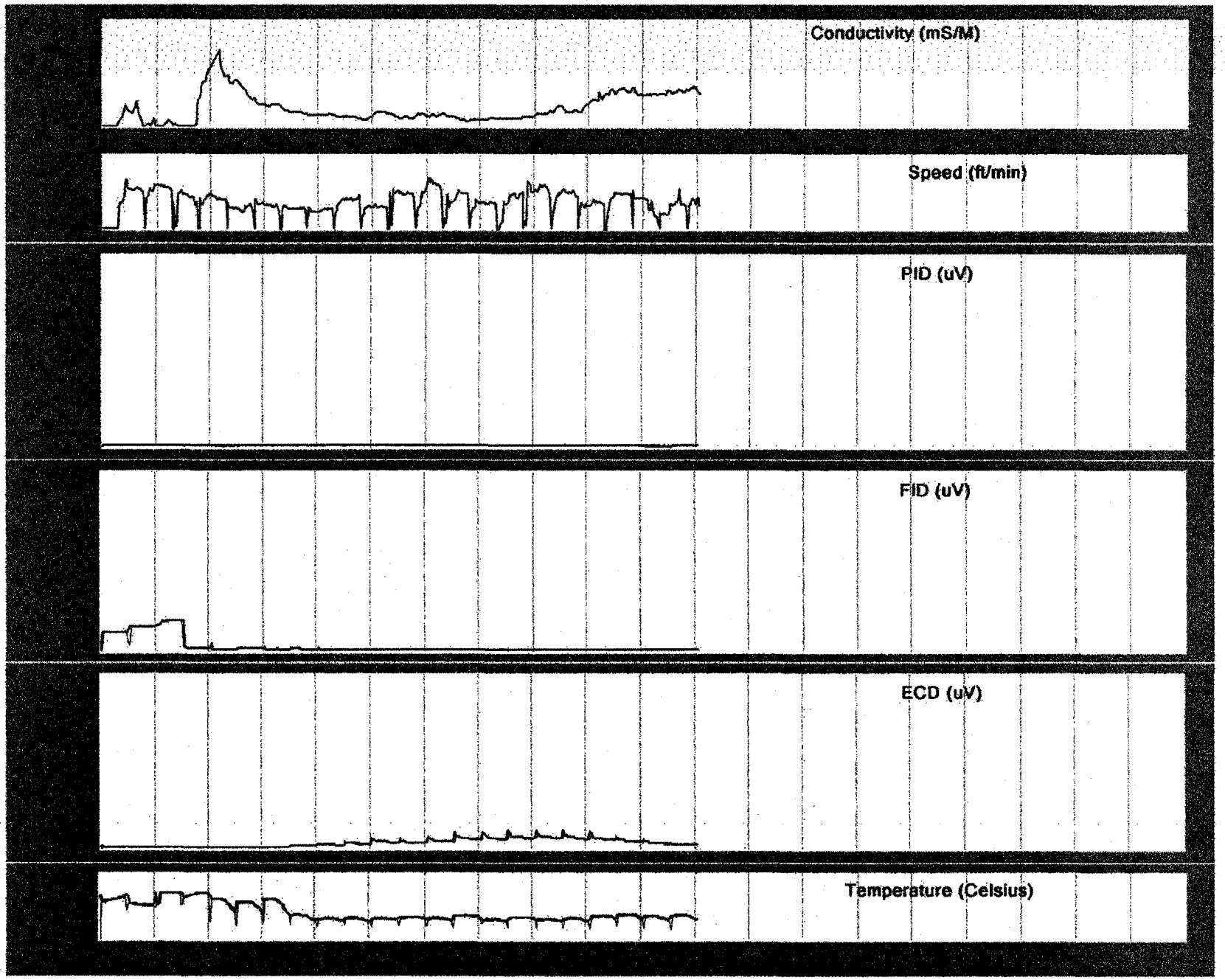

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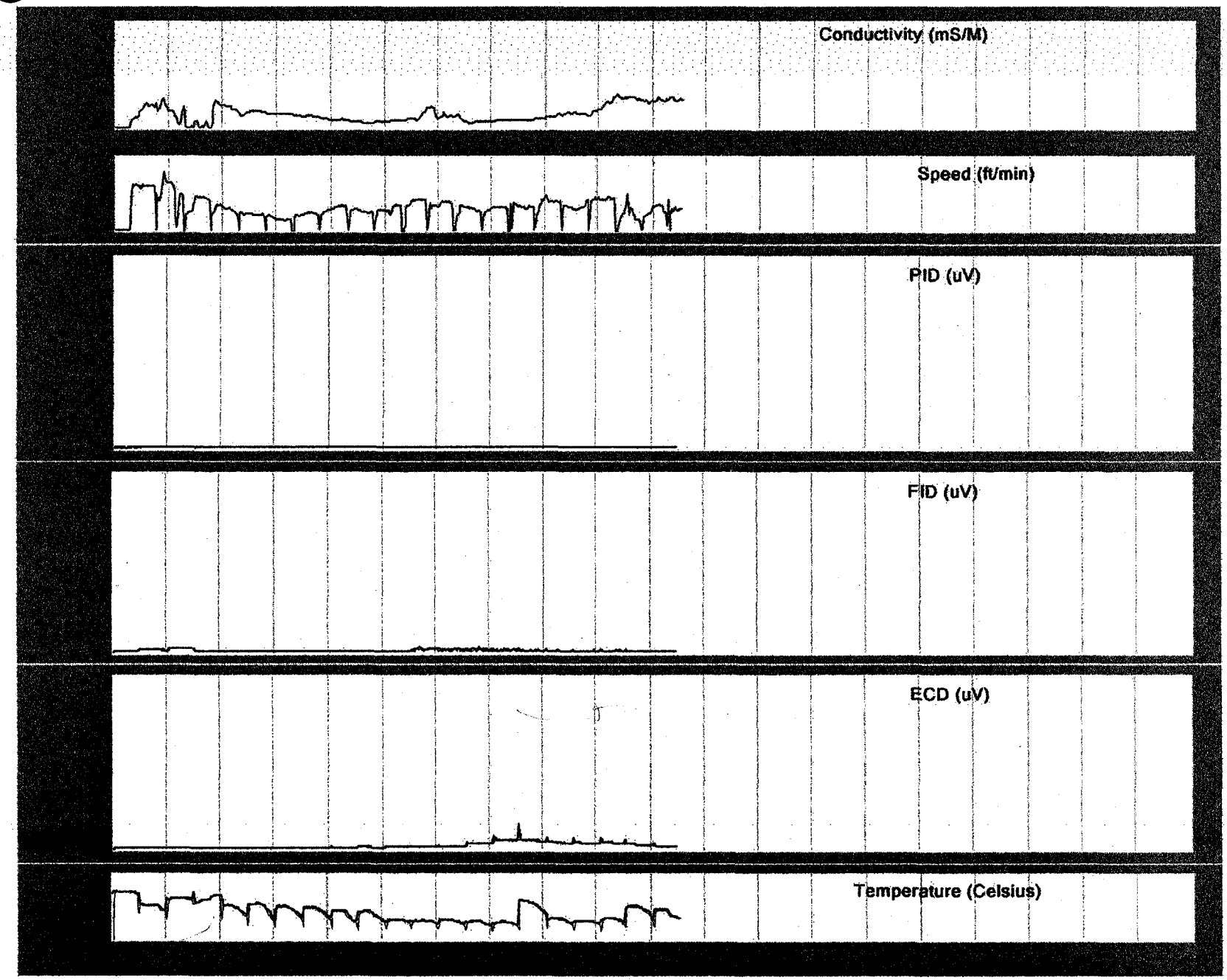

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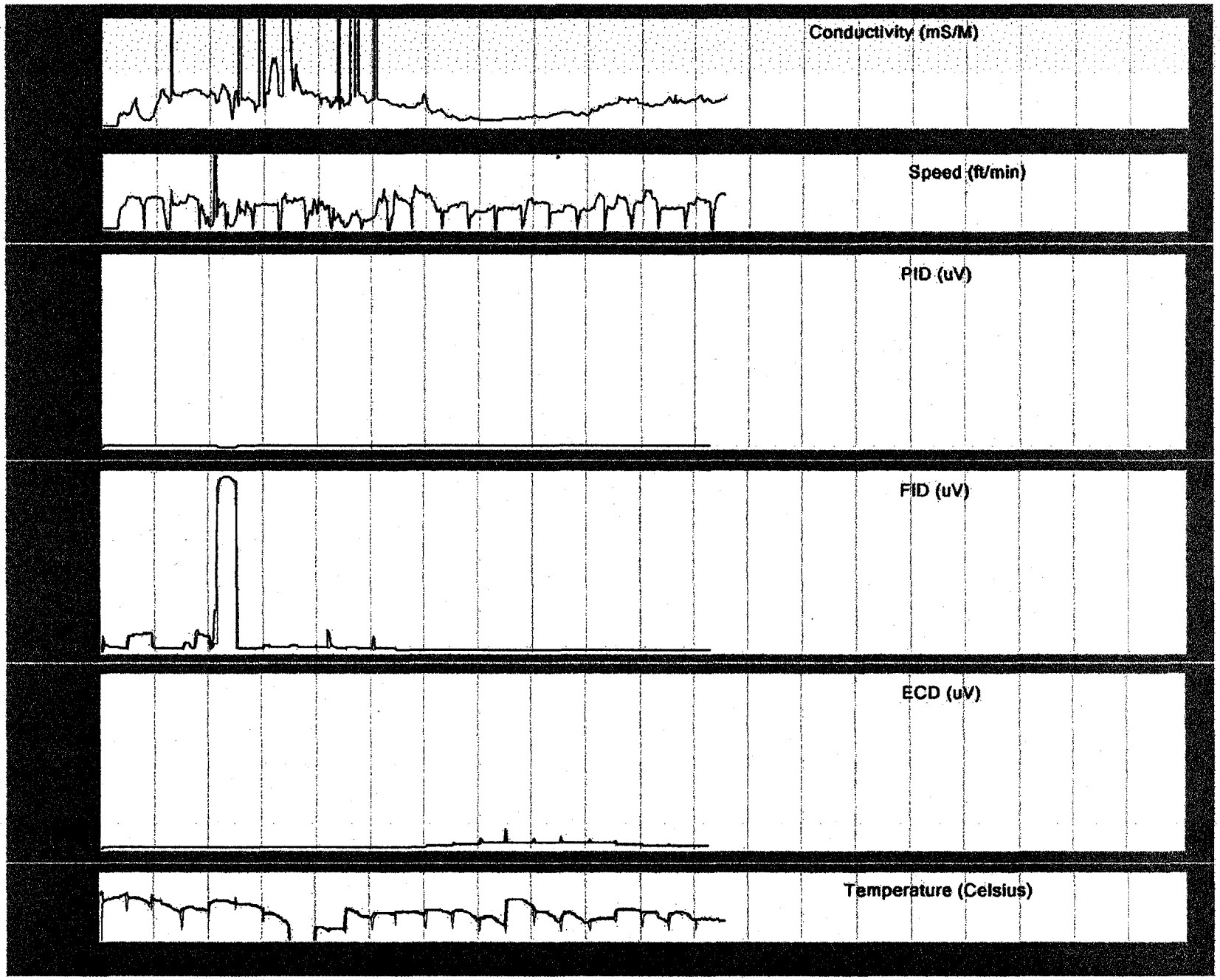

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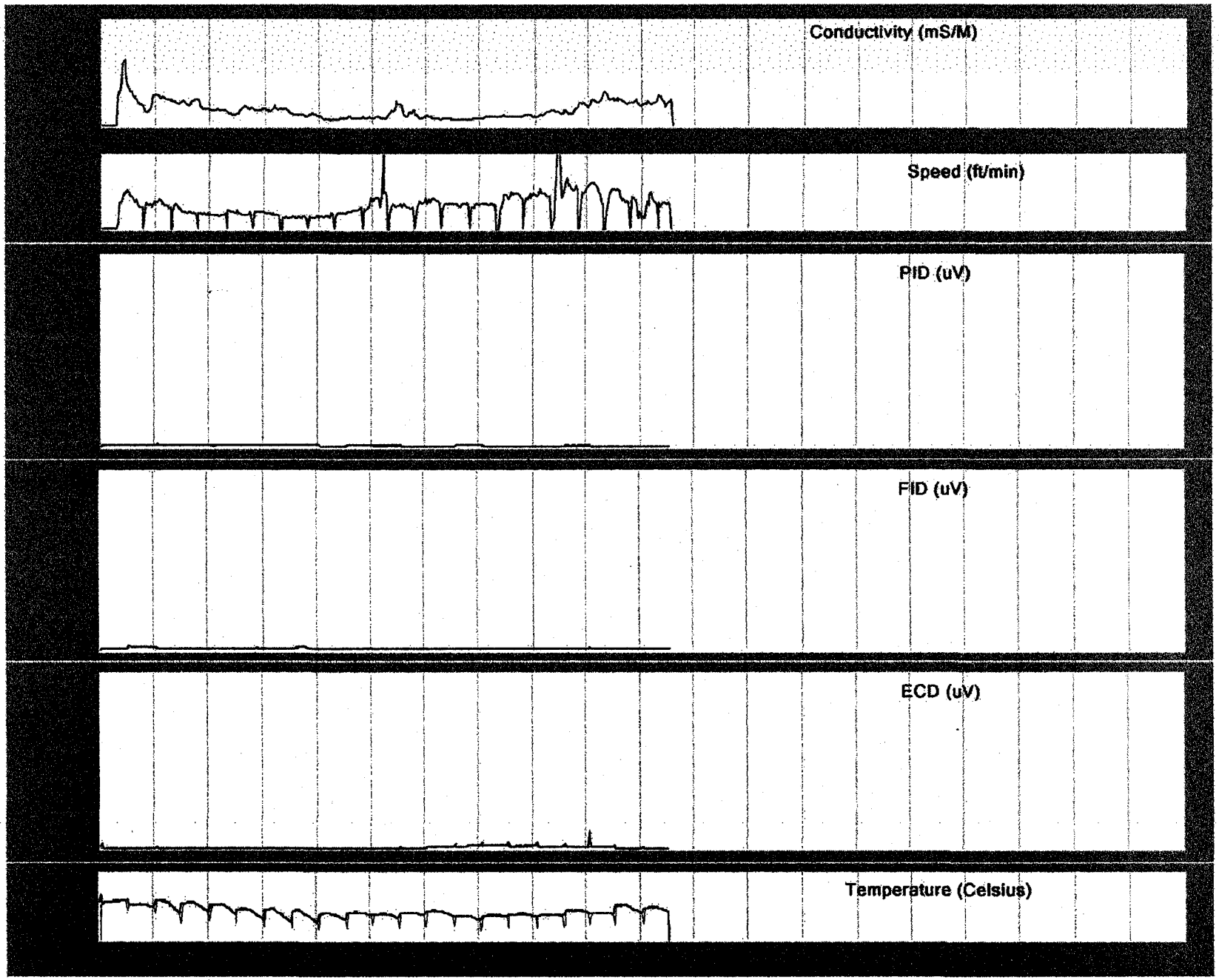

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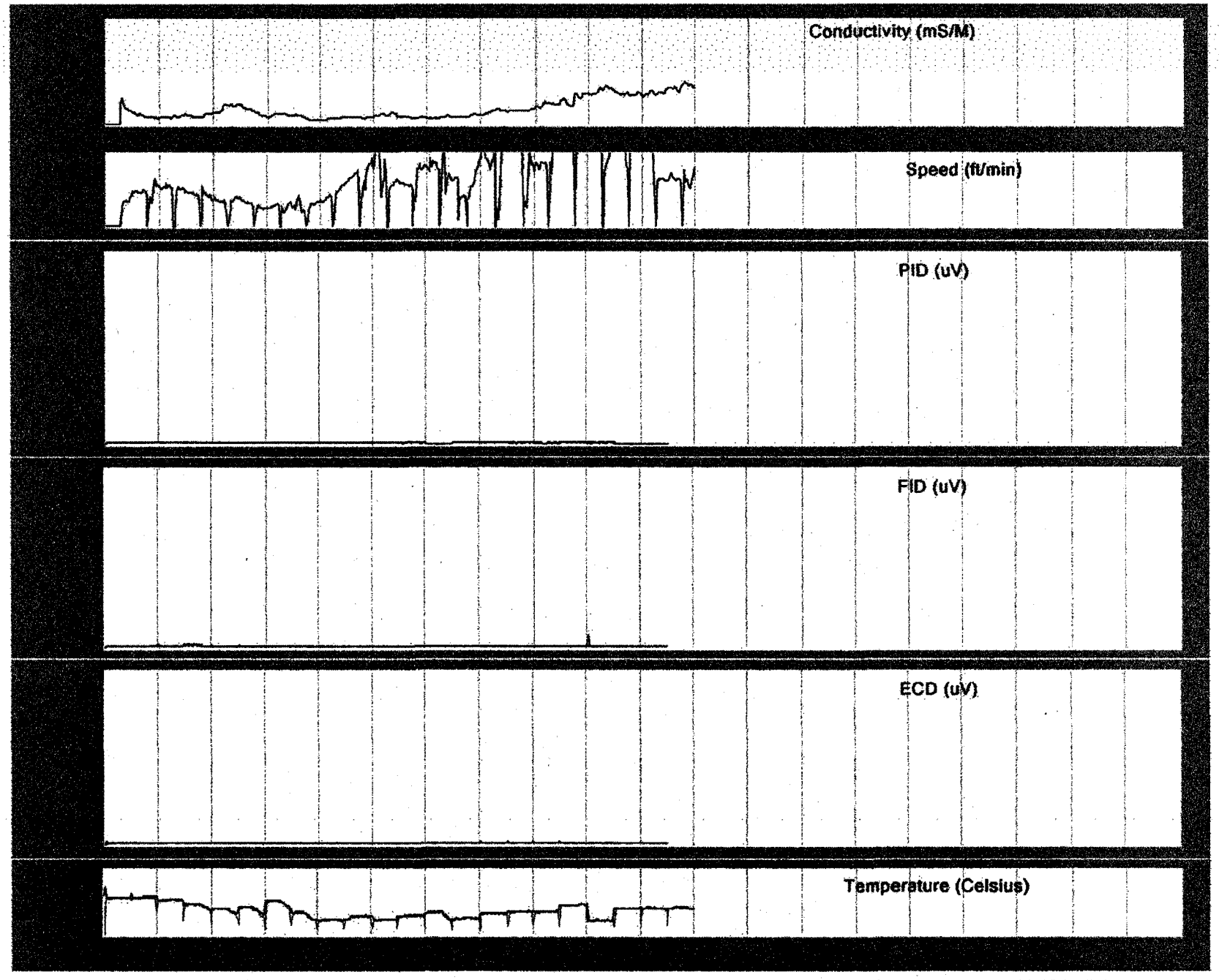

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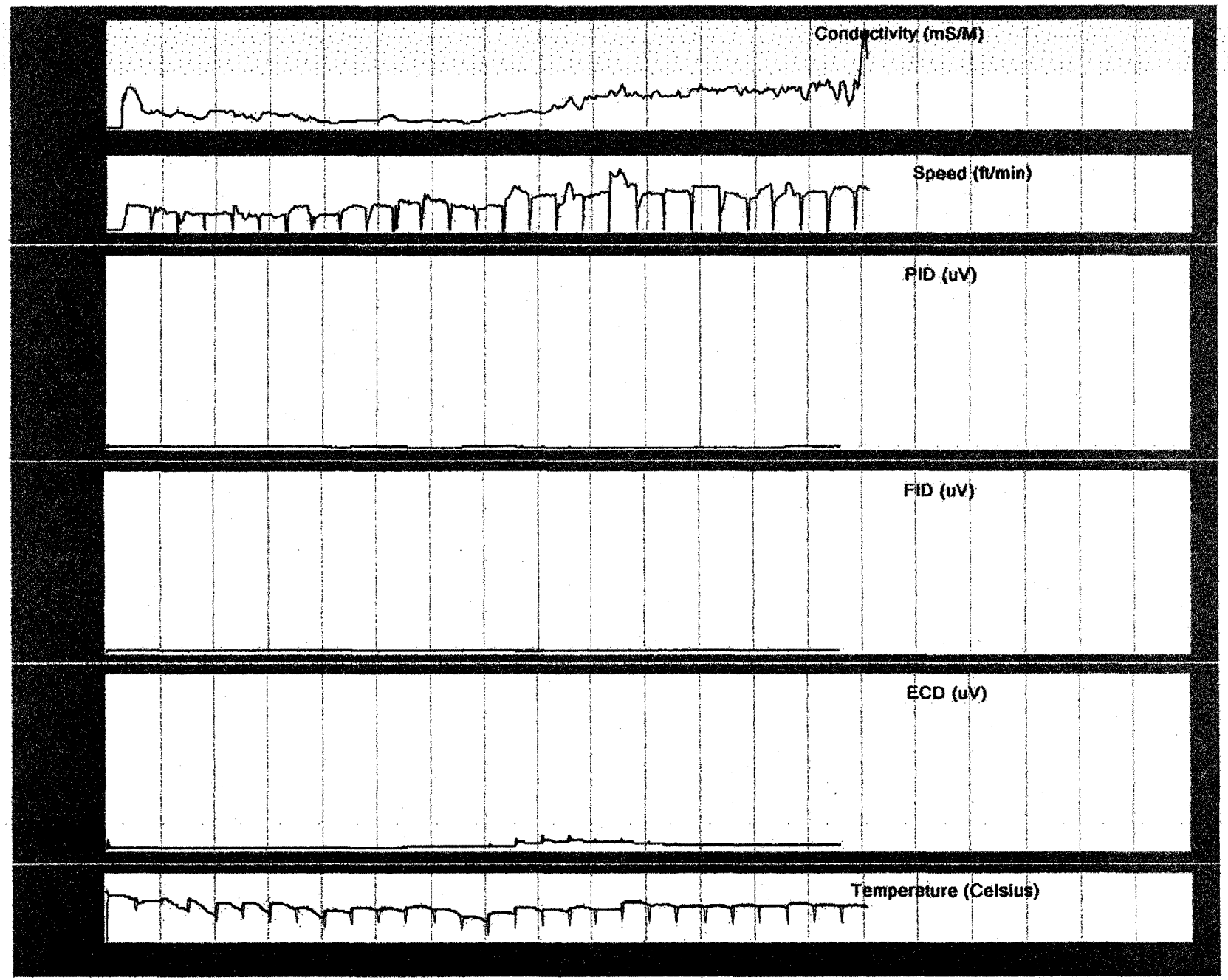

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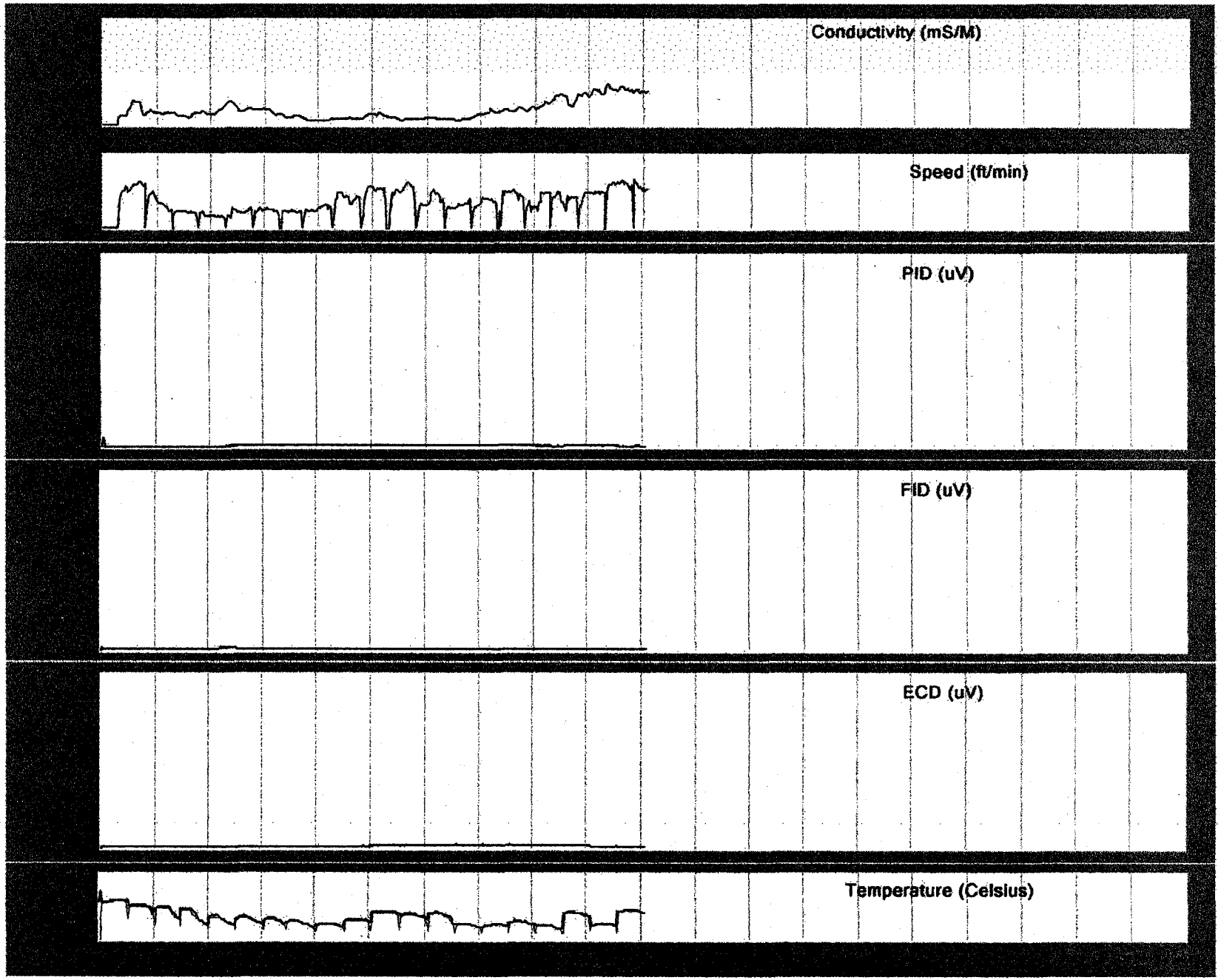

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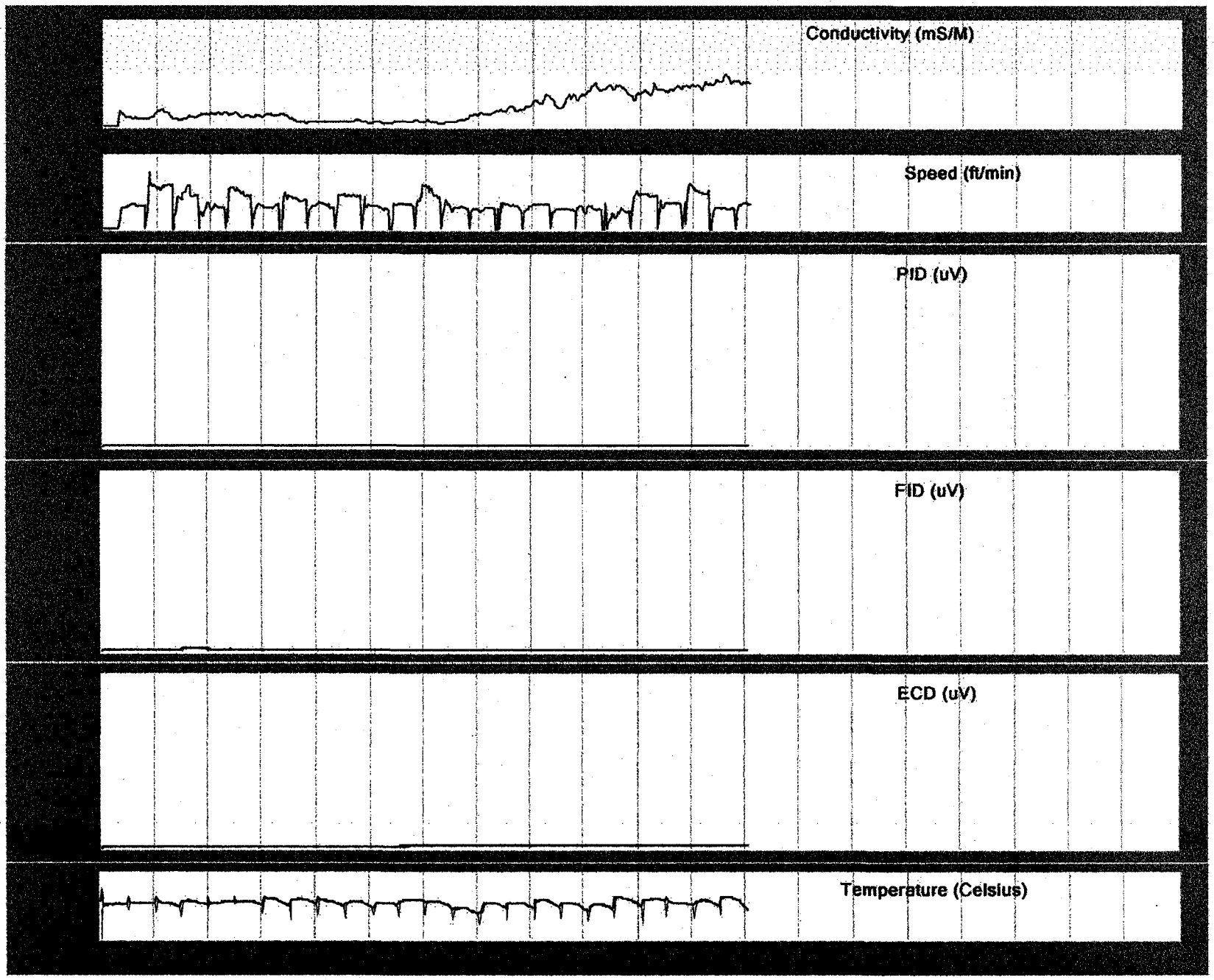

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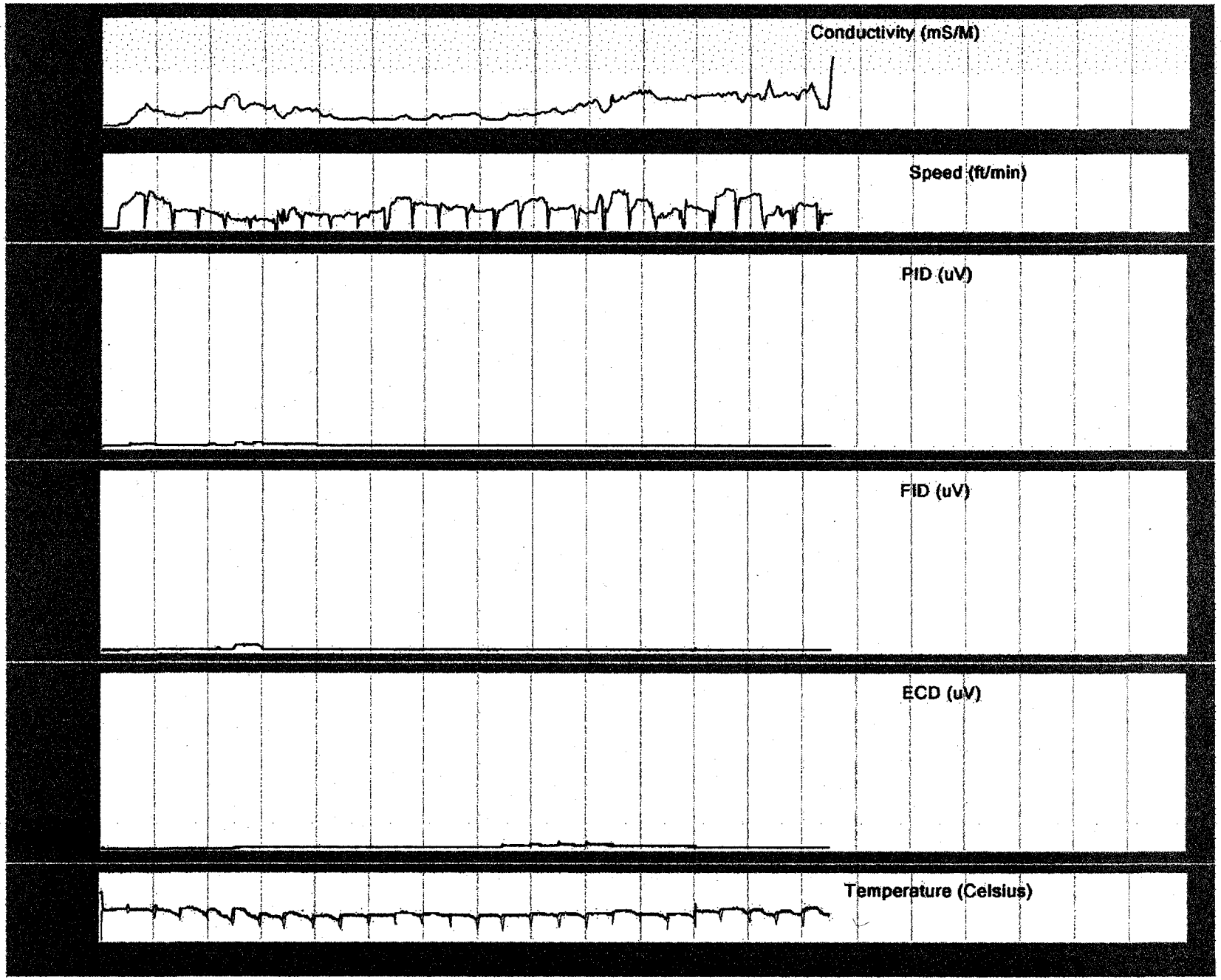

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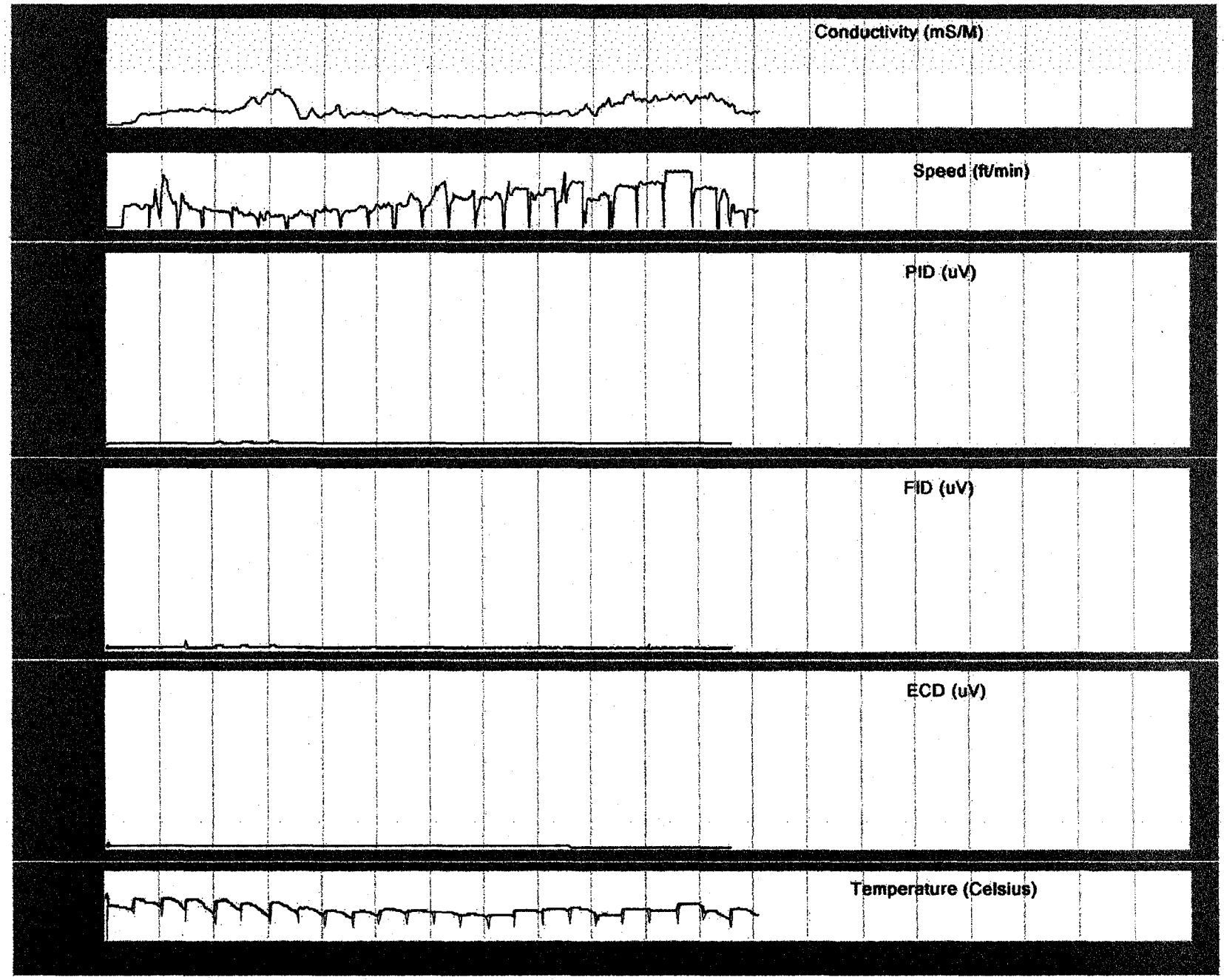

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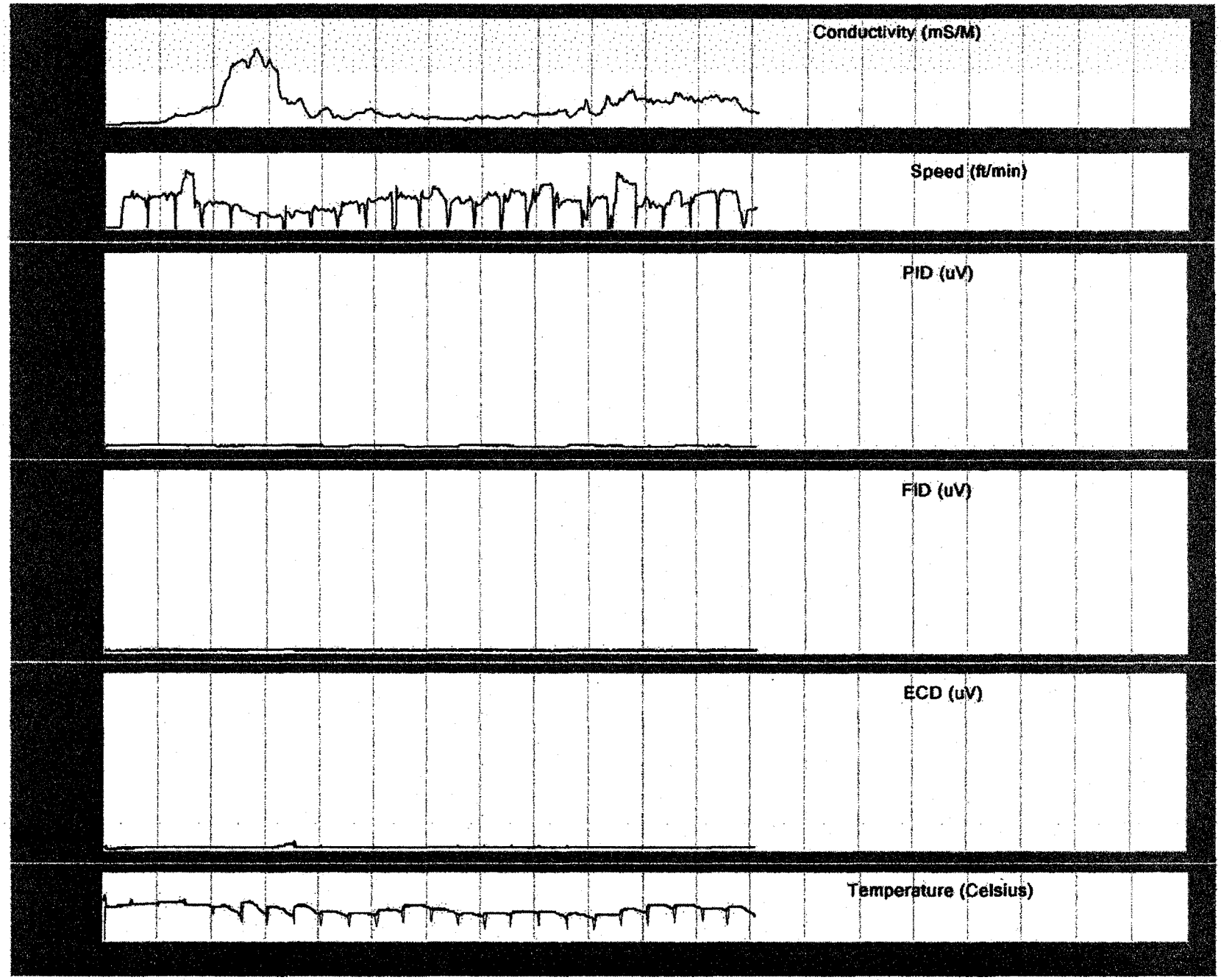

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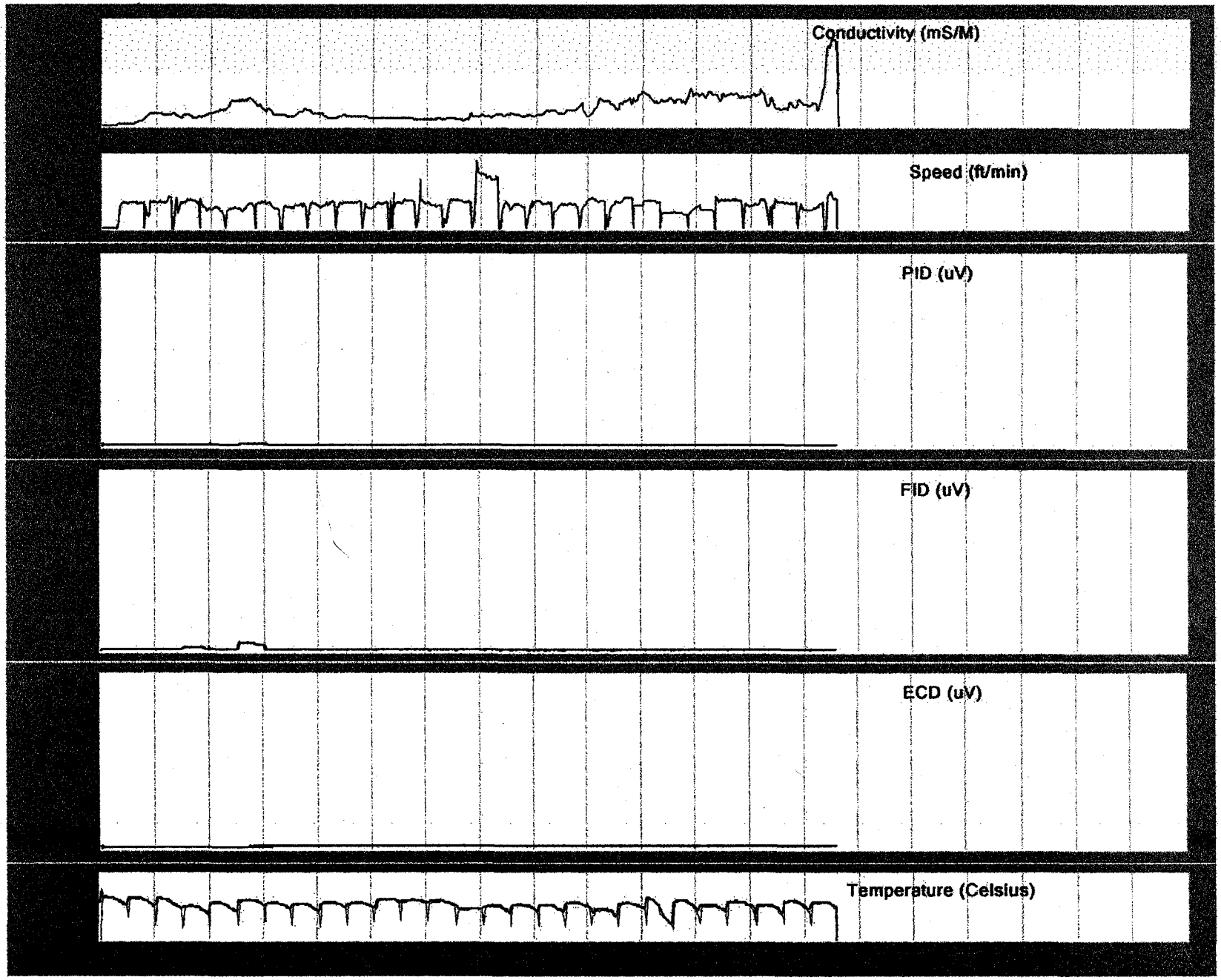

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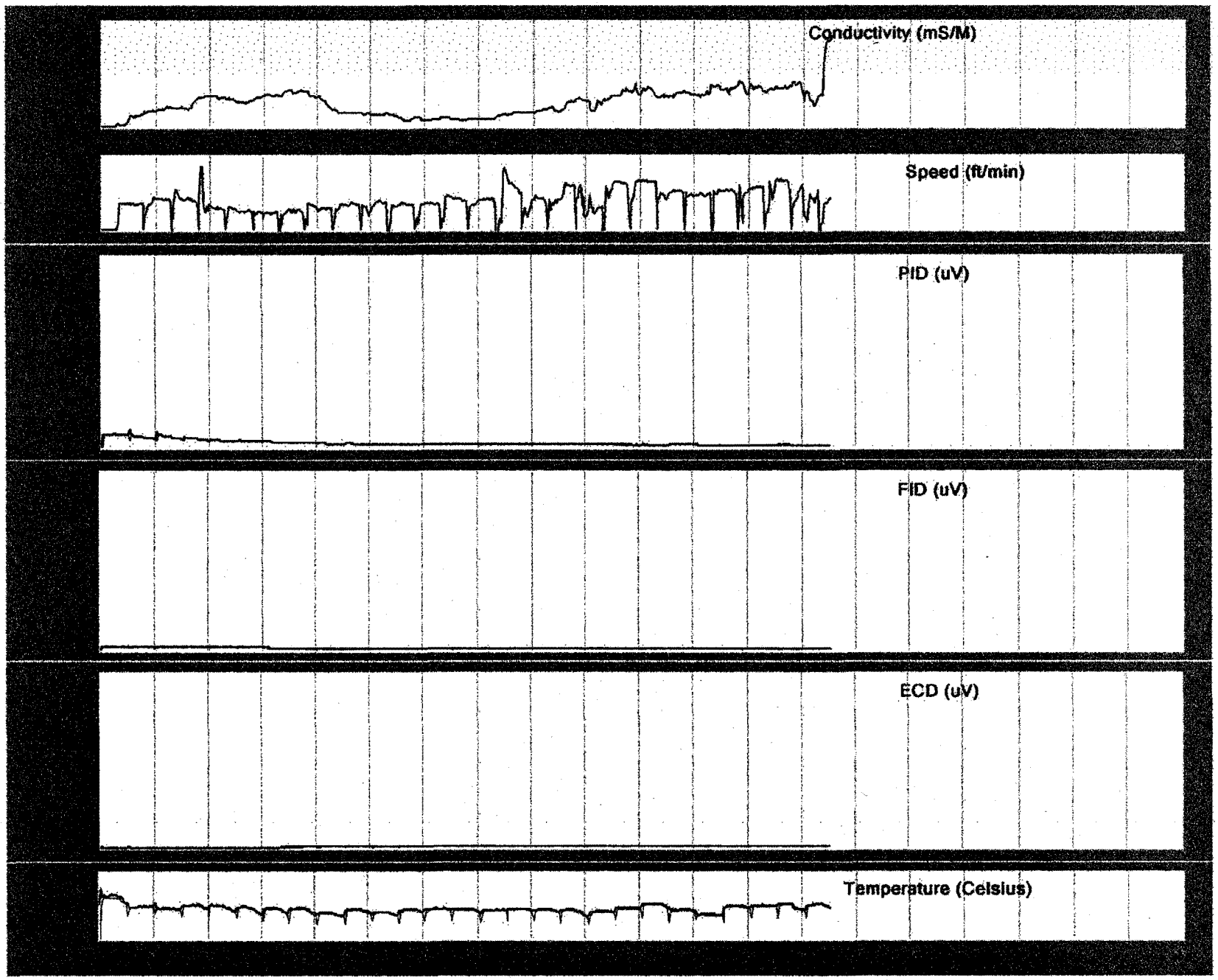

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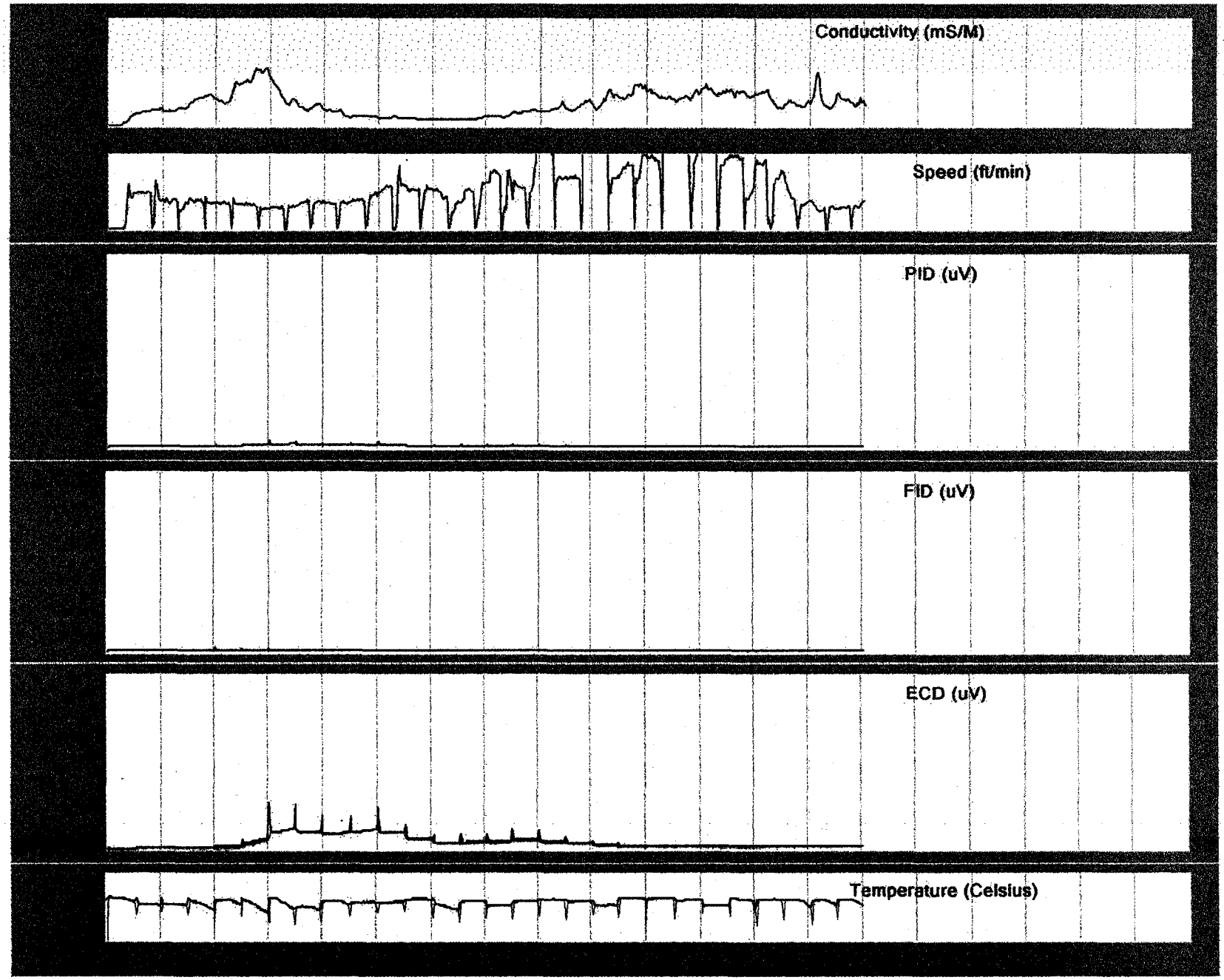

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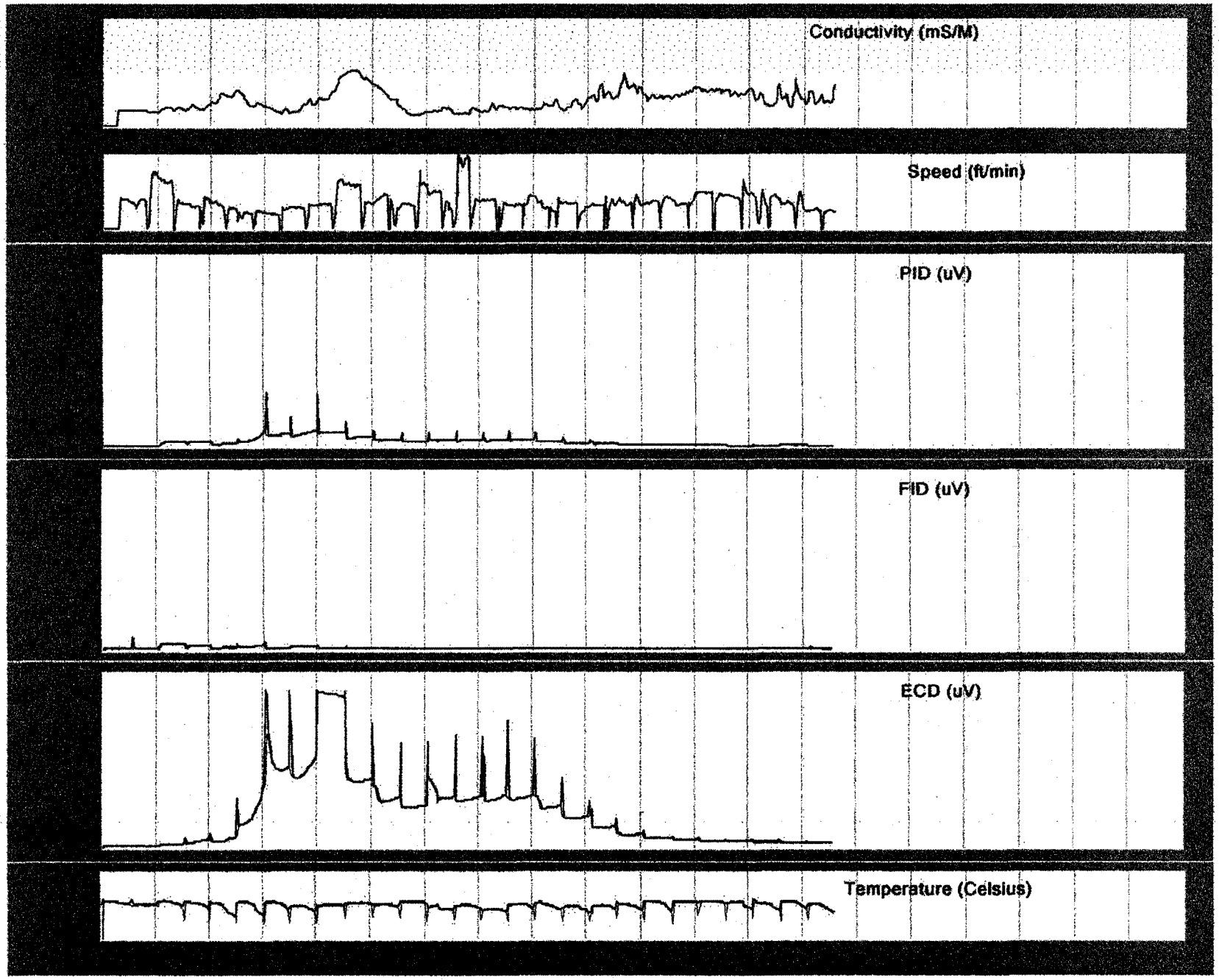

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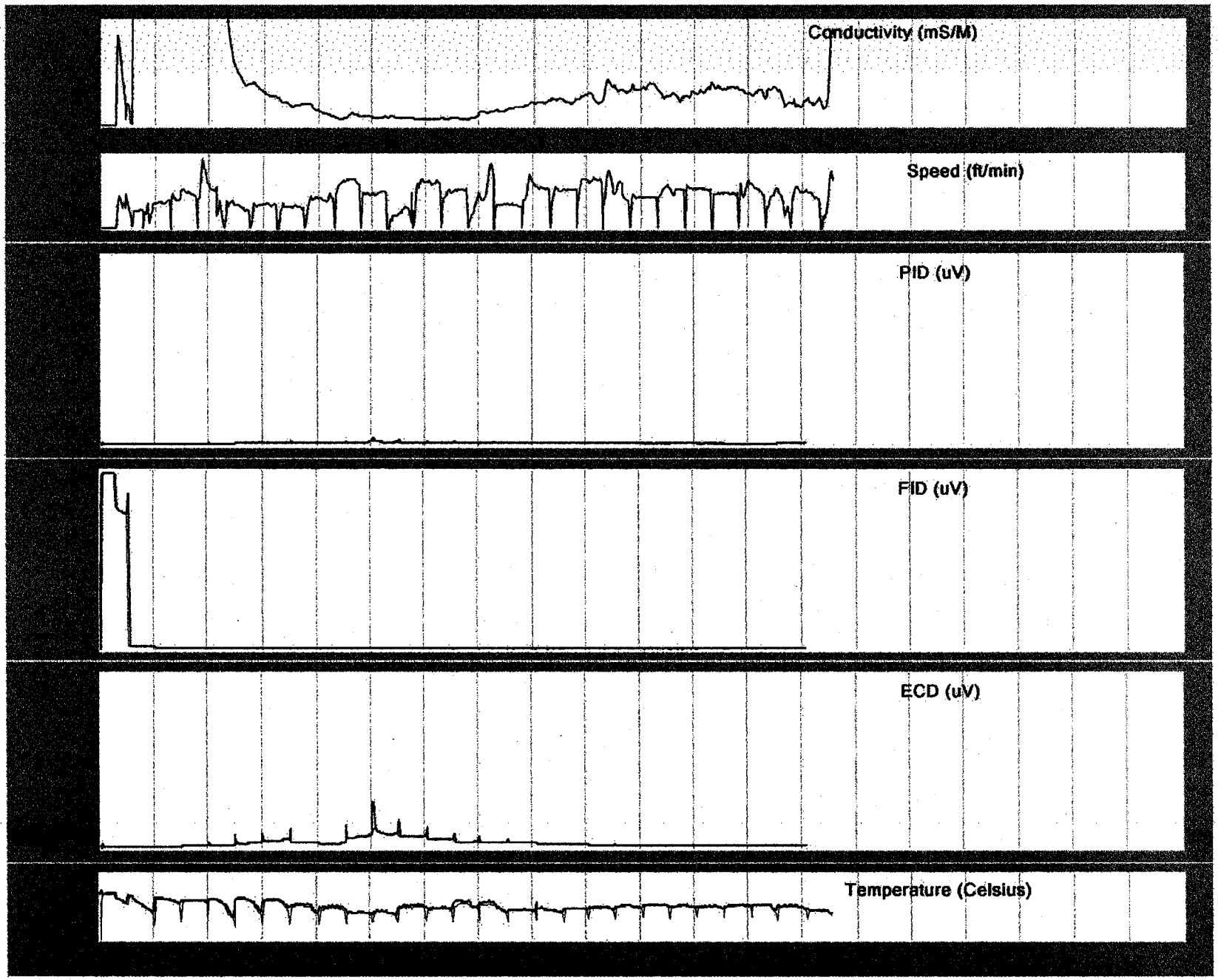

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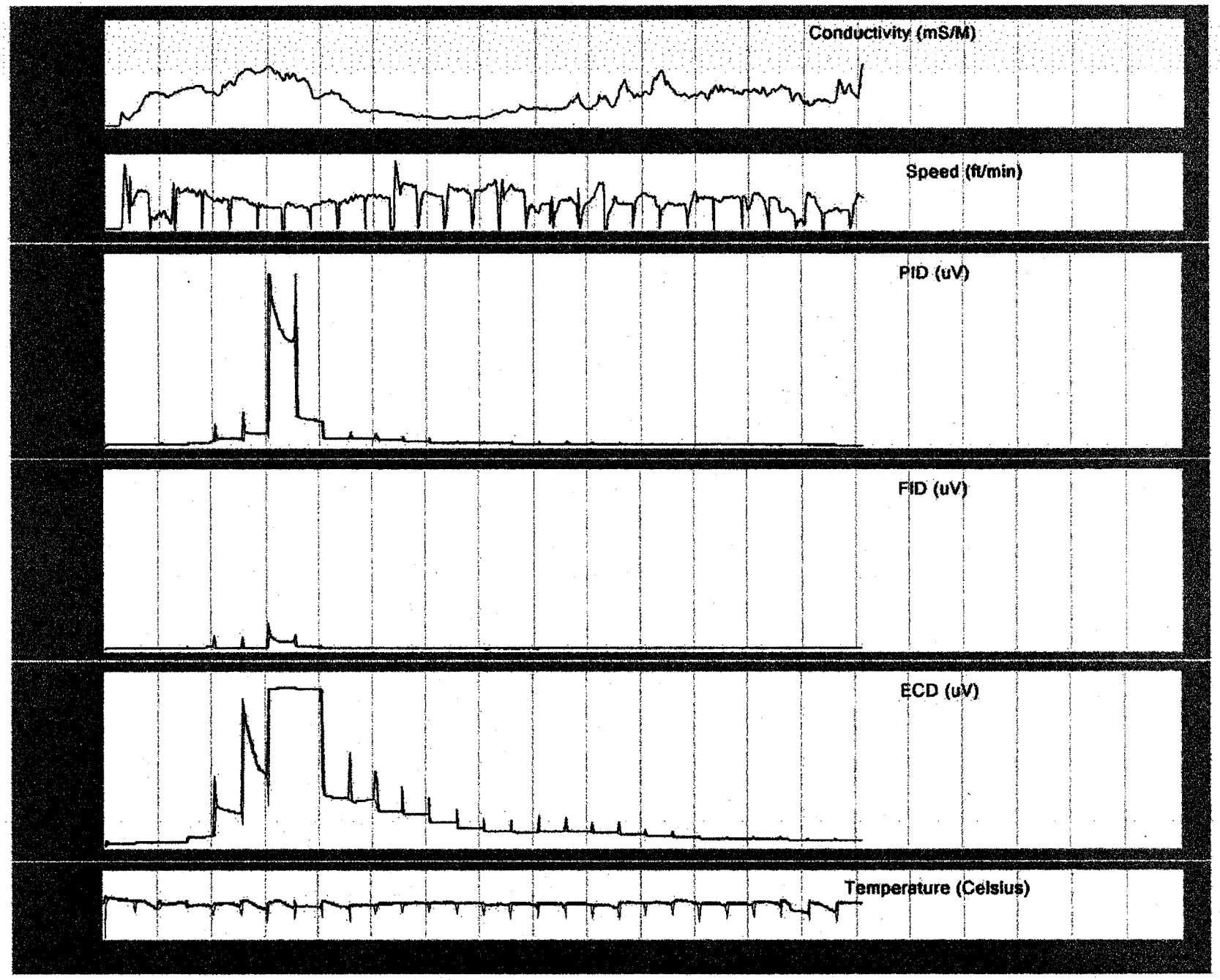

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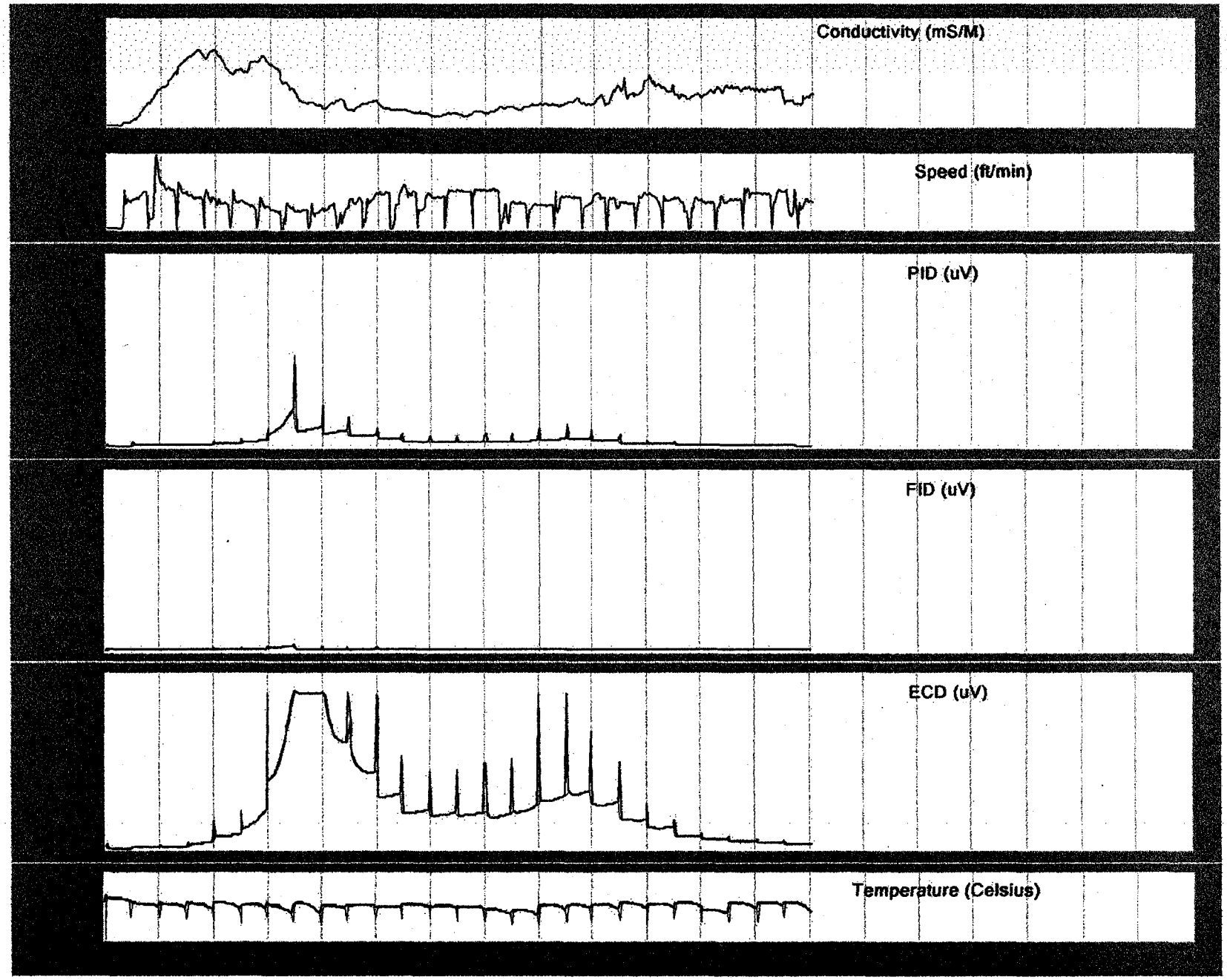

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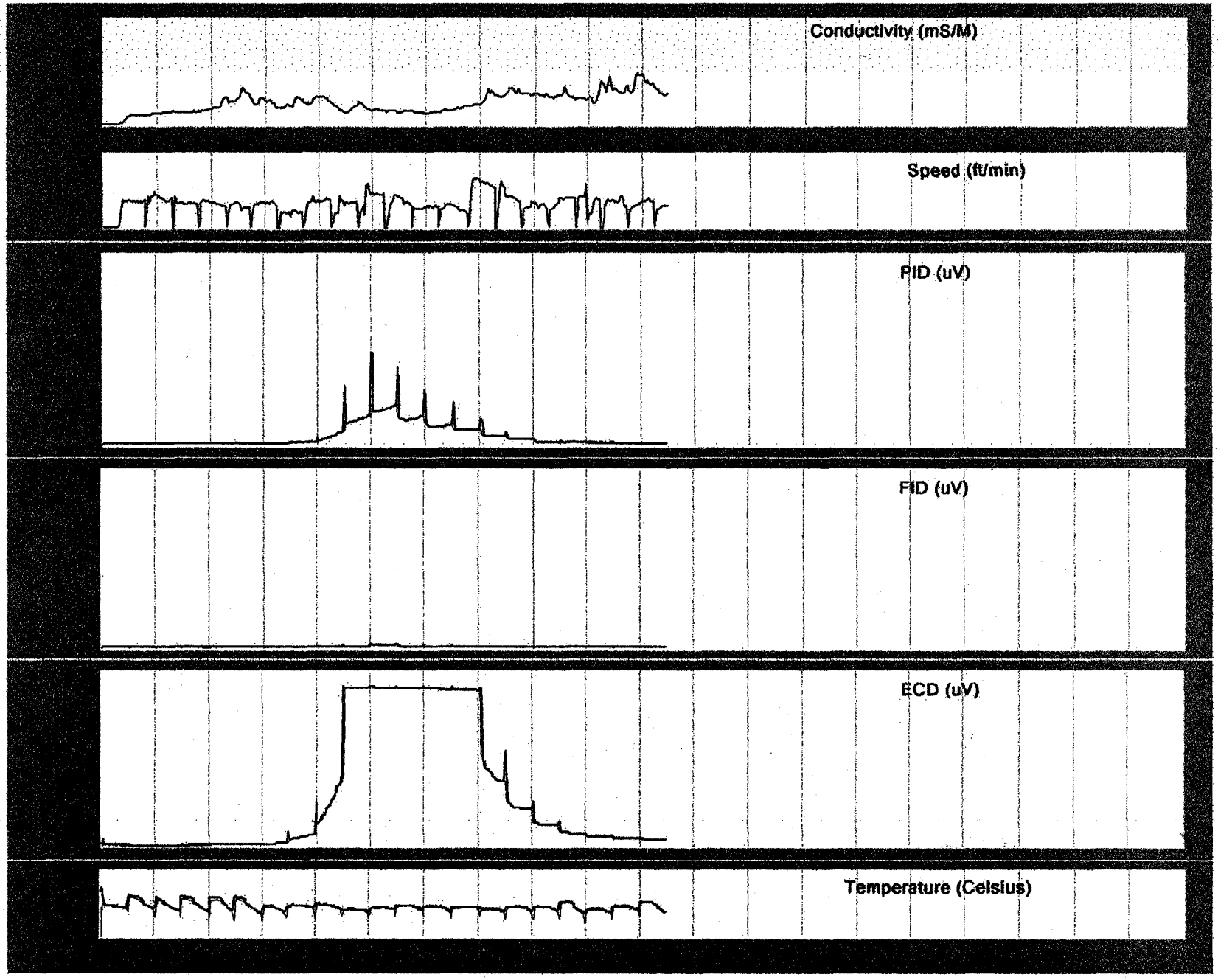

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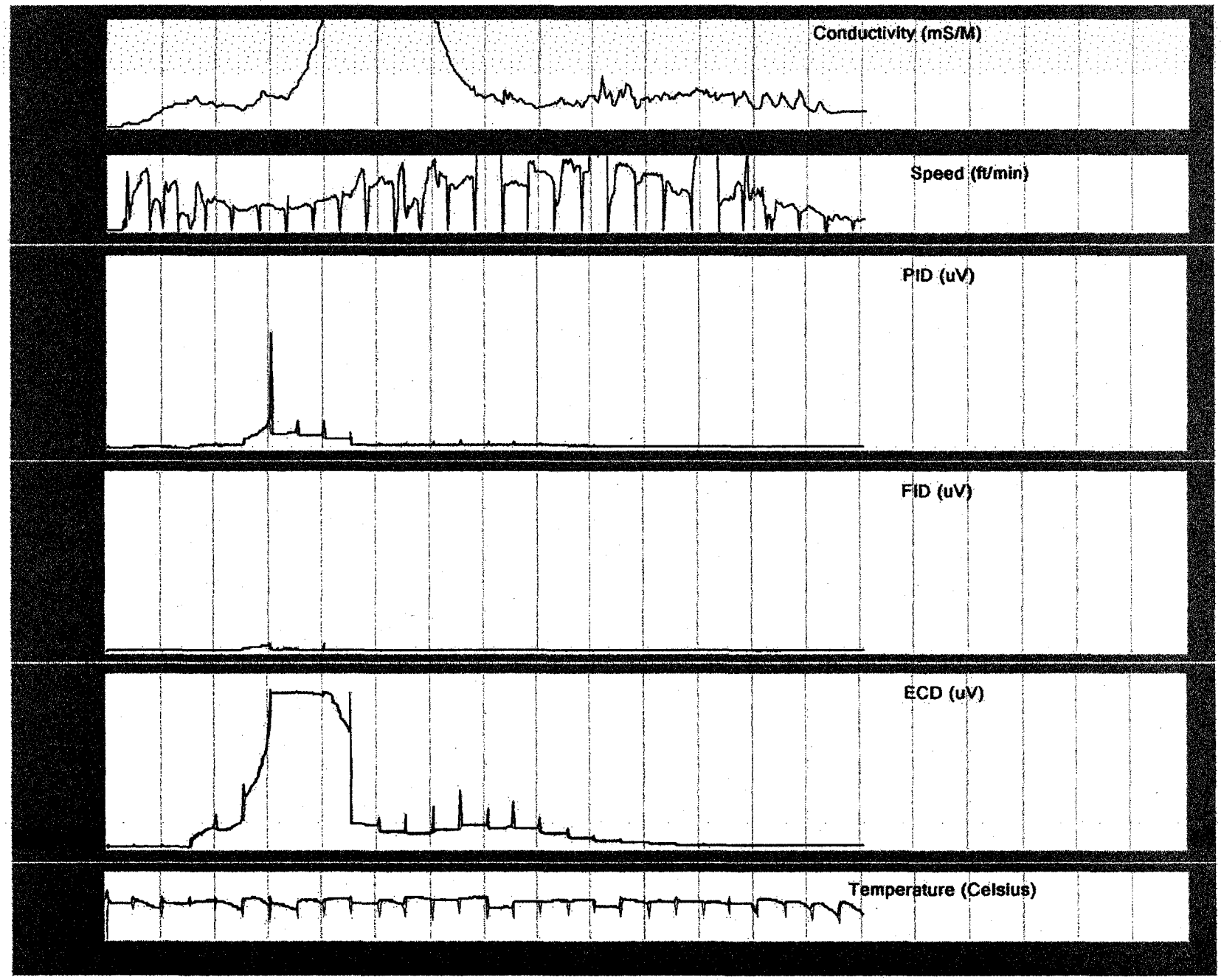

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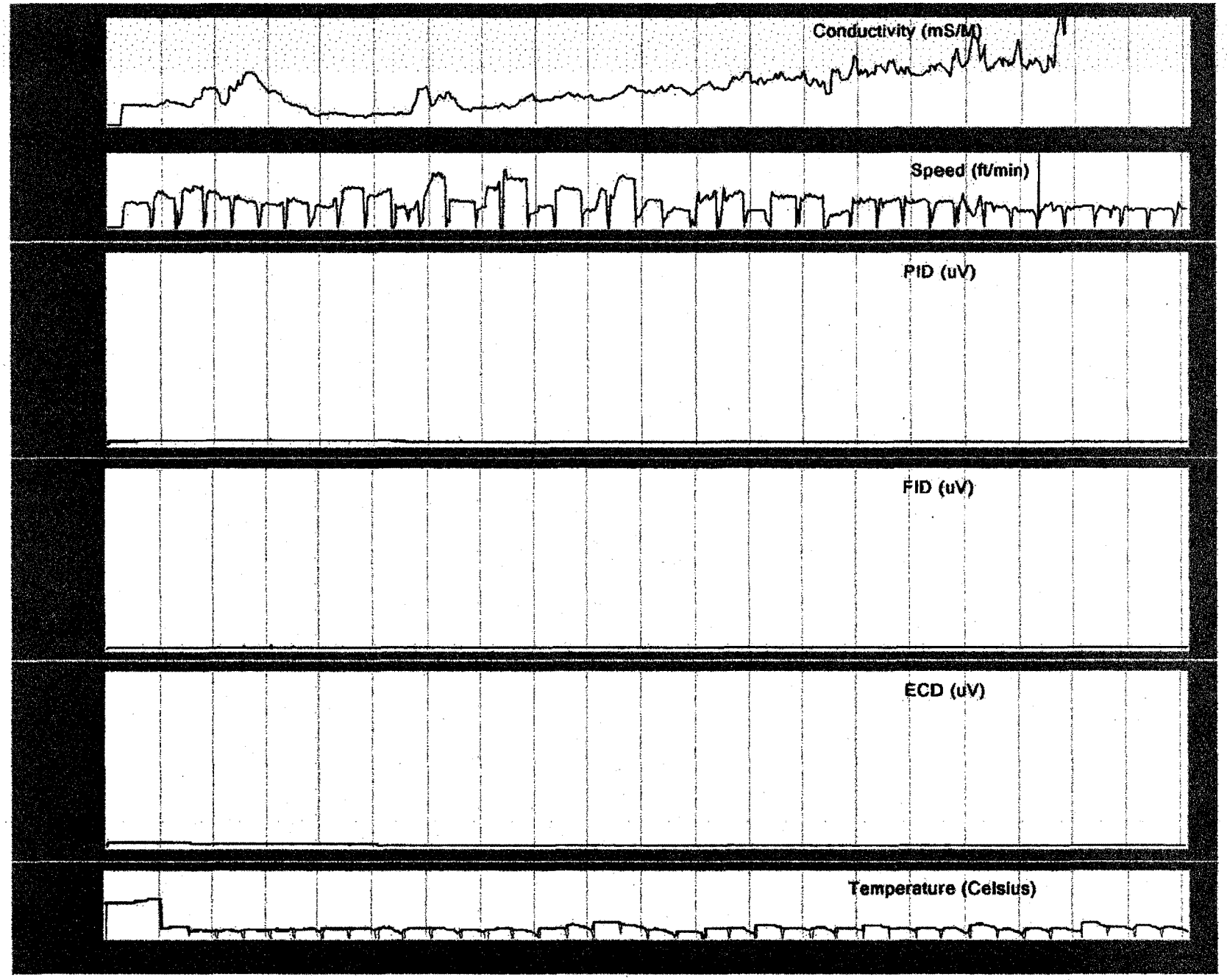

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APPENDIX B-2
2005 MIP REPORT

COLUMBIA TECHNOLOGIES

SmartData Solutions®

Subsurface Characterization Using Membrane Interface Probe (MIP) and Soil Conductivity (SC) Technologies Naval Weapons Station, SWMU 17 Charleston, South Carolina

PREPARED FOR

Tetra Tech NUS, Inc.
Foster Plaza 7
661 Andersen Drive
Pittsburgh, Pennsylvania 15220

August 4, 2005

PREPARED BY

COLUMBIA Technologies, LLC
1448 South Rolling Rd.
Baltimore, Maryland 21227
410-536-9911
www.columbiatechnologies.com

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TABLE OF CONTENTS

Page

Introduction 3

Objectives 3

Equipment Description 3

Response Test 5

Investigation Method 5

MIP Log Interpretation 5

SmartData Solutions® 6

FIGURES

Figure 1. Sitemap and MIP Locations

Figure 2. Plan View, ECD Response 4.0E+05uV and Above

Figure 3. Plan View, ECD Response 1.0E+06uV and Above

Figure 4. Plan View, ECD Response 5.0E+06uV and Above

Figure 5. Plan View, PID Response 5.0E+05uV and Above

Figure 6. Transect View Looking North, ECD Response 4.0E+05uV and Above, With Soil Conductivity 50mS and Above

Figure 7. Transect View Looking East, ECD Response 4.0E+05uV and Above, With Soil Conductivity 50mS and Above

Figure 8. Transect View Looking North, ECD Response 1.0E+06uV and Above, With Soil Conductivity 50mS and Above

Figure 9. Transect View Looking East, ECD Response 1.0E+06uV and Above, With Soil Conductivity 50mS and Above

Figure 10. Transect View Looking North, PID Response 5.0E+05uV and Above

APPENDIX

Appendix A: MIP Logs (Best Fit Scale)

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Introduction

Tetra Tech NUS, Inc. (TTNUS) contracted **COLUMBIA Technologies, LLC (COLUMBIA)** to conduct an investigation of subsurface contamination at the Naval Weapons Station, SWMU 17, located in Charleston, South Carolina. This investigation involved delineating the depth and horizontal extent of contamination using Membrane Interface Probe (MIP) and Soil Conductivity (SC) technologies. The purpose of this investigation was to characterize subsurface soils in the vadose and saturated zones, and delineate the nature and extent of soil and groundwater contamination.

The investigation was conducted in two phases, the first phase completed in 1993. The second phase was completed December 6th, 2004 through January 12th, 2005. COLUMBIA personnel on-site during the second phase included Morgan Aycock, Field Geochemist, Randy Brand, Environmental Field Technician, and Amy Gethmann, Field Geochemist.

Objectives

The objectives of the MIP/SC investigation were to:

1. Characterize subsurface soils in the vadose and saturated zones.
2. Delineate the lateral boundaries of the contaminant in soil and groundwater.
3. Delineate the vertical extent of contamination in soil and groundwater.

Equipment Description

The MIP/SC probe is approximately 12-inches (30 cm) in length and 1.5-inches (3.8 cm) in diameter. The probe is driven into the ground at the nominal rate of one foot per minute using a Geoprobe® or similar direct push rig.

Soil conductivity, the inverse of soil resistivity, is measured using a dipole arrangement. In this process, an alternating electrical current is transmitted through the soil from the center, isolated pin of the probe. This current is then passed back to the probe body. The voltage response of the imposed current to the soil is measured across these same two points. Conductivity is measured in Siemens/meter, and due to the low conductivity of earth materials, the SC probe uses milliSiemens/meter (mS/m). The probe is reasonably accurate in the range of 5 to 400 mS/m. In general, at a given location, lower conductivity values indicate larger

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particles such as sands, while higher conductivities are representative of finer sized particles such as silts and clays.

The MIP portion of the probe was developed and patented by Geoprobe Systems, Inc. The operating principle is based on heating the soil and/or water around a semi-permeable polymer membrane to 121°C, which allows volatile organic compounds (VOCs) to partition across this membrane. The MIP can be used in saturated or unsaturated soils, as water does not pass through the membrane. Using nitrogen as a carrier gas, which sweeps across the back of the membrane, the VOCs are carried to the installed detectors. It takes approximately 37 seconds for the nitrogen gas stream to travel through 100 feet of inert tubing and reach the detectors.

COLUMBIA utilizes two detectors: a Photo Ionization Detector (PID), and an Electron Capture Detector (ECD), mounted on a laboratory grade Shimadzu Model 14A gas chromatograph. The output signal from the detectors is captured by a MIP data logging system installed on a MIP Field Computer or laptop computer. Conductivity, speed, detector data and temperature are displayed continuously in real time during each push of the probe.

The PID detector consists of a special UV lamp mounted on a thermostat controlled, low volume, flow-through cell. The temperature is adjustable from ambient temperature to 250°C. The 10.2 electron volt (eV) UV lamp emits energy at a wavelength of 120 nanometers, which is sufficient to ionize most aromatics (benzene, toluene, xylene, etc.) and many other molecules (H_2S, hexane, ethanol) whose ionization potential is below 10.2 eV. The PID also emits a lower response for chlorinated compounds such as TCE and PCE. Methanol and water, which have ionization potentials greater than 10.2 eV, do not respond on the PID. Detection limits for aromatics are in the low picogram range. Since the PID is non-destructive, it is often run first in series with other detectors for multiple analyses from a single injection. Use of the PID is mandated in several EPA methods (8021, TO-14 etc.) because of its sensitivity and selectivity.

The ECD detector consists of a sealed stainless steel cylinder containing radioactive Nickel-63. The Nickel-63 emits beta particles (electrons), which collide with the carrier gas molecules, ionizing them in the process. This forms a stable cloud of free electrons in the ECD cell. When electro-negative compounds (especially chlorinated, fluorinated or brominated molecules) such as carbon tetrachloride or TCE enter the cell, they immediately combine with the free electrons, temporarily reducing the number remaining in the electron cloud. The detector electronics, which maintain a constant current of about 1 nanoampere through the electron cloud,

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are forced to pulse at a faster rate to compensate for the decreased number of free electrons. The pulse rate is converted to an analog output, which is transmitted to the data system.

Response Test

Prior to logging each MIP location, performance tests with specific compounds are conducted to evaluate the sensitivity of the particular probe, transfer line and detector suite to be used. Using neat benzene to test the PID, and neat TCE to test the ECD, the headspace vapors are introduced to the membrane of the probe for four seconds. To test the FID, butane is released on the membrane for four seconds. These values are compared to predetermined values and recorded.

Investigation Methods

MIP/SC profiling was conducted at 55 locations total on the property of the Naval Weapons Station, SWMU 17, selected by TTNUS's representative onsite. Drilling was completed using a Geoprobe® 54DT track mounted rig, and termination of MIP logging was determined by TTNUS's representative onsite. The results from each location are shown in Appendix A. Maps and 3D graphics of the site have been prepared for easier visualization of the subsurface.

MIP Log Interpretation

Each MIP log includes six separate graphs of data. The first graph is conductivity and is measured in mS/M. In general, lower conductivities are indicative of coarser grained particles, such as sands, and higher conductivities indicate finer grained particles, such as silts and clays. The second graph is the rate of penetration (speed of the probe) and is measured in feet/min. This information can be used to determine how hard the subsurface is. The next three graphs are chemical data: PID, FID, and ECD, measured in microvolts (uV). These graphs are a linear scale, and give relative concentrations of contamination. The last graph displays the temperature of the probe as it is advanced in the subsurface. This graph can be useful to determine where the groundwater table is located.

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SmartData Solutions®

COLUMBIA's SmartData Solutions® is a patent pending process that enables the rapid processing of field data into easy to understand 3D visualizations posted to a password protected website. This process includes quality assurance, formatting and rapid visualization of the data for the project team and enables a complete check of the dataset prior to completion of fieldwork.

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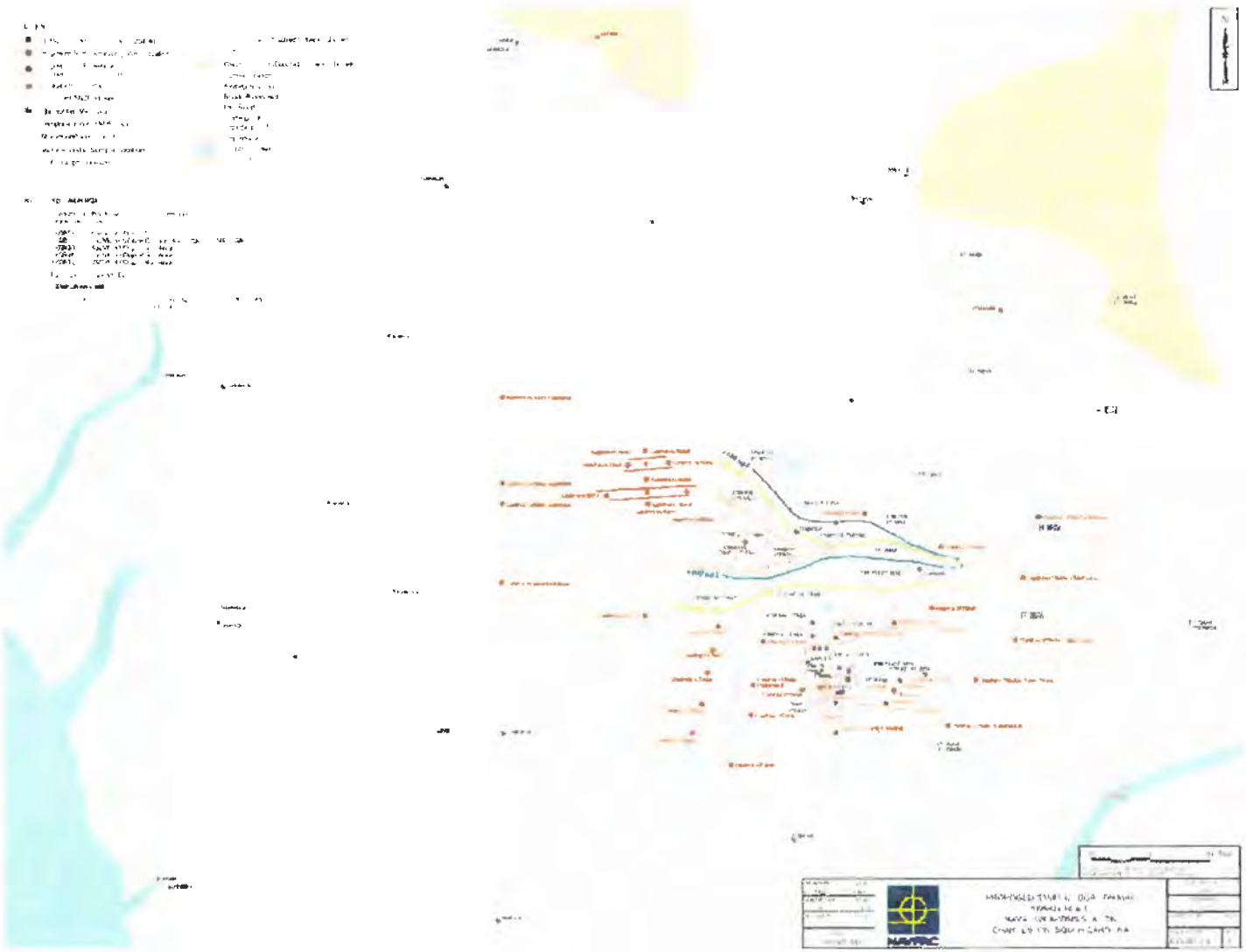

Figure 1
Sitemap and MIP Locations
Naval Weapons Station, SWMU 17
Tetra Tech NUS, Inc.
December 6th, 2004 – January 12th, 2005

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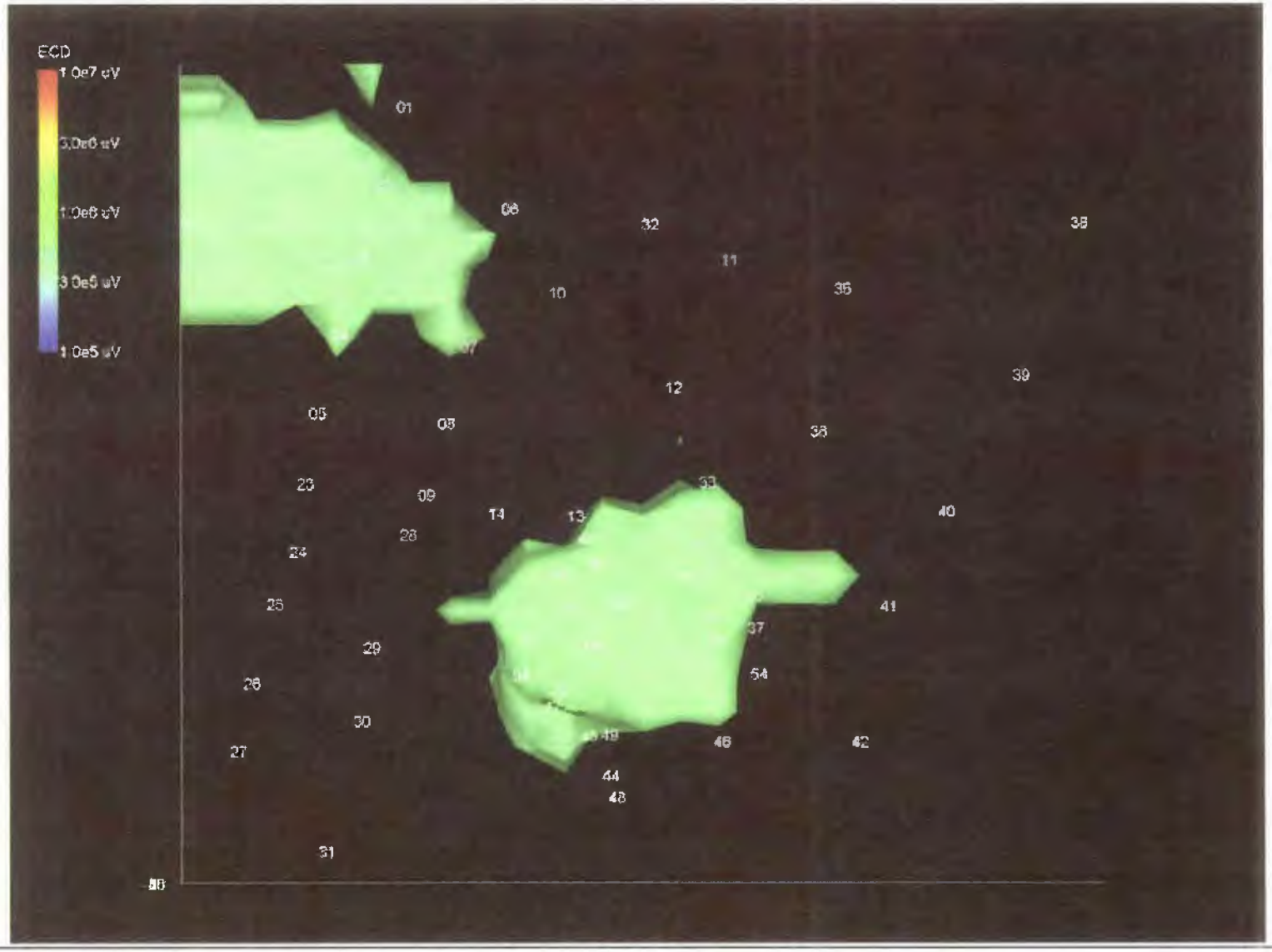

Figure 2
Plan View, ECD Response 4.0E+05uV and Above
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Tetra Tech NUS, Inc.
December 6th, 2004 – January 12th, 2005

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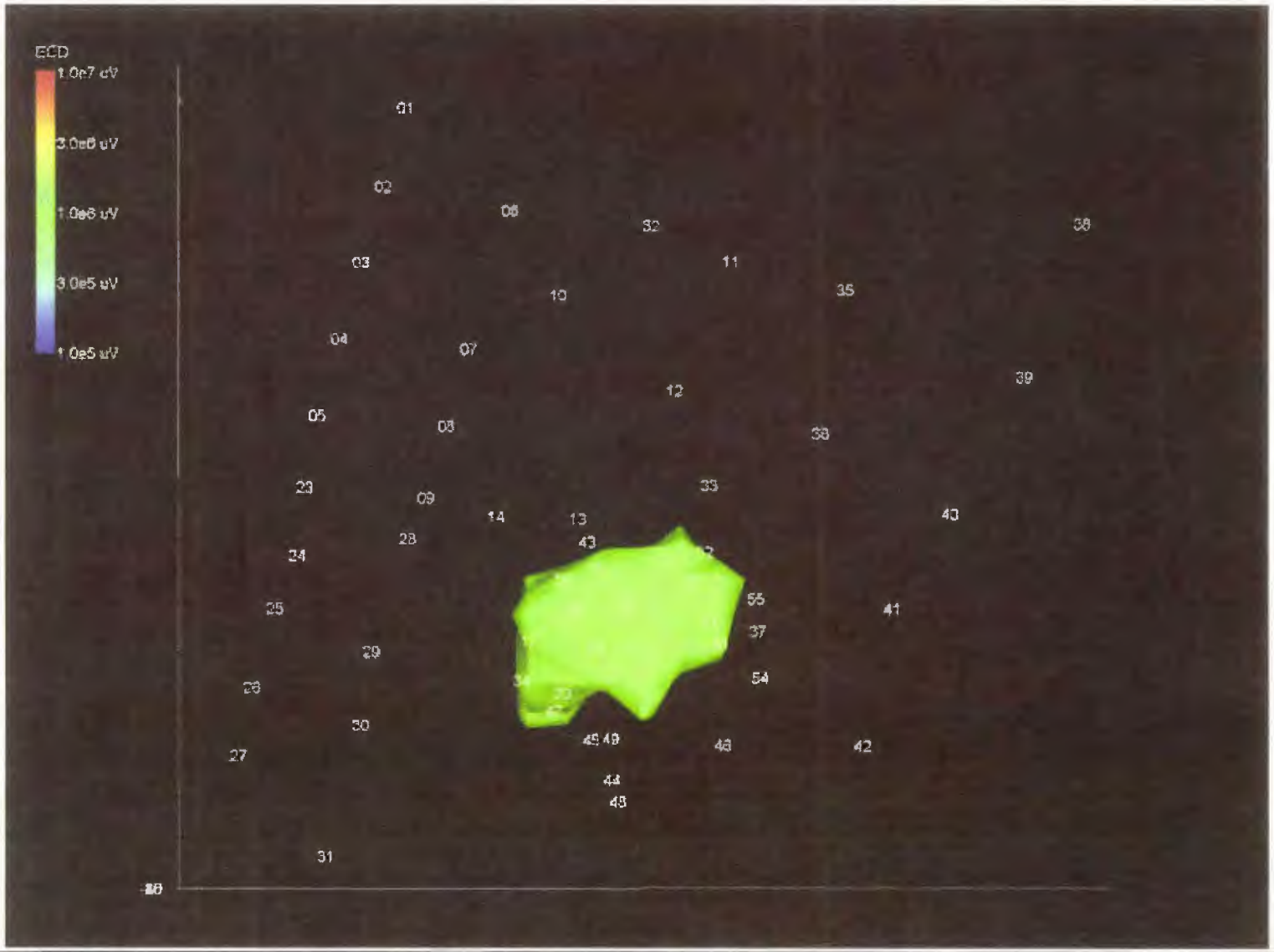

Figure 3
Plan View, ECD Response 1.0E+06uV and Above
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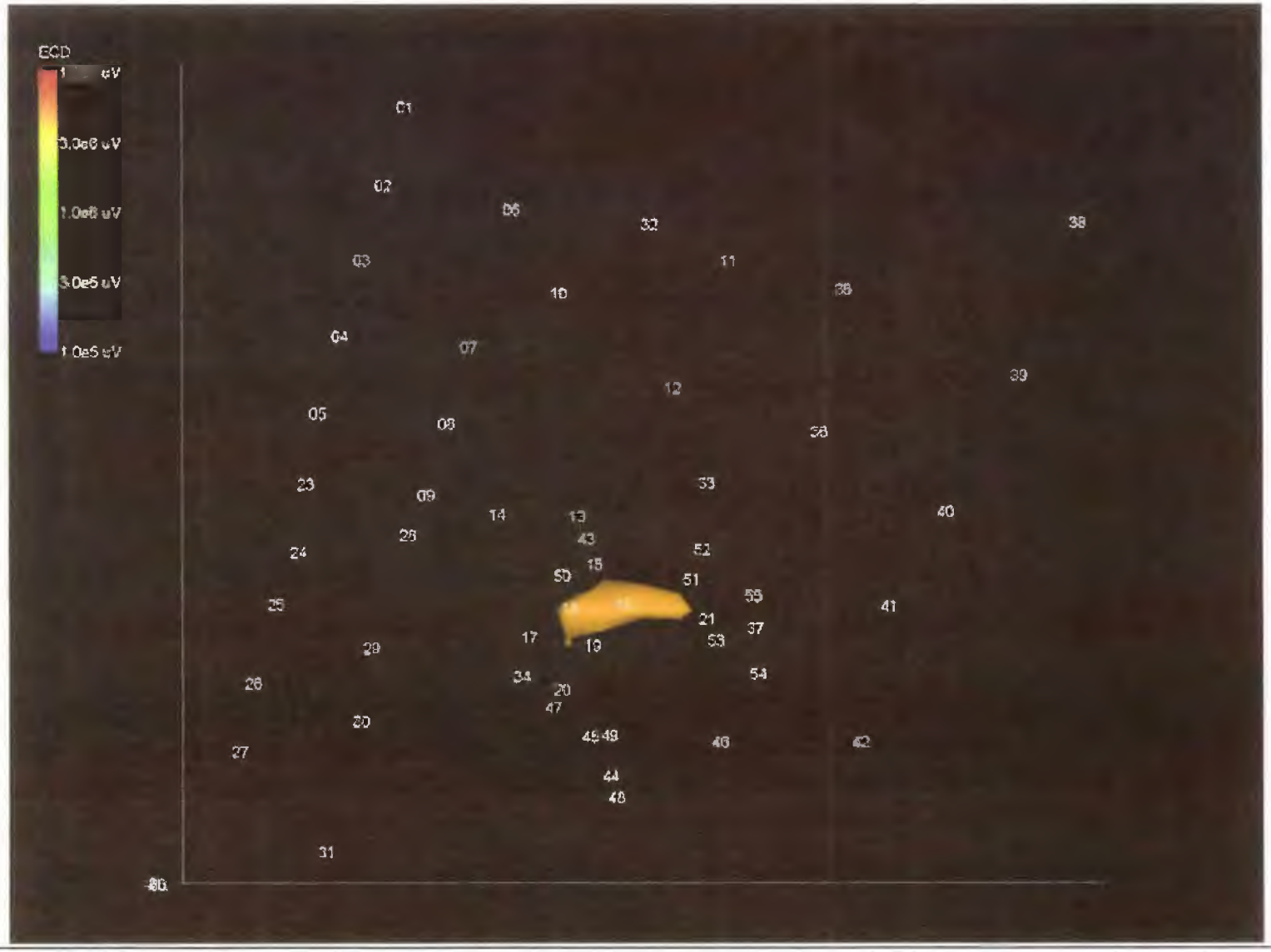

Figure 4
Plan View, ECD Response 5.0E+06uV and Above
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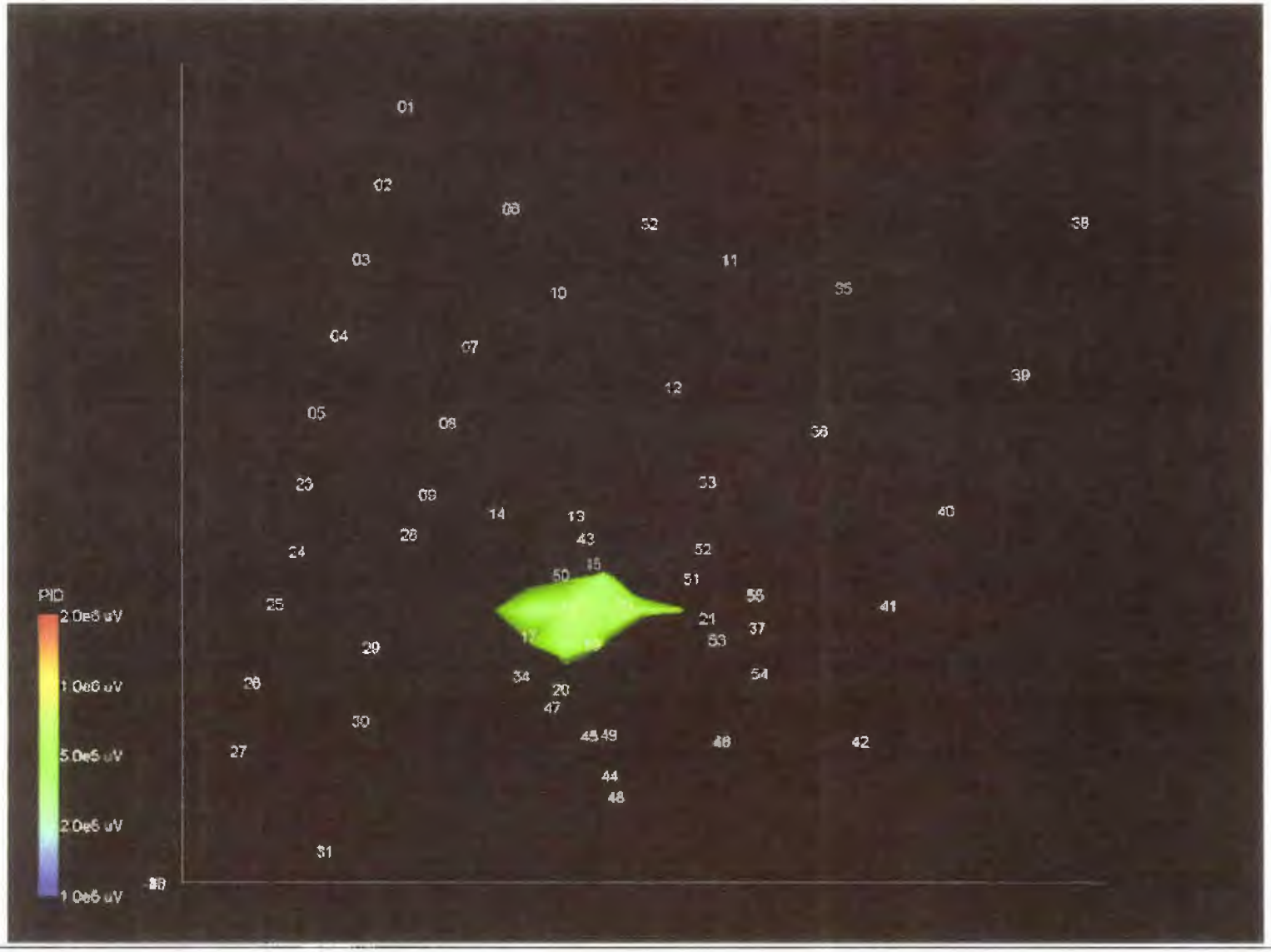

Figure 5
Plan View, PID Response 5.0E+05uV and Above
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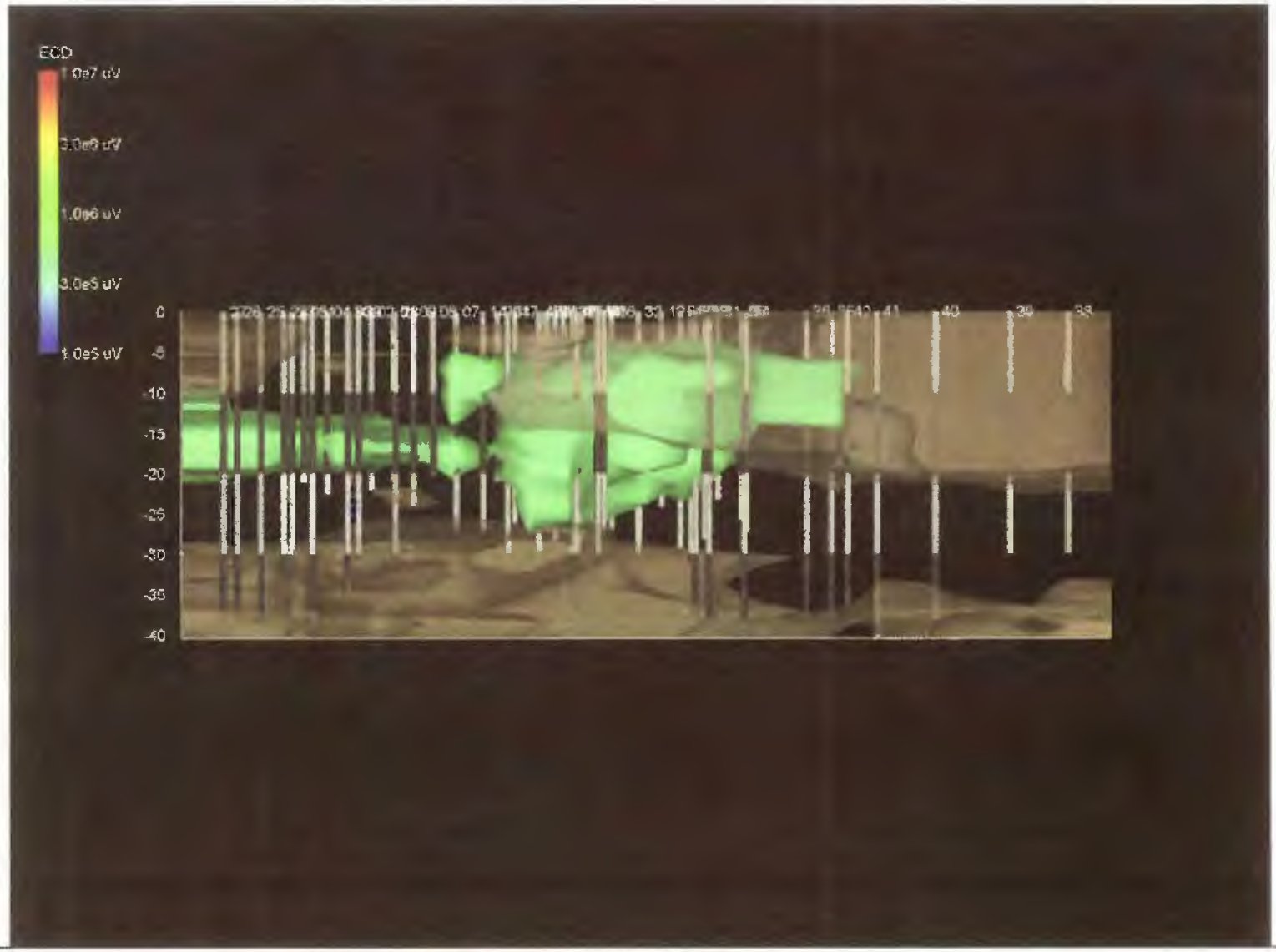

Figure 6
Transect View Looking North, ECD Response (green) 4.0E+05uV and Above, With Soil Conductivity (tan) 50mS and Above
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Tetra Tech NUS, Inc.
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Figure 7
Transect View Looking East, ECD Response (green) 4.0E+05uV and Above, With Soil Conductivity (tan) 50mS and Above
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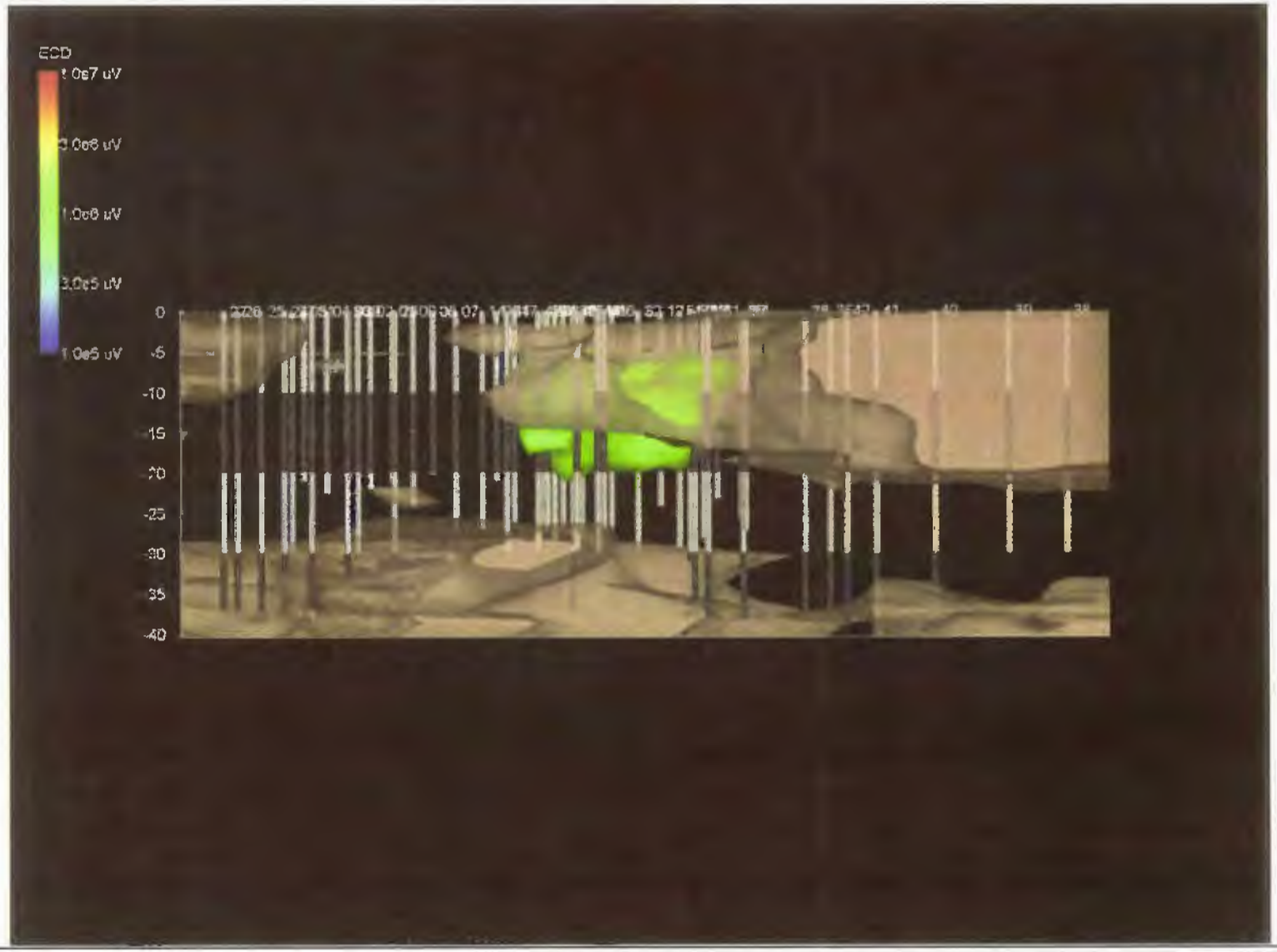

Figure 8
Transect View Looking North, ECD Response (green) 1.0E+06uV and Above, With Soil Conductivity (tan) 50mS and Above
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Figure 9
Transect View Looking East, ECD Response (green) 1.0E+06uV and Above, With Soil Conductivity (tan) 50mS and Above
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Figure 10
Transect View Looking North, PID Response 1.0E+06uV and Above
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Appendix A: MIP Logs

(Best Fit Scale)

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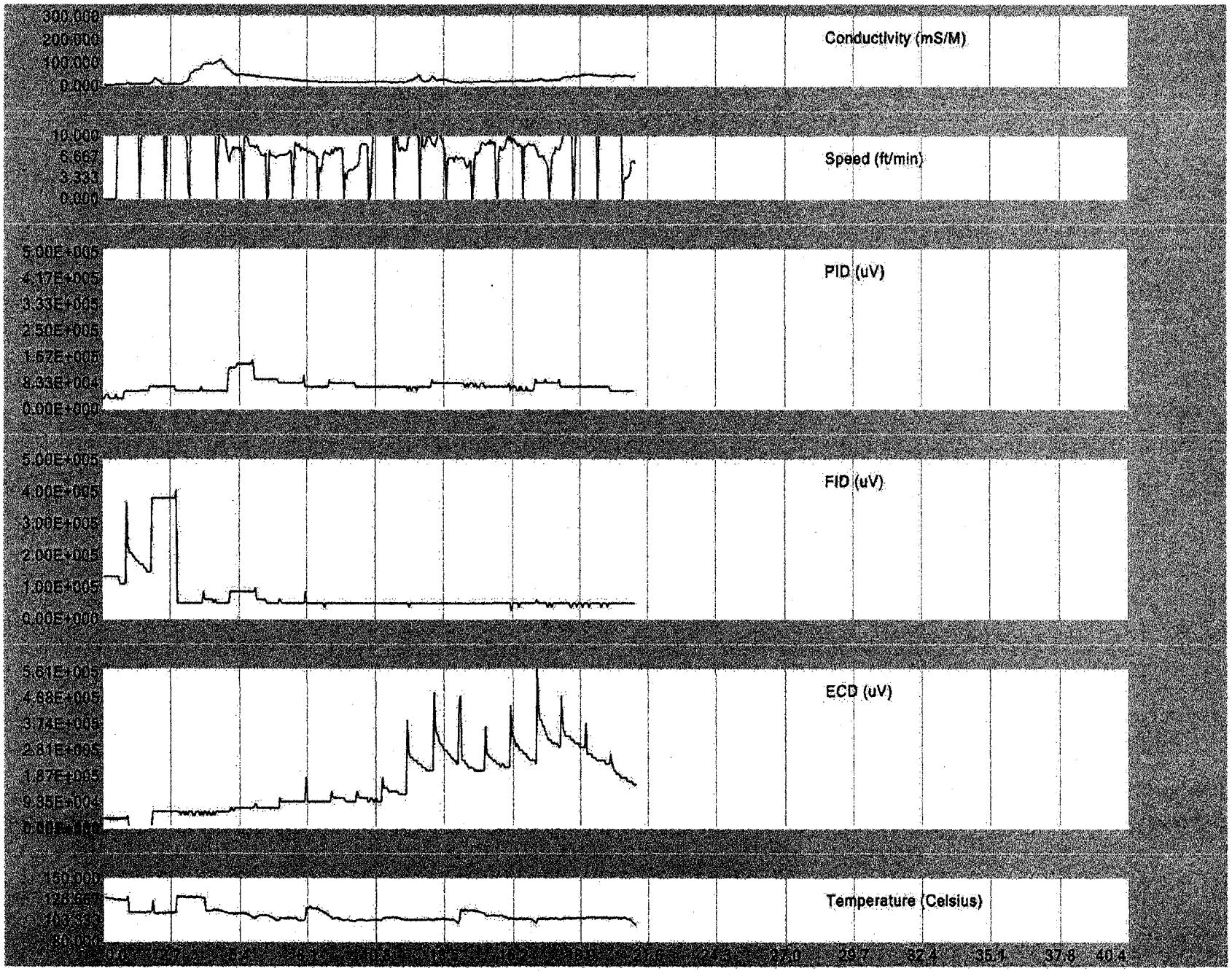

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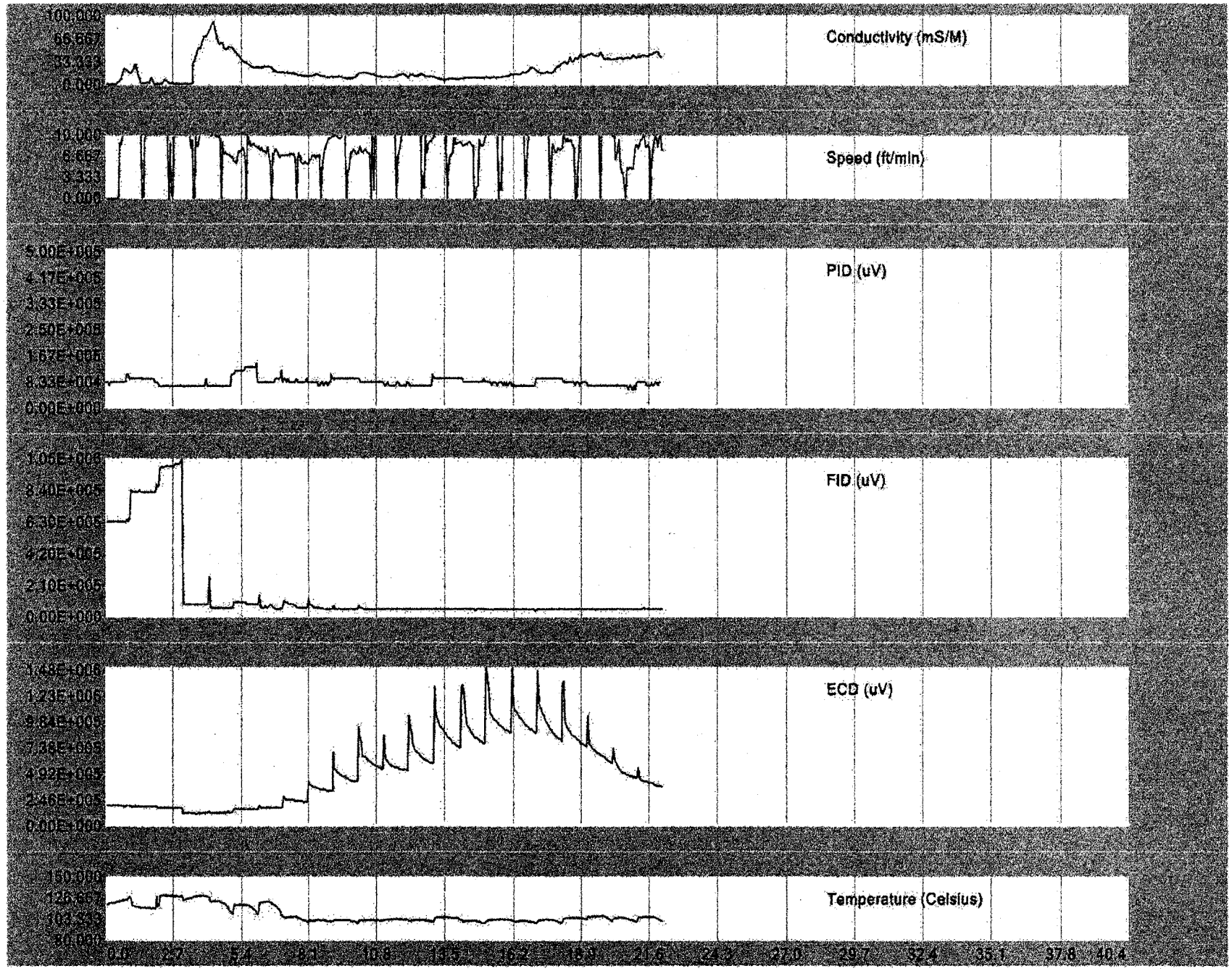

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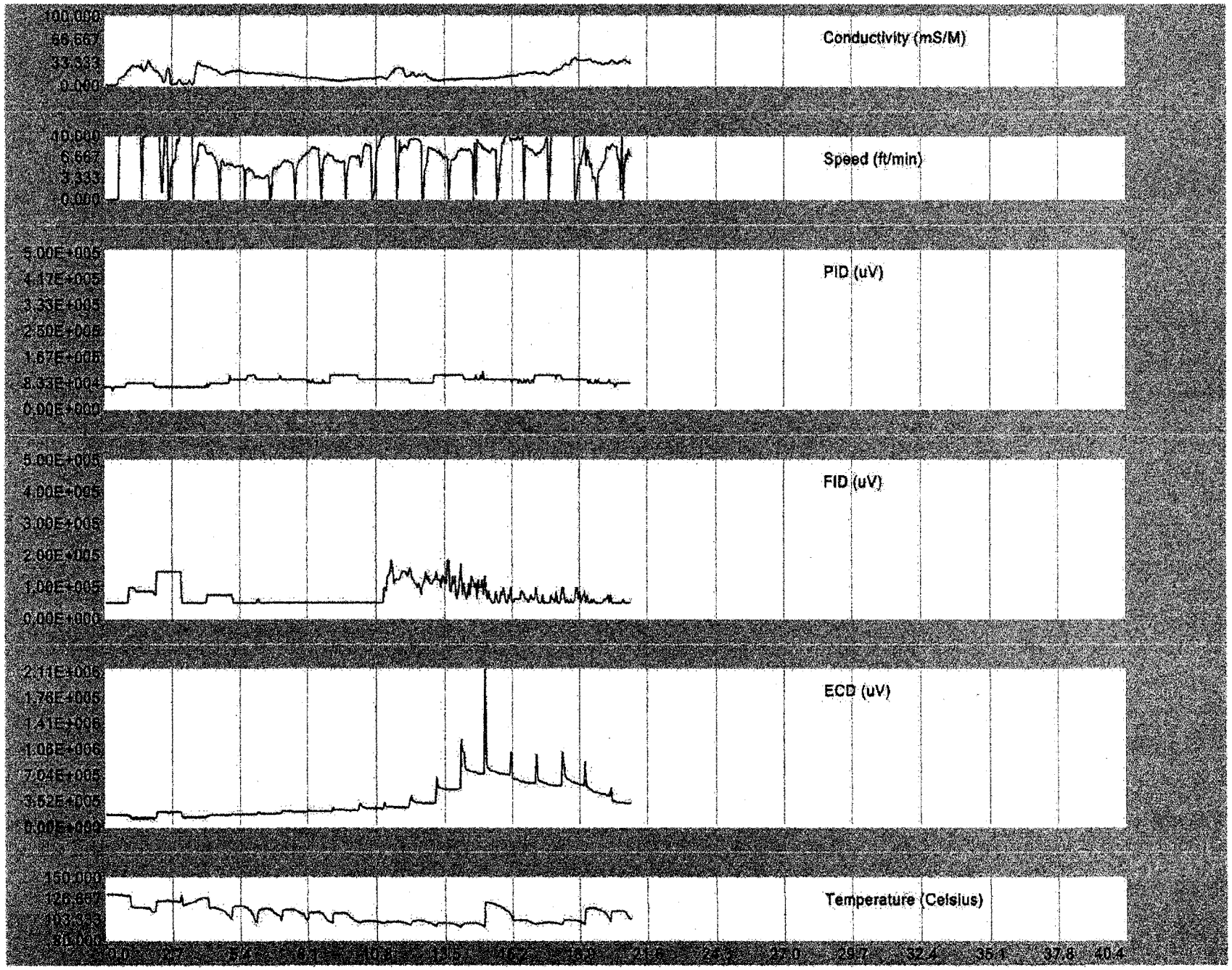

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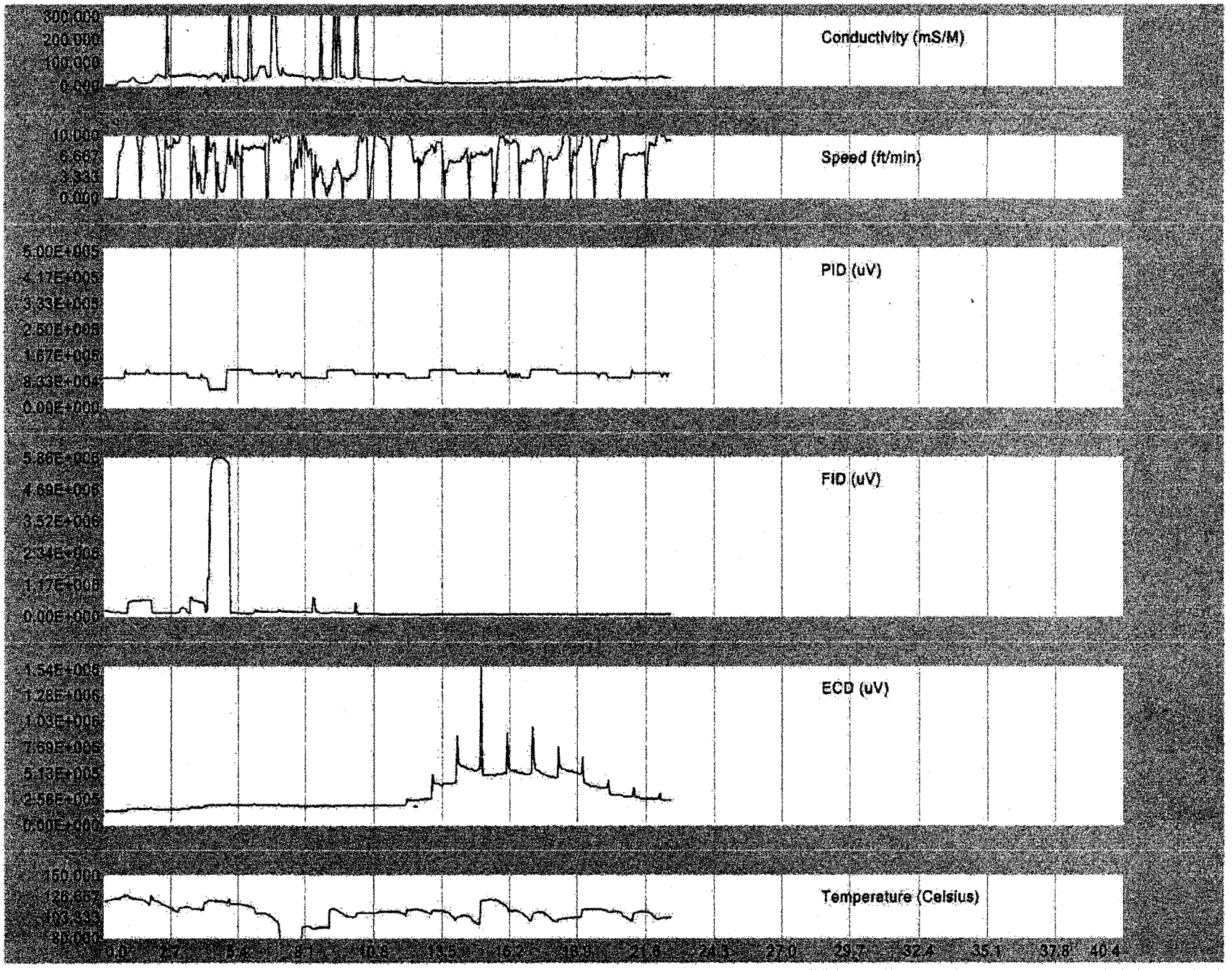

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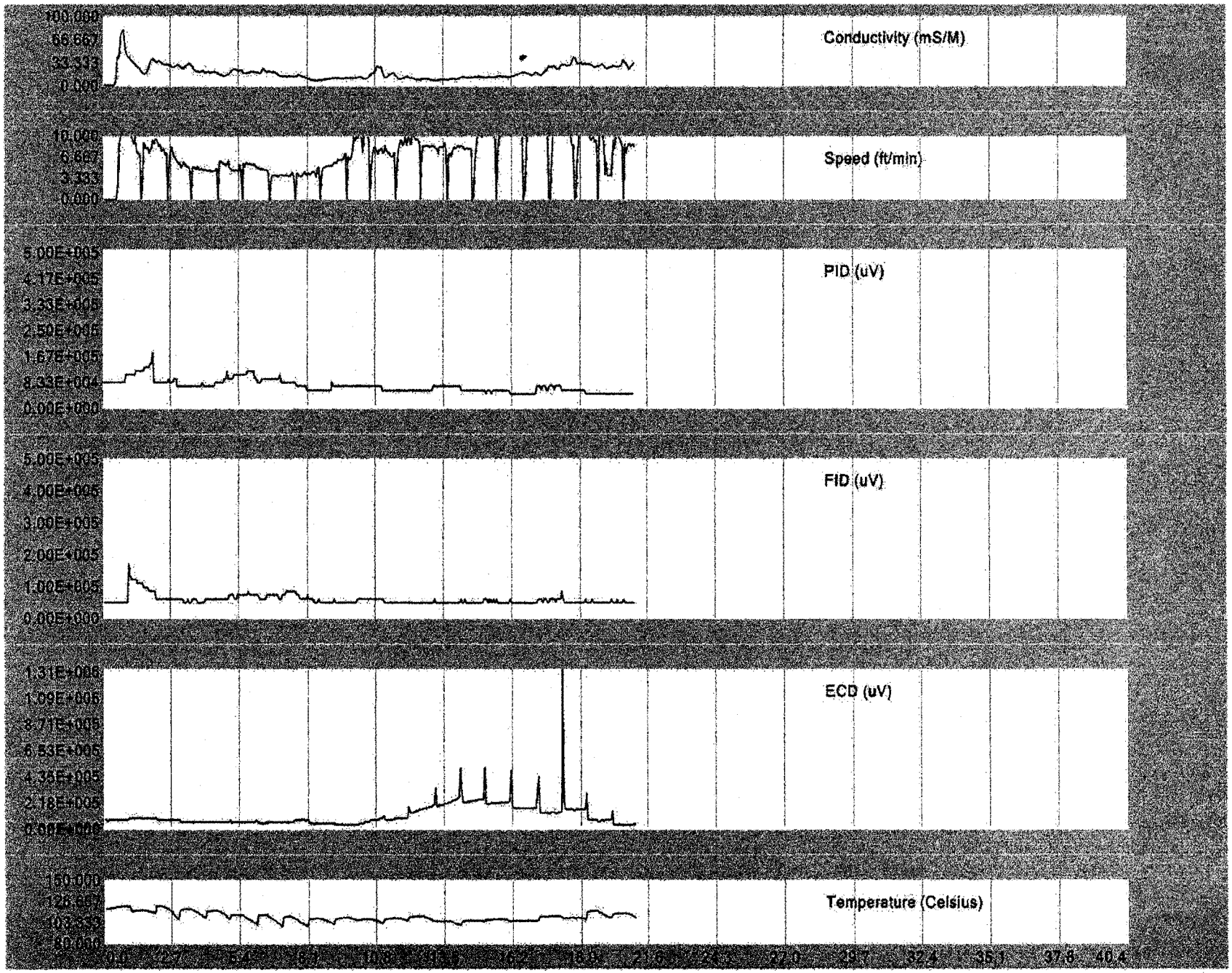

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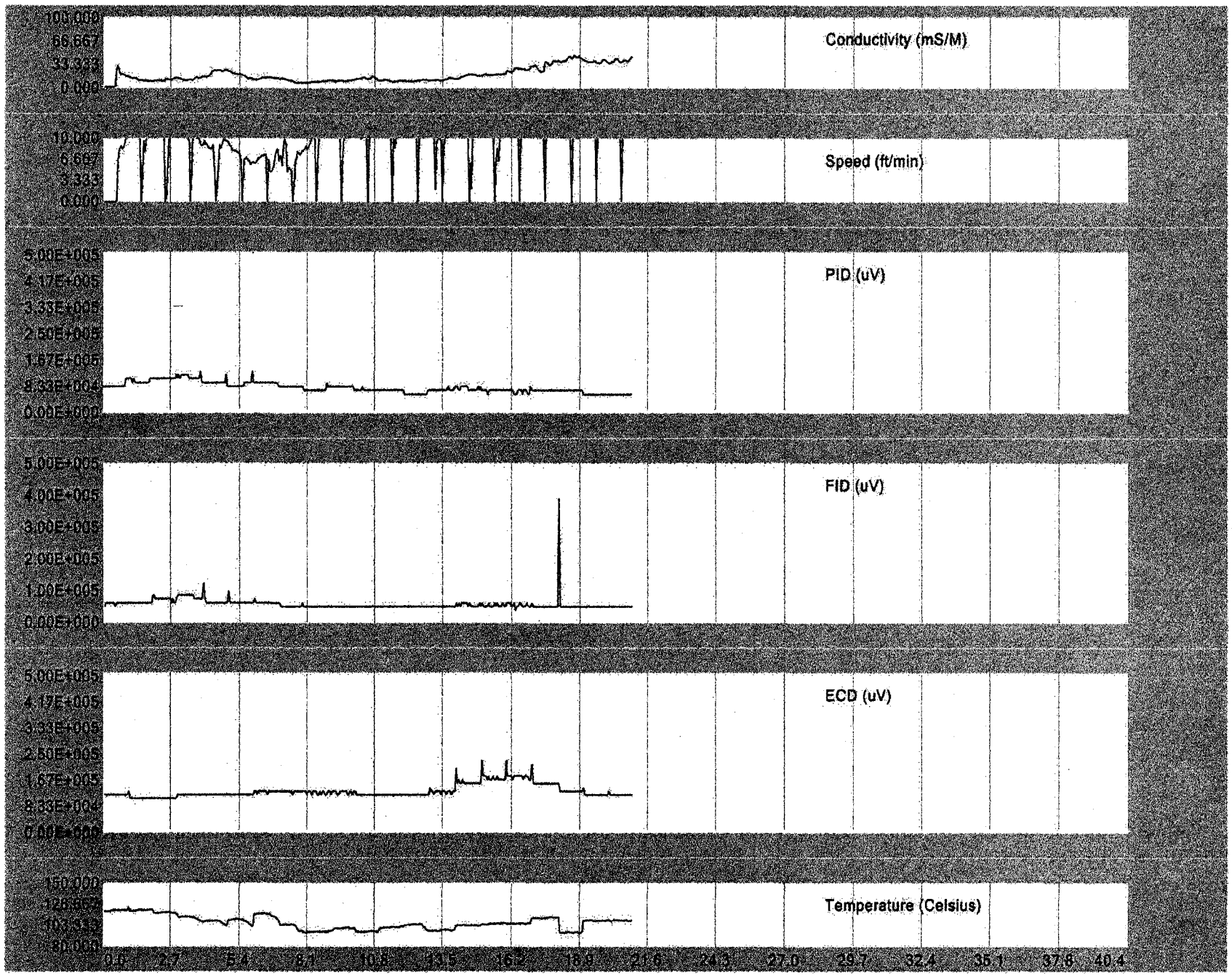

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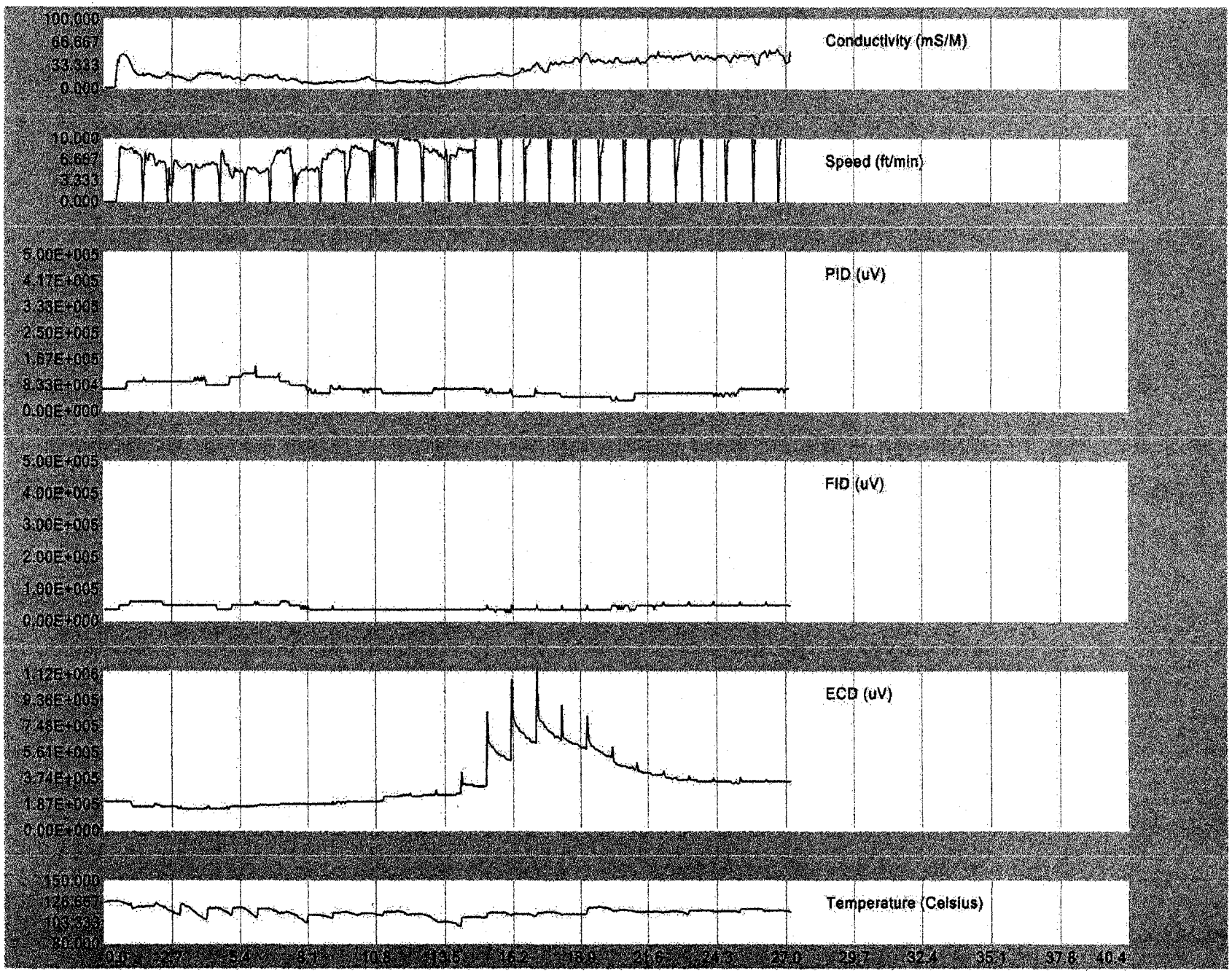

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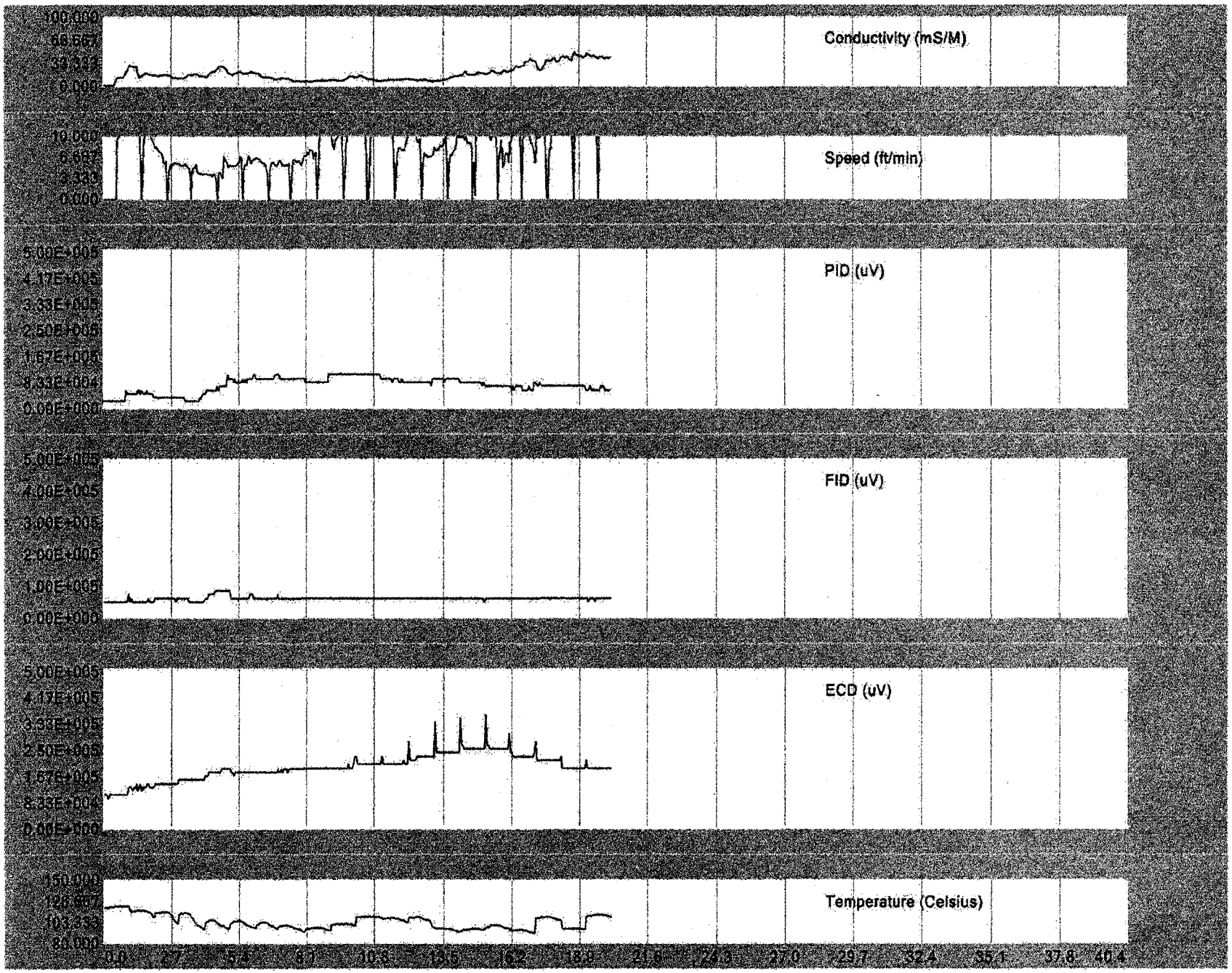

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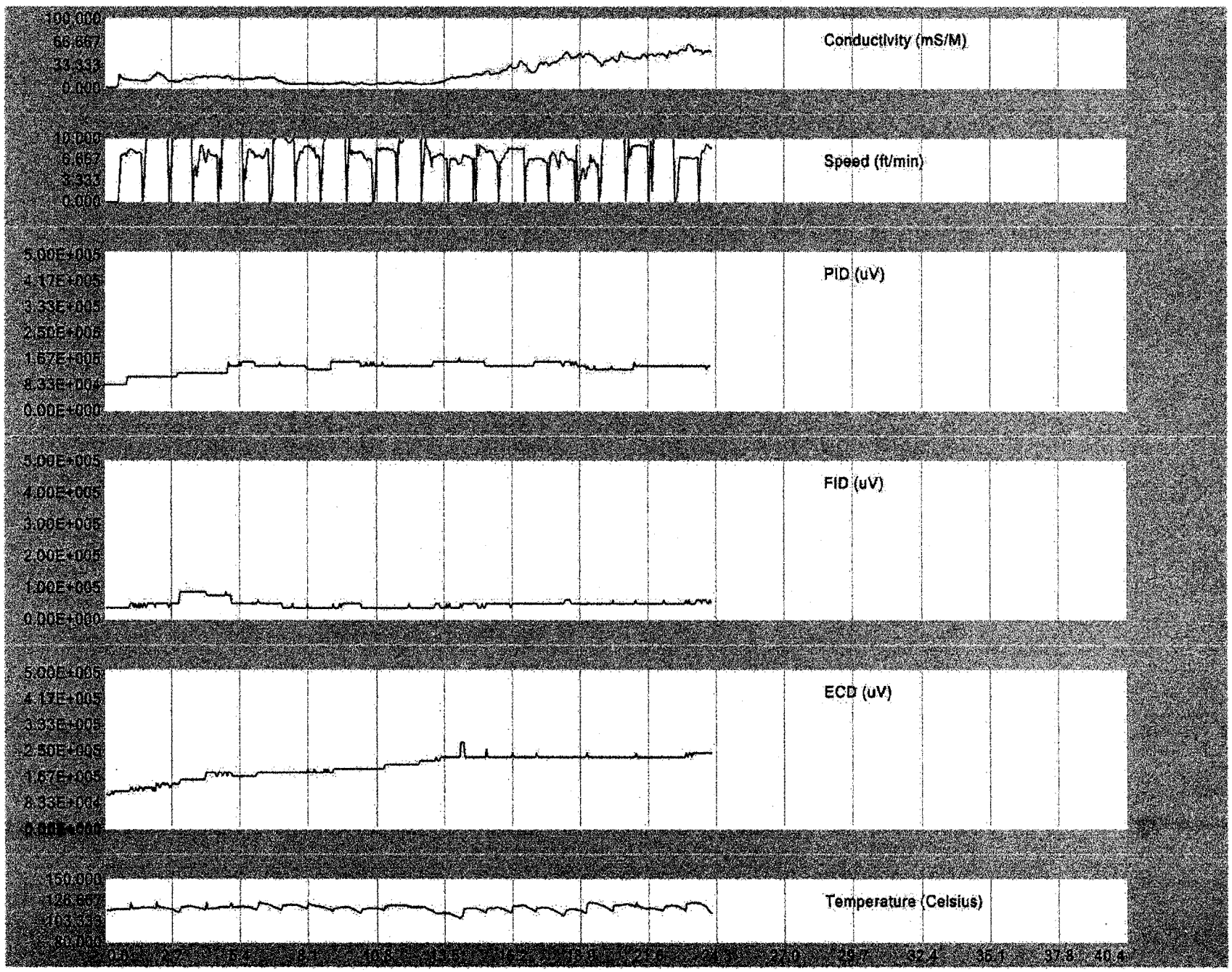

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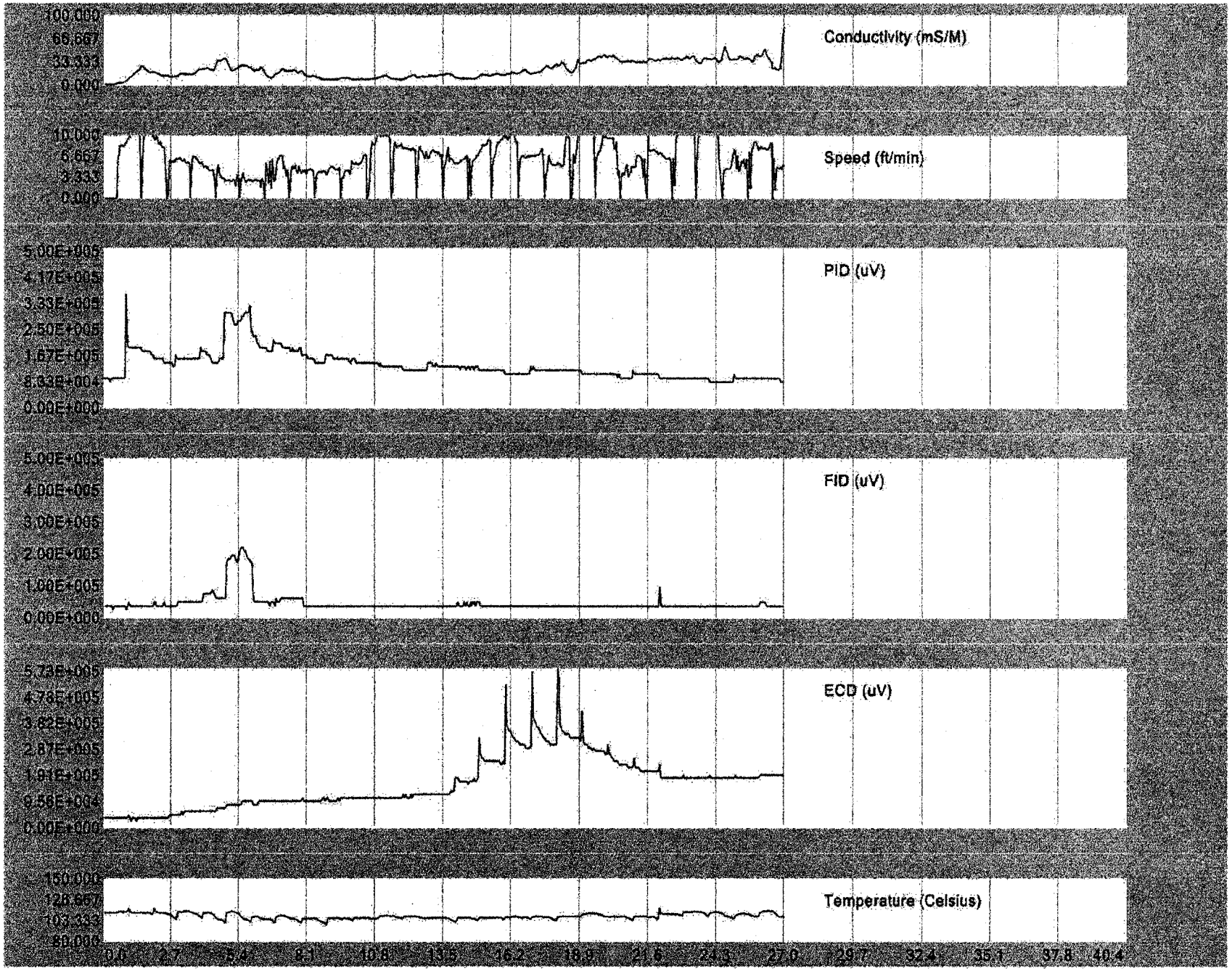

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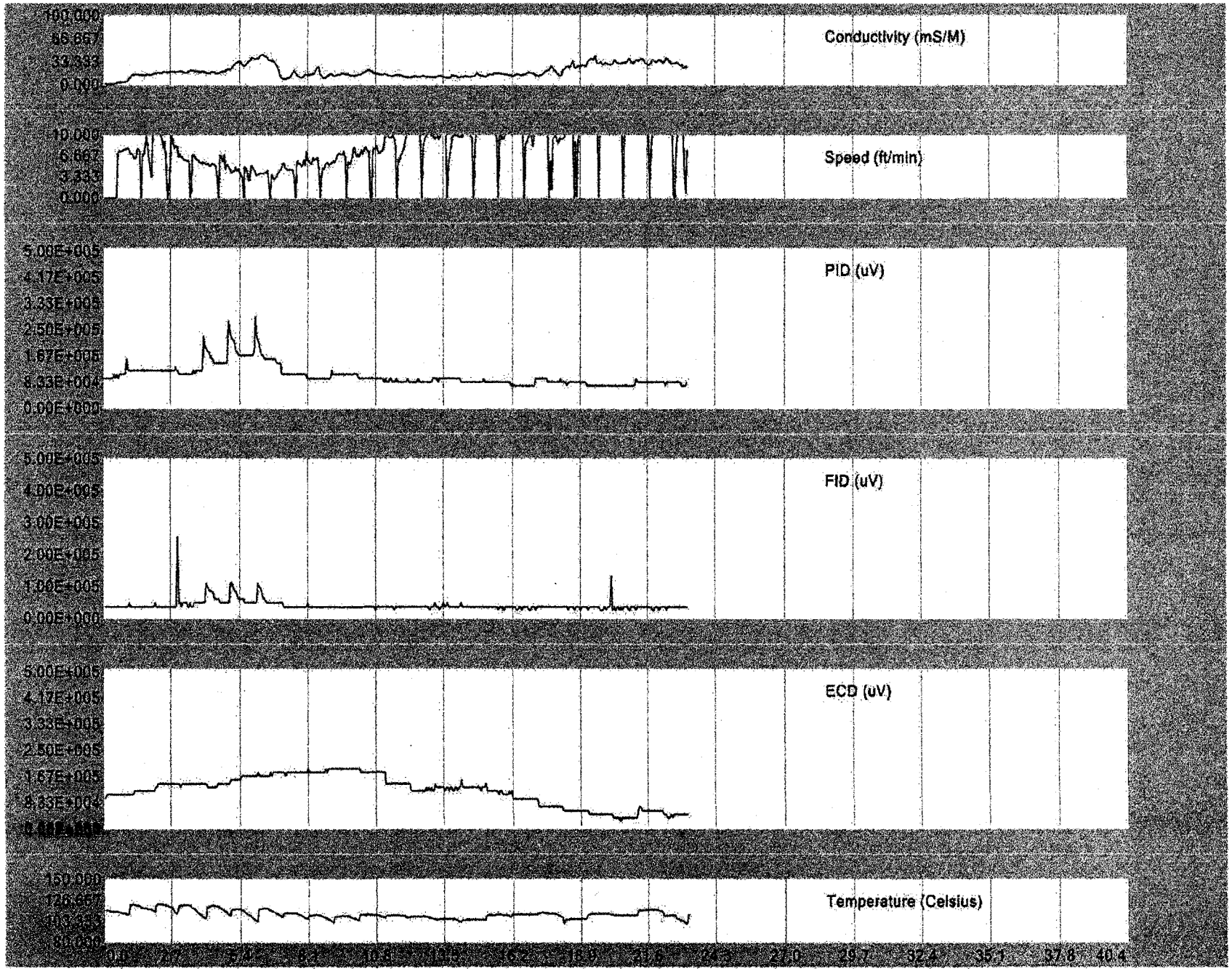

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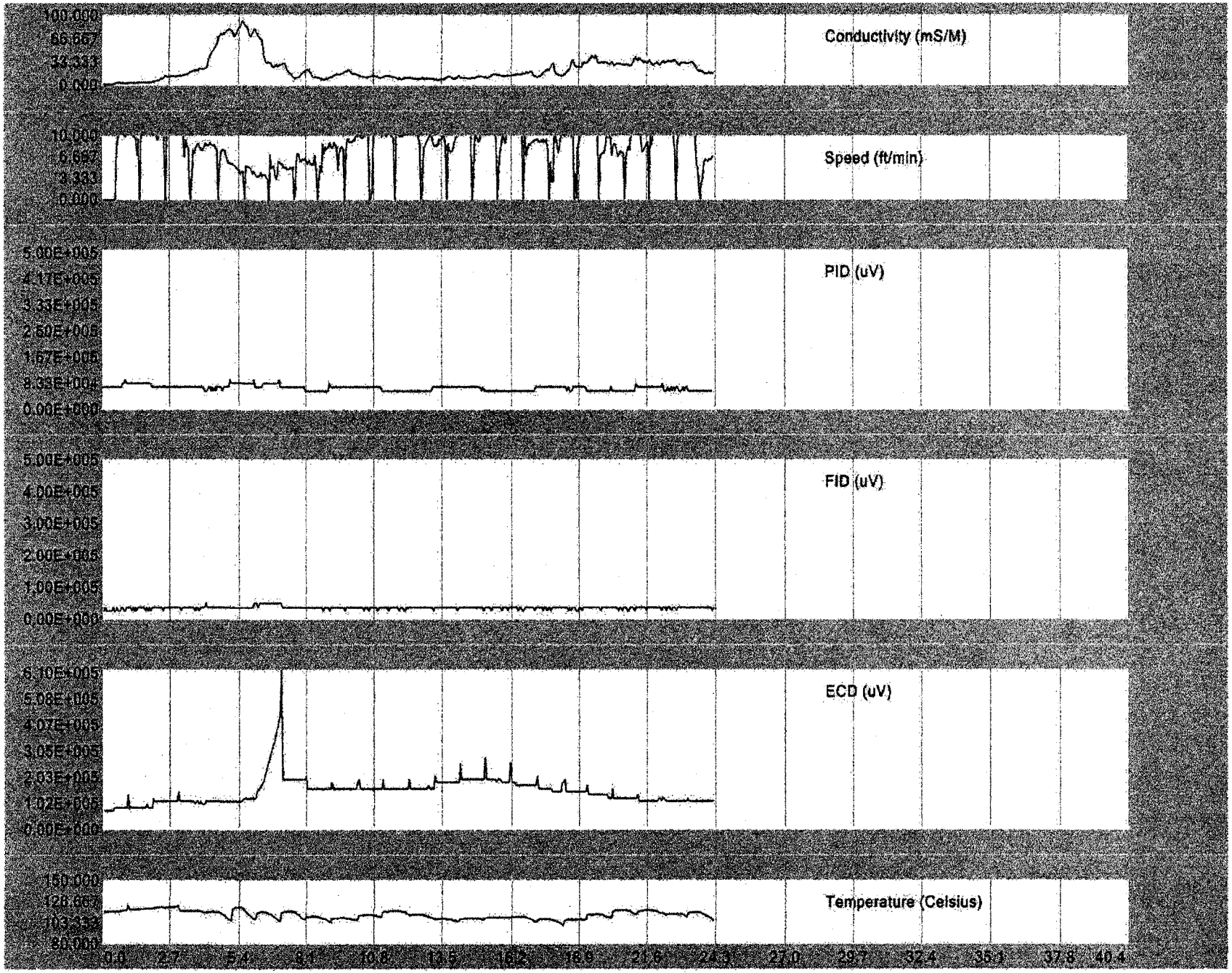

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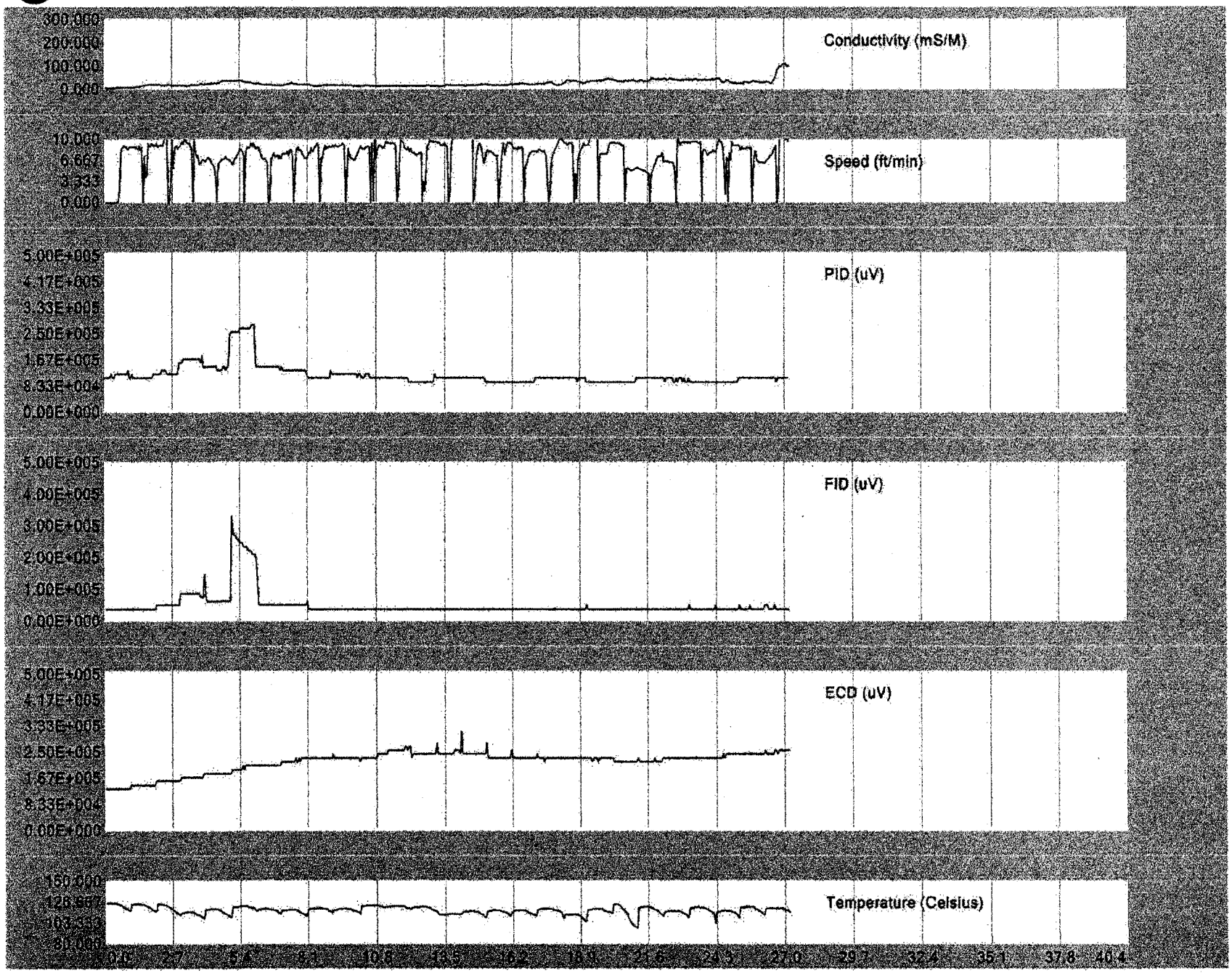

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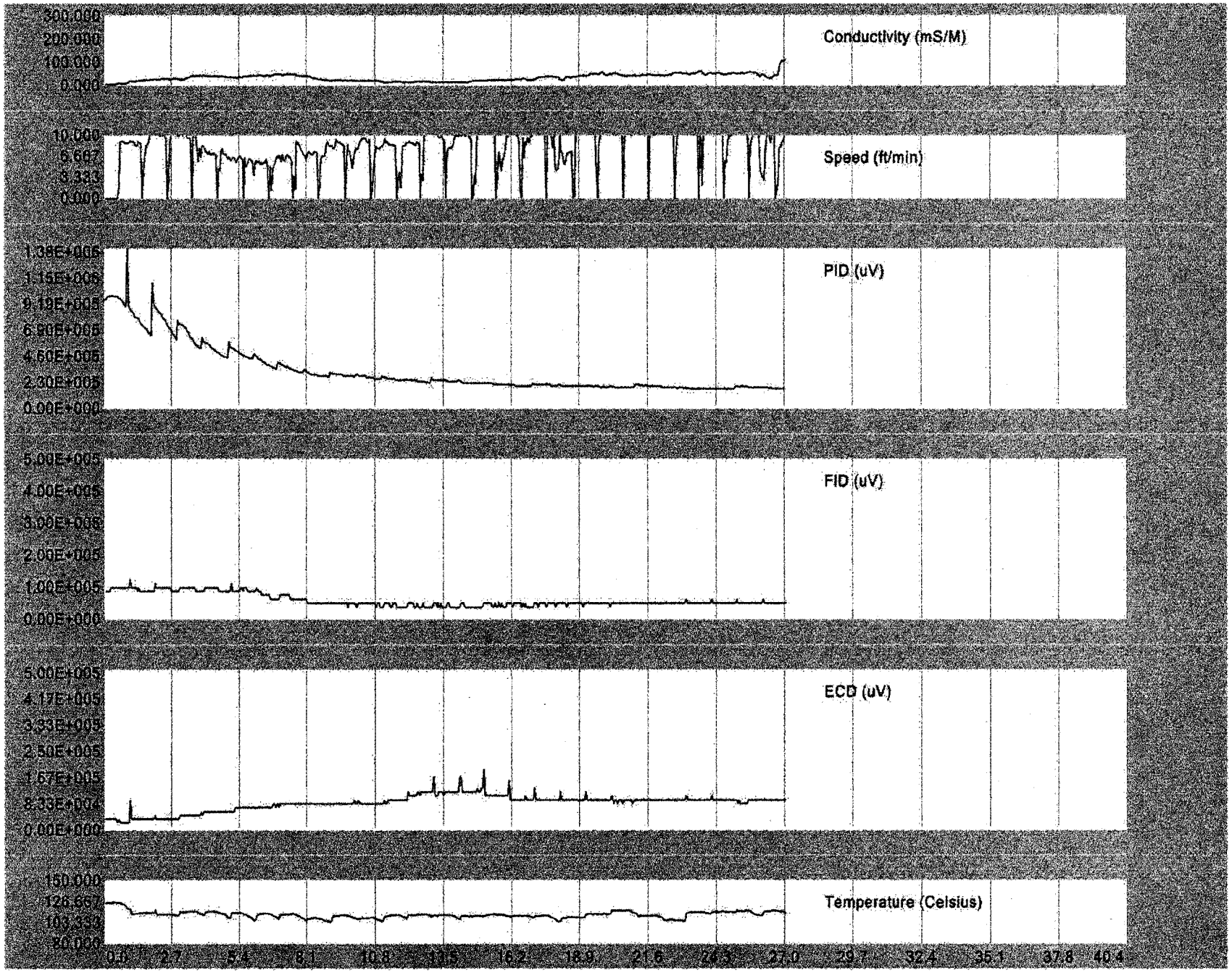

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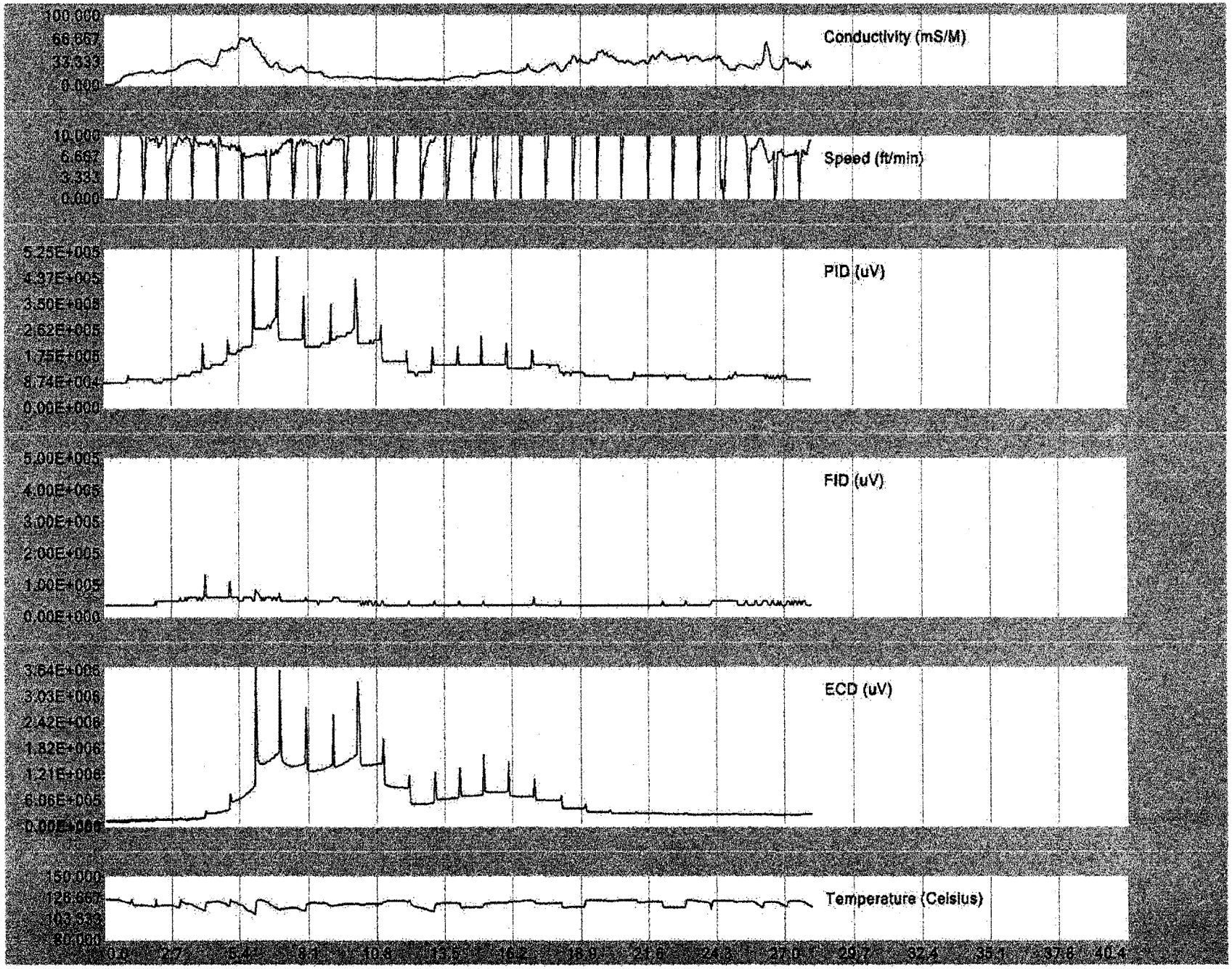

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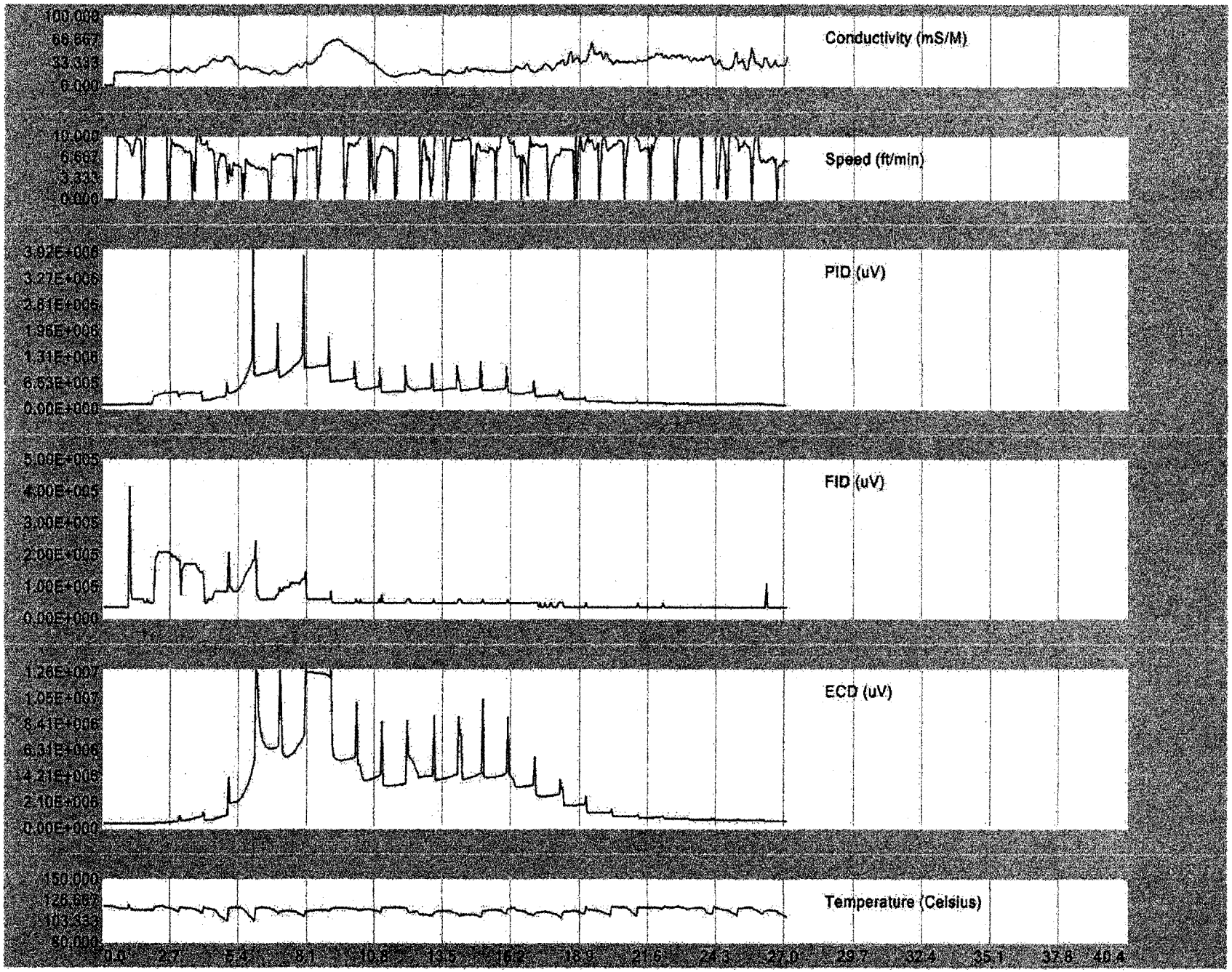

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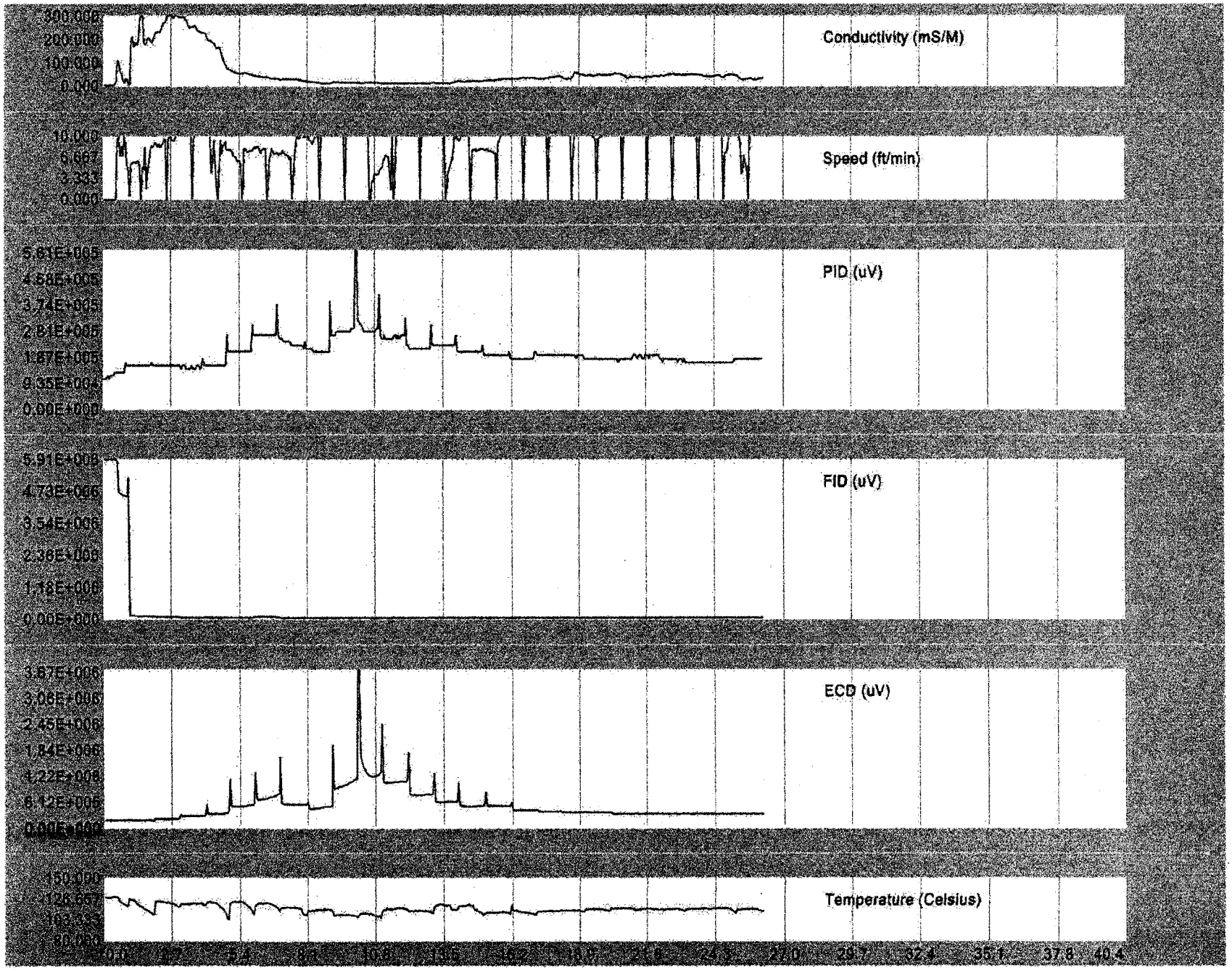

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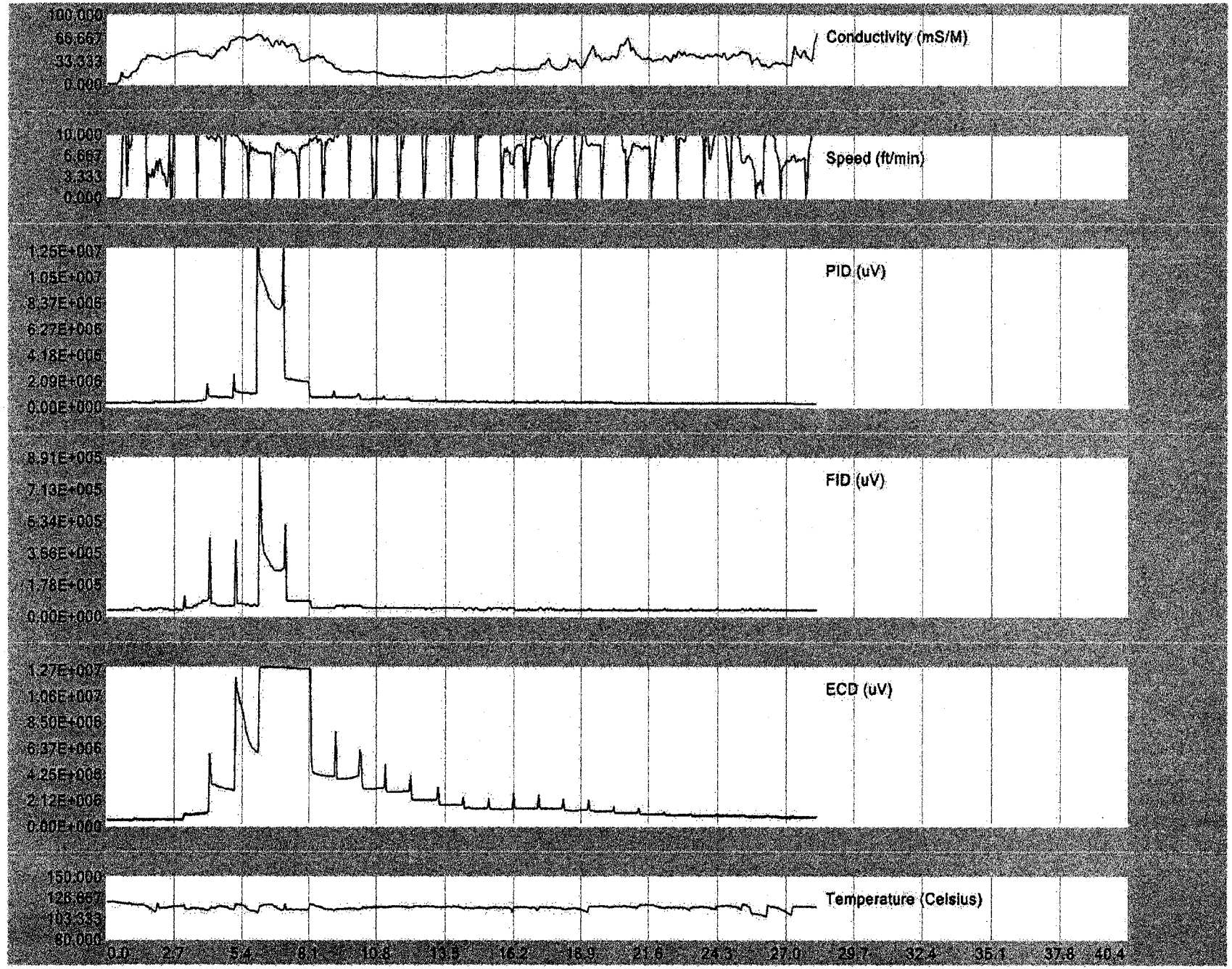

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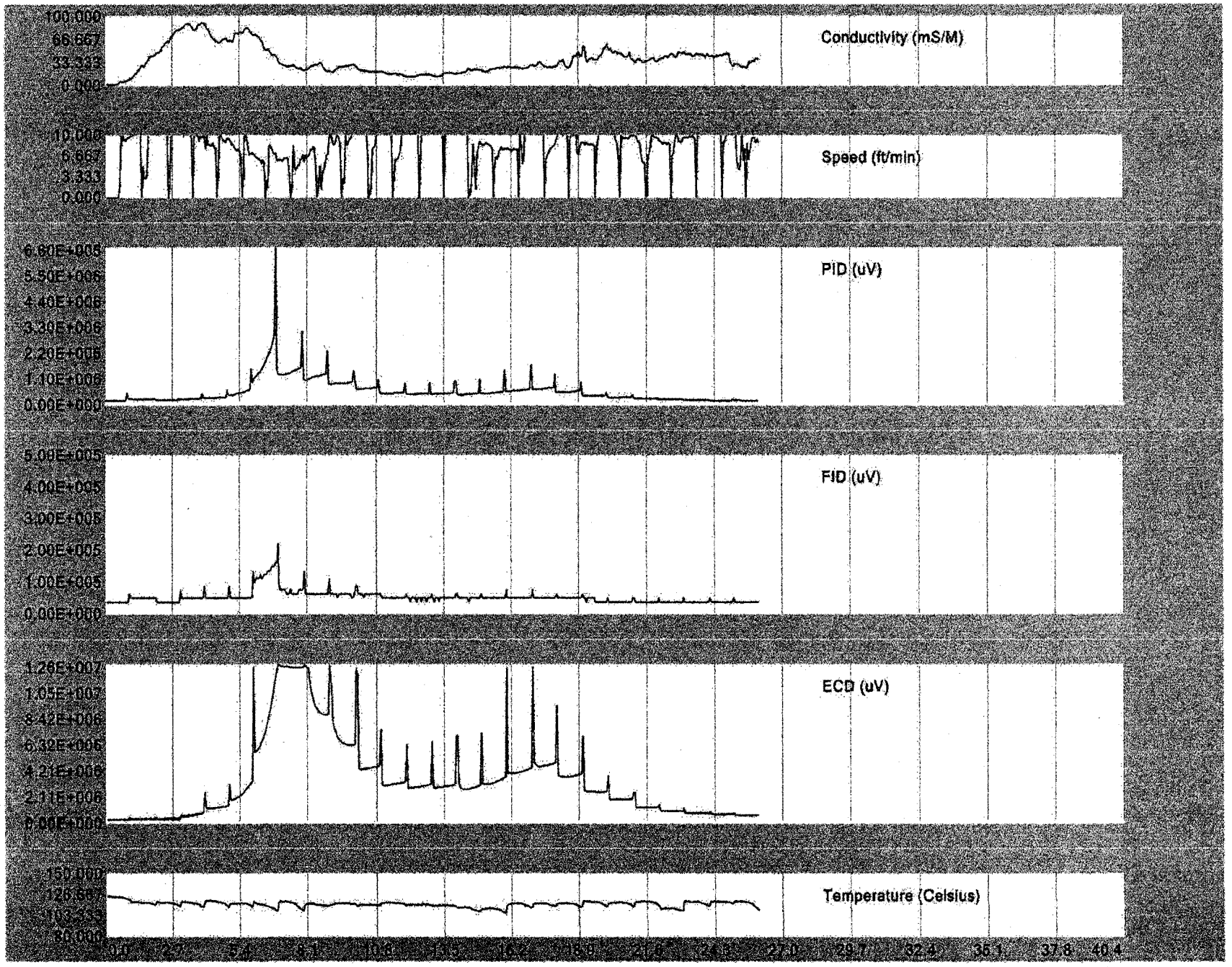

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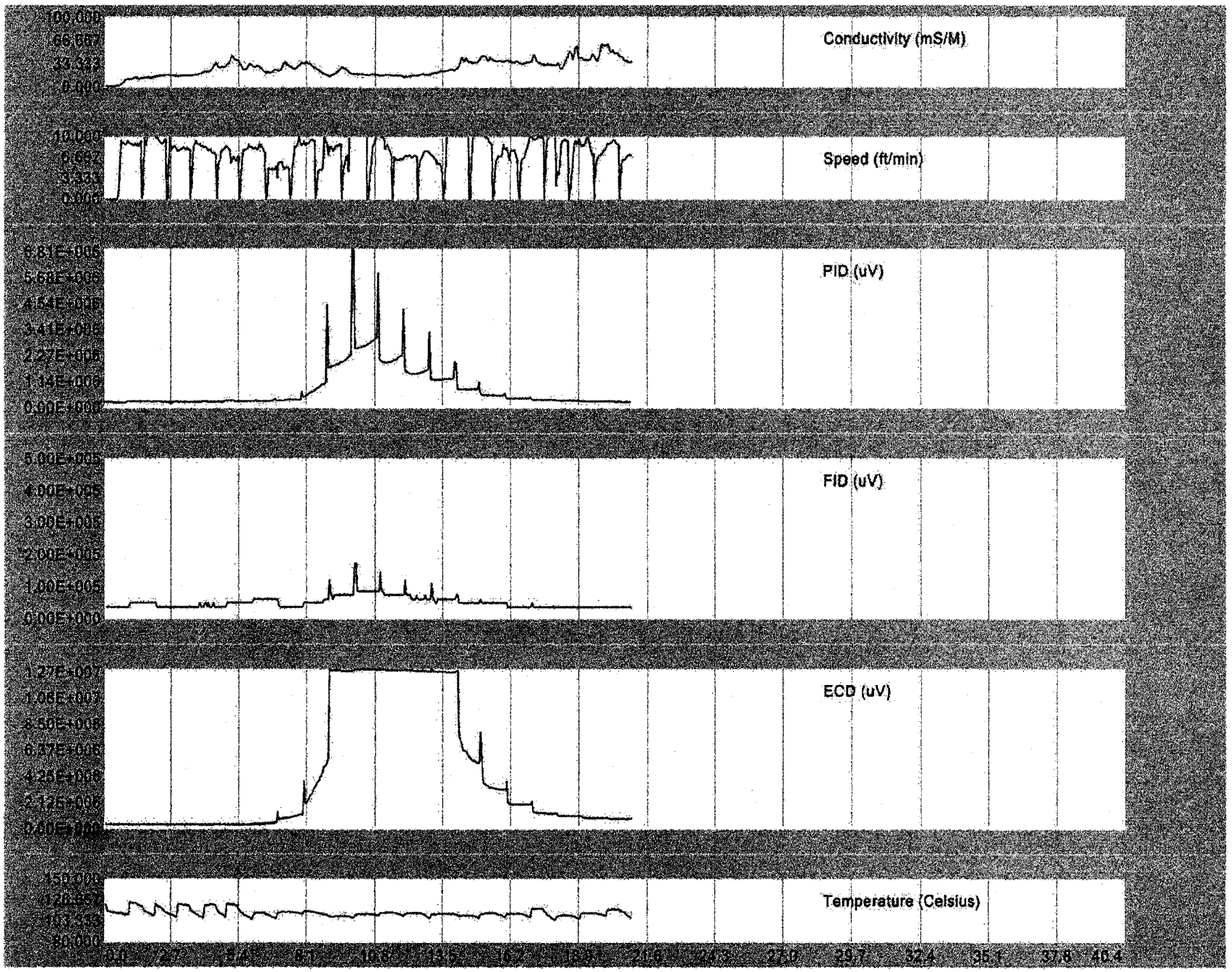

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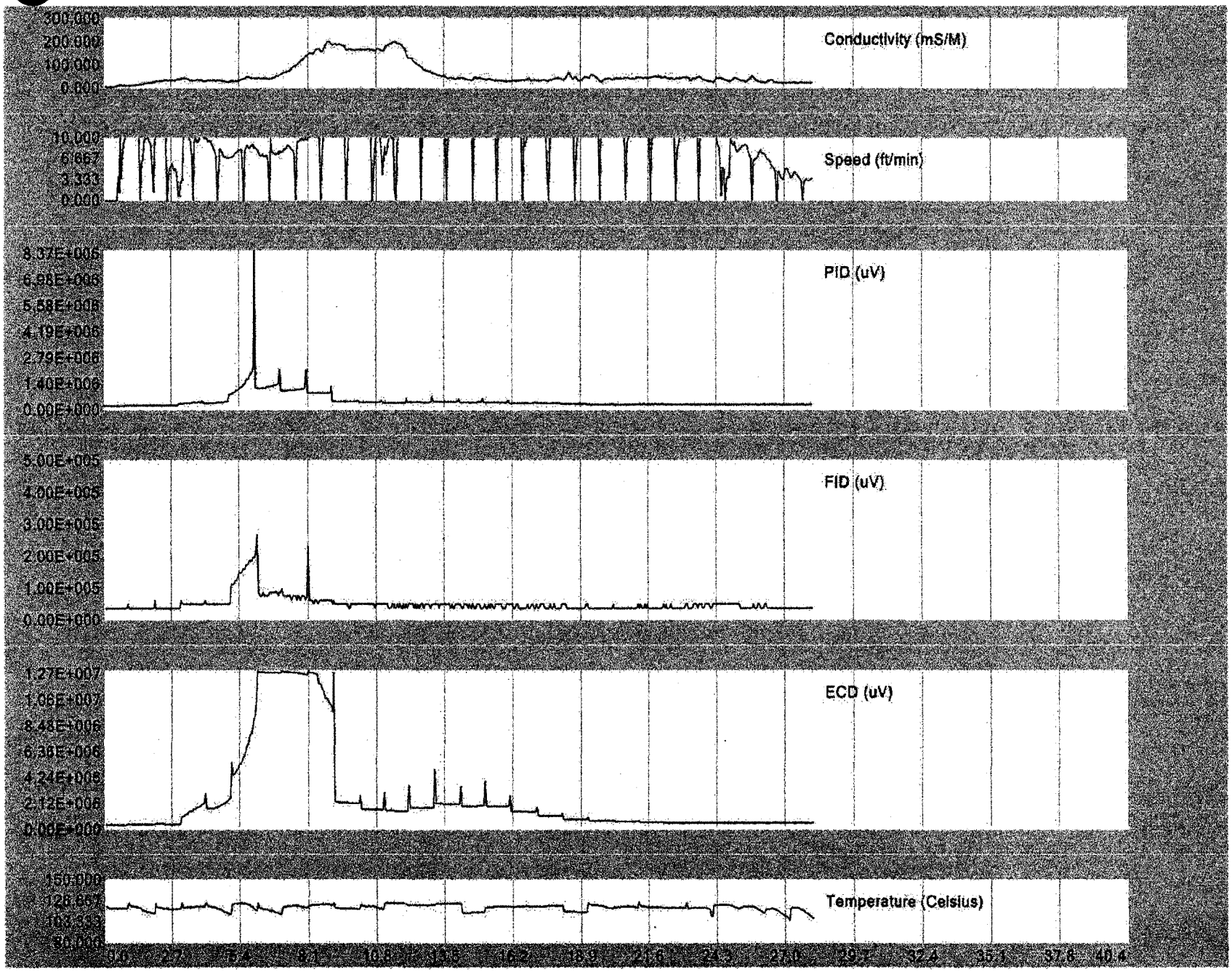

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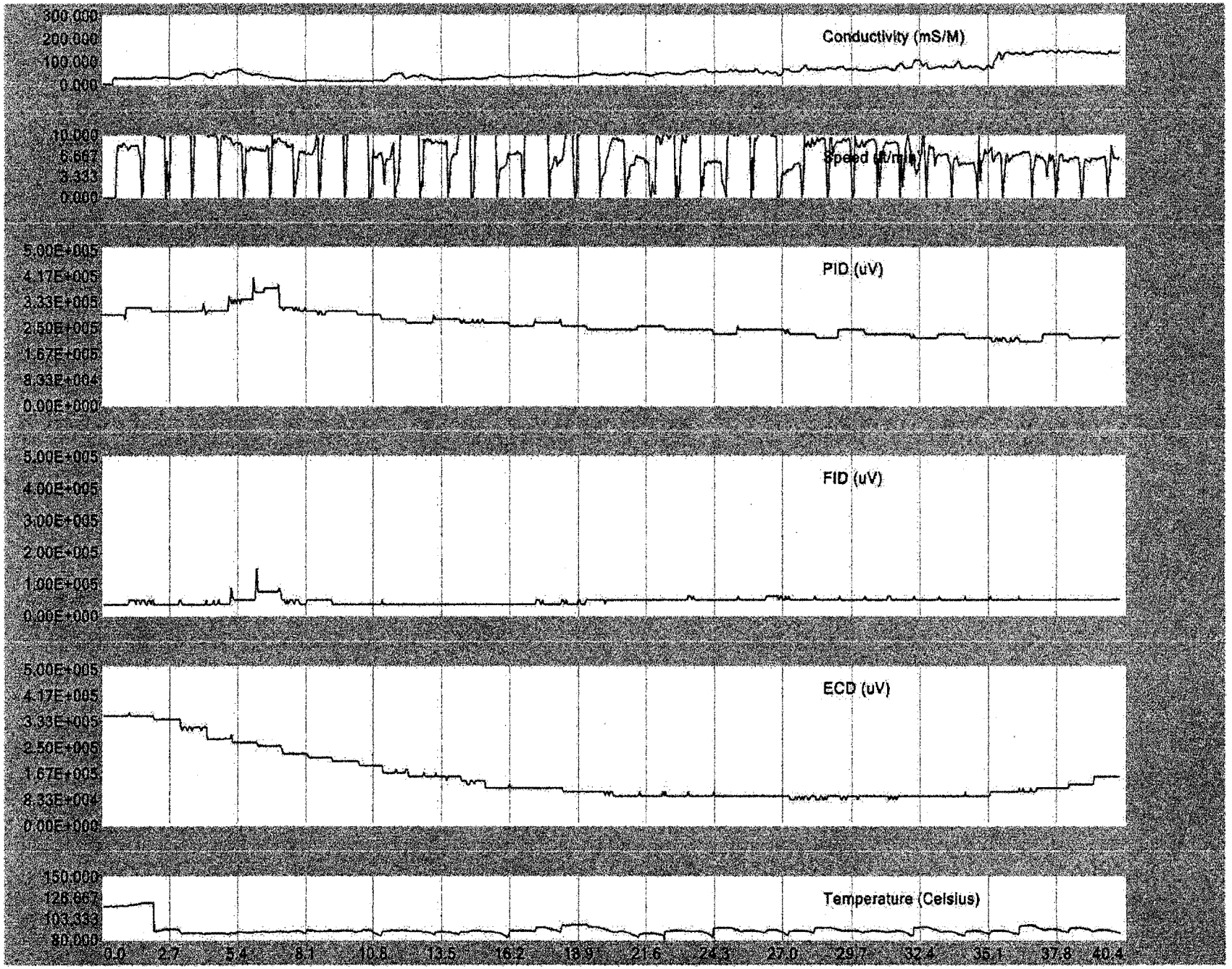

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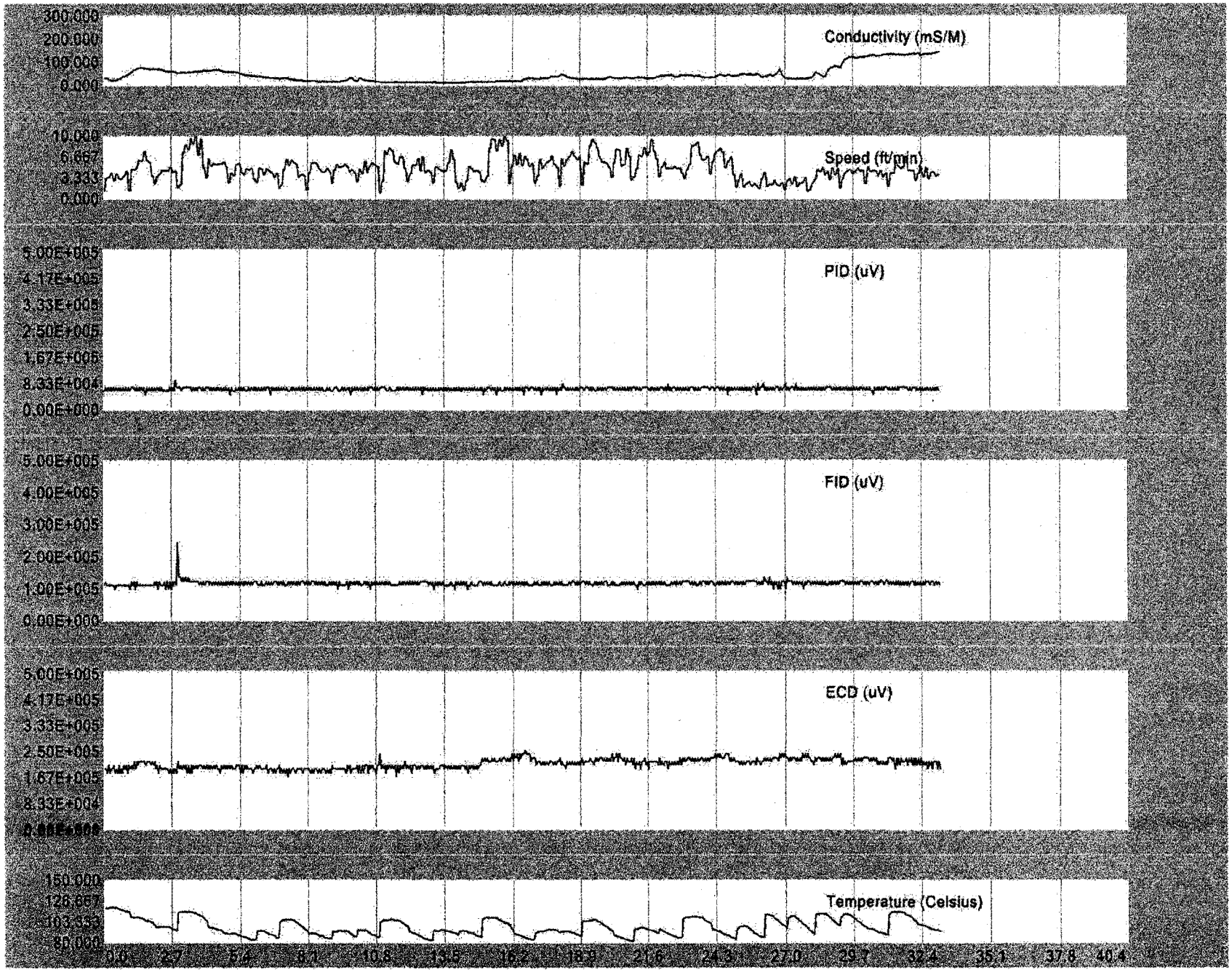

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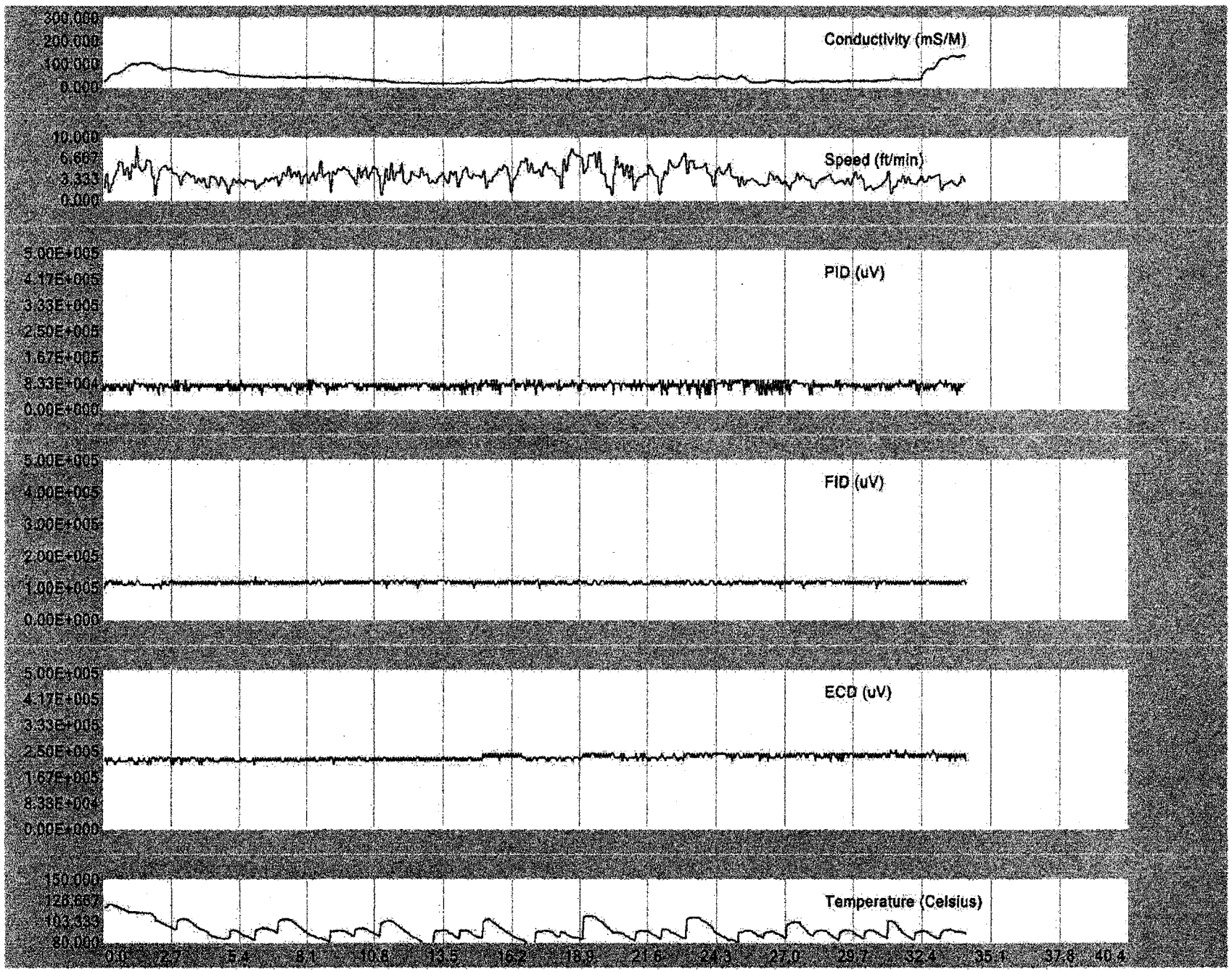

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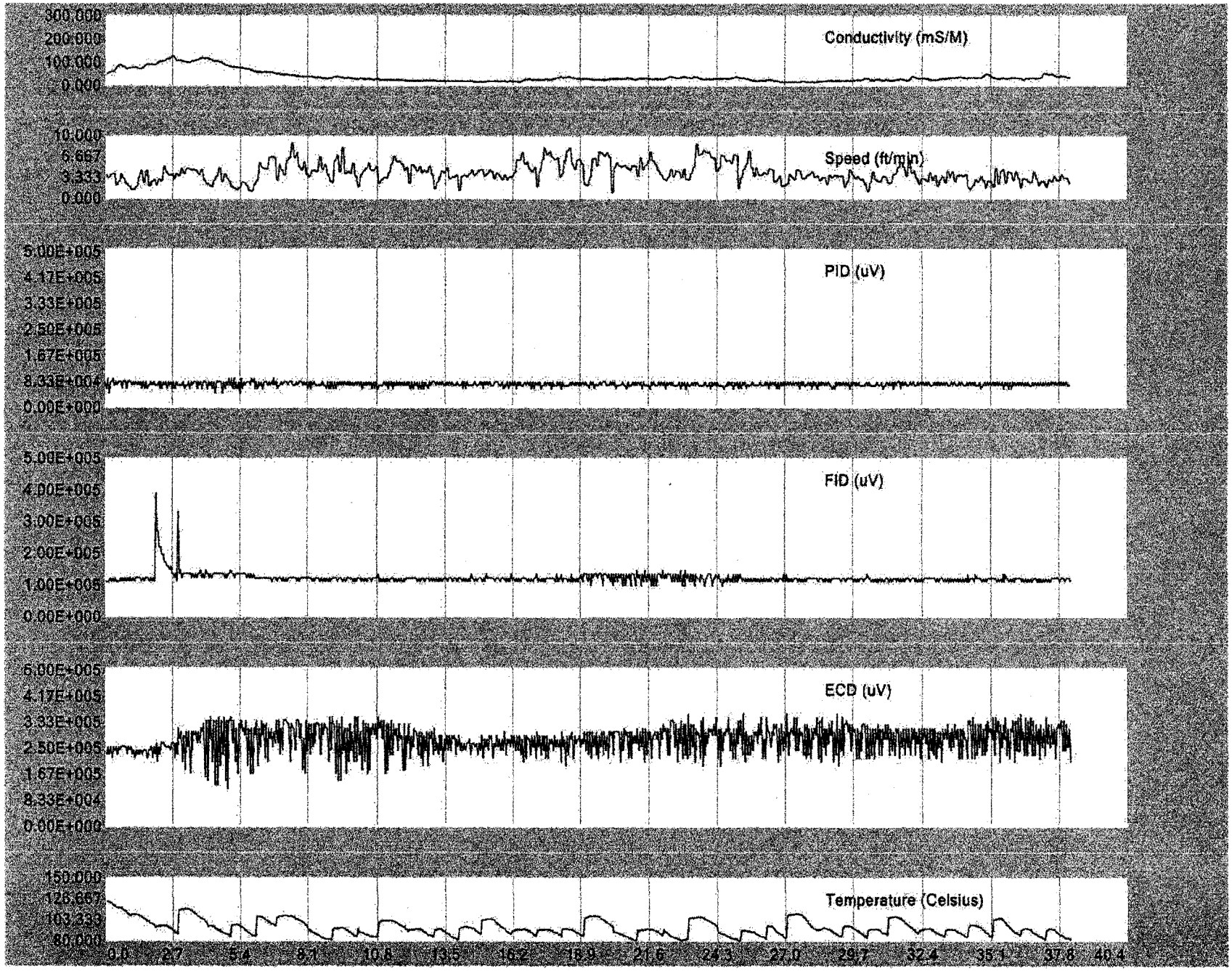

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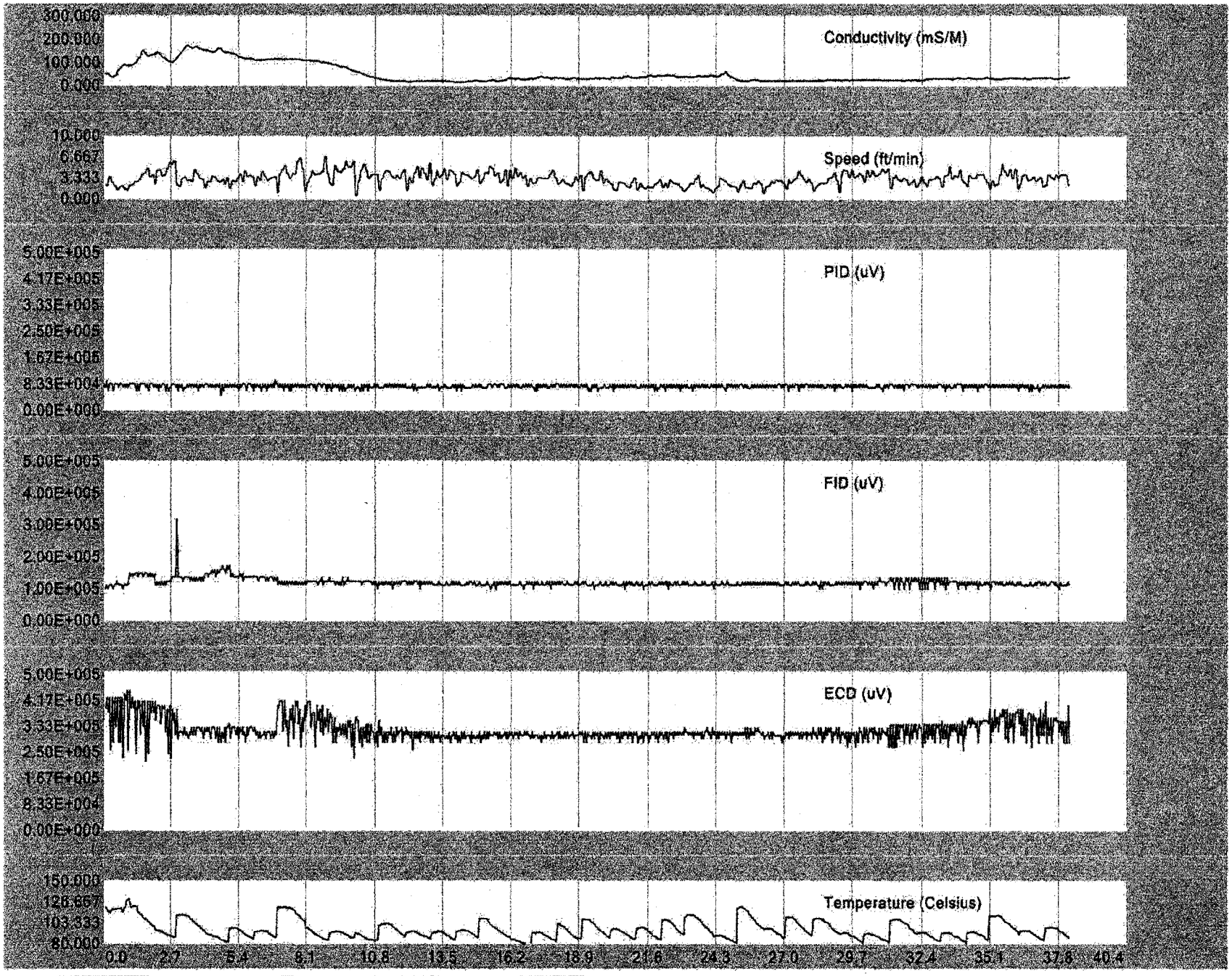

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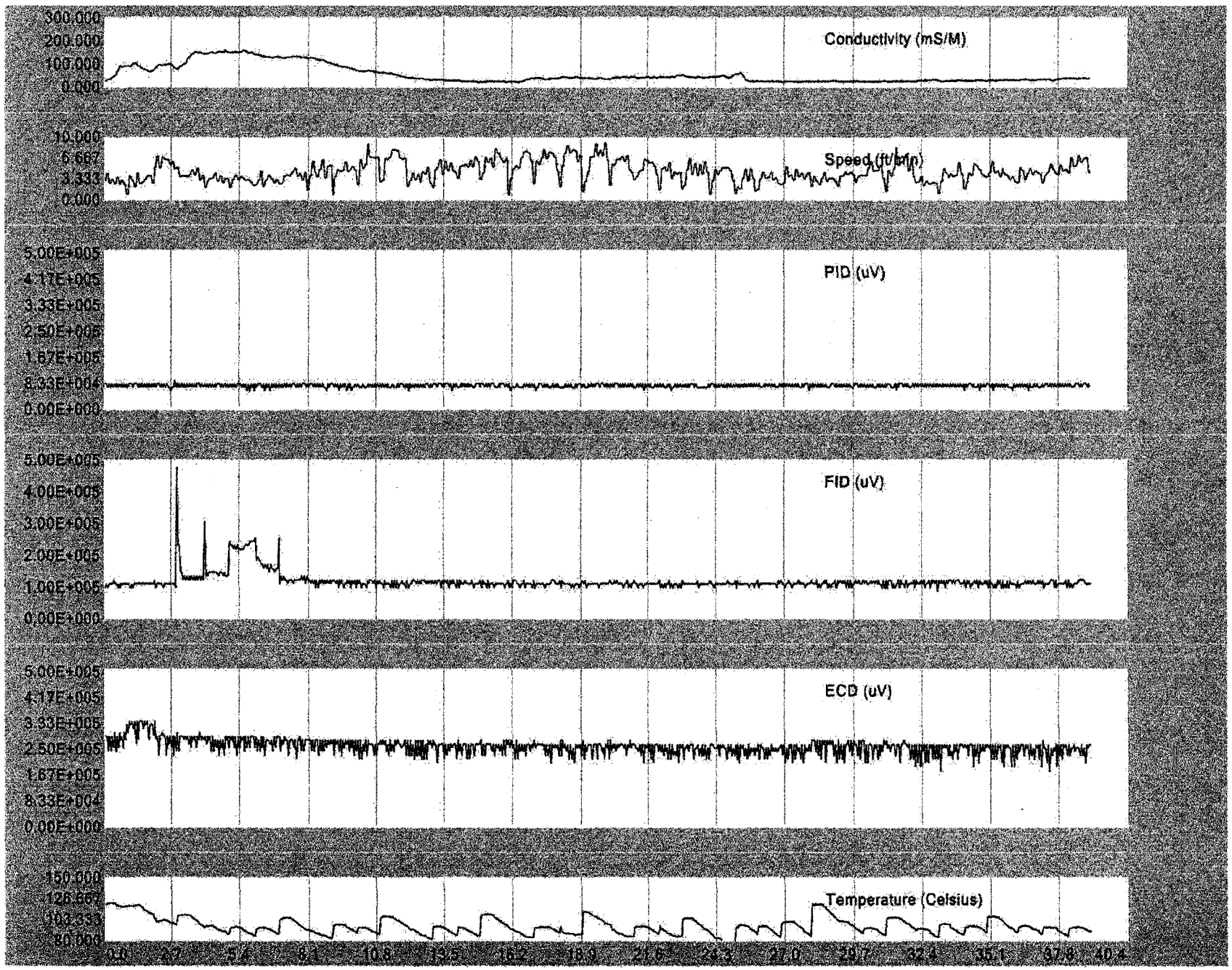

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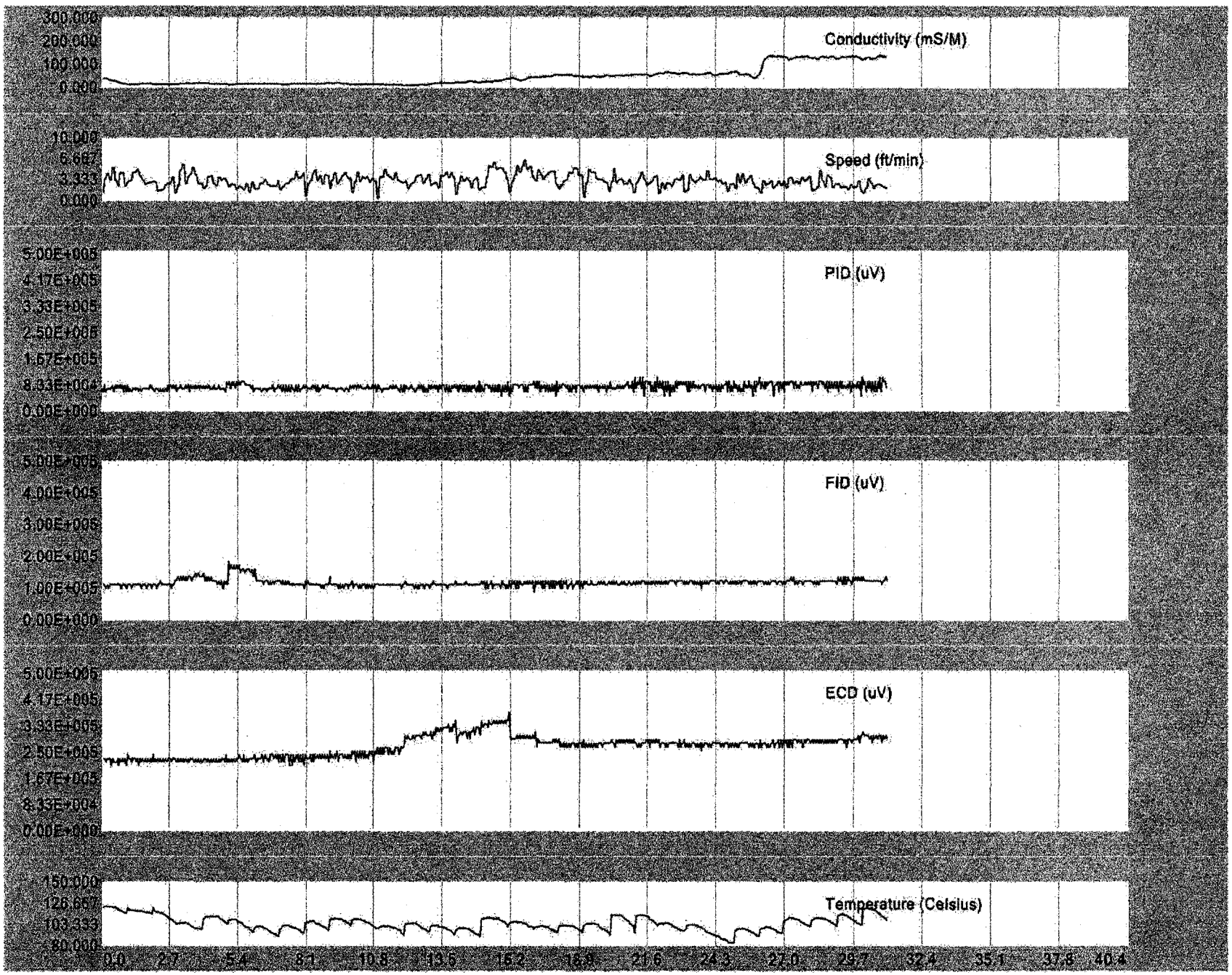

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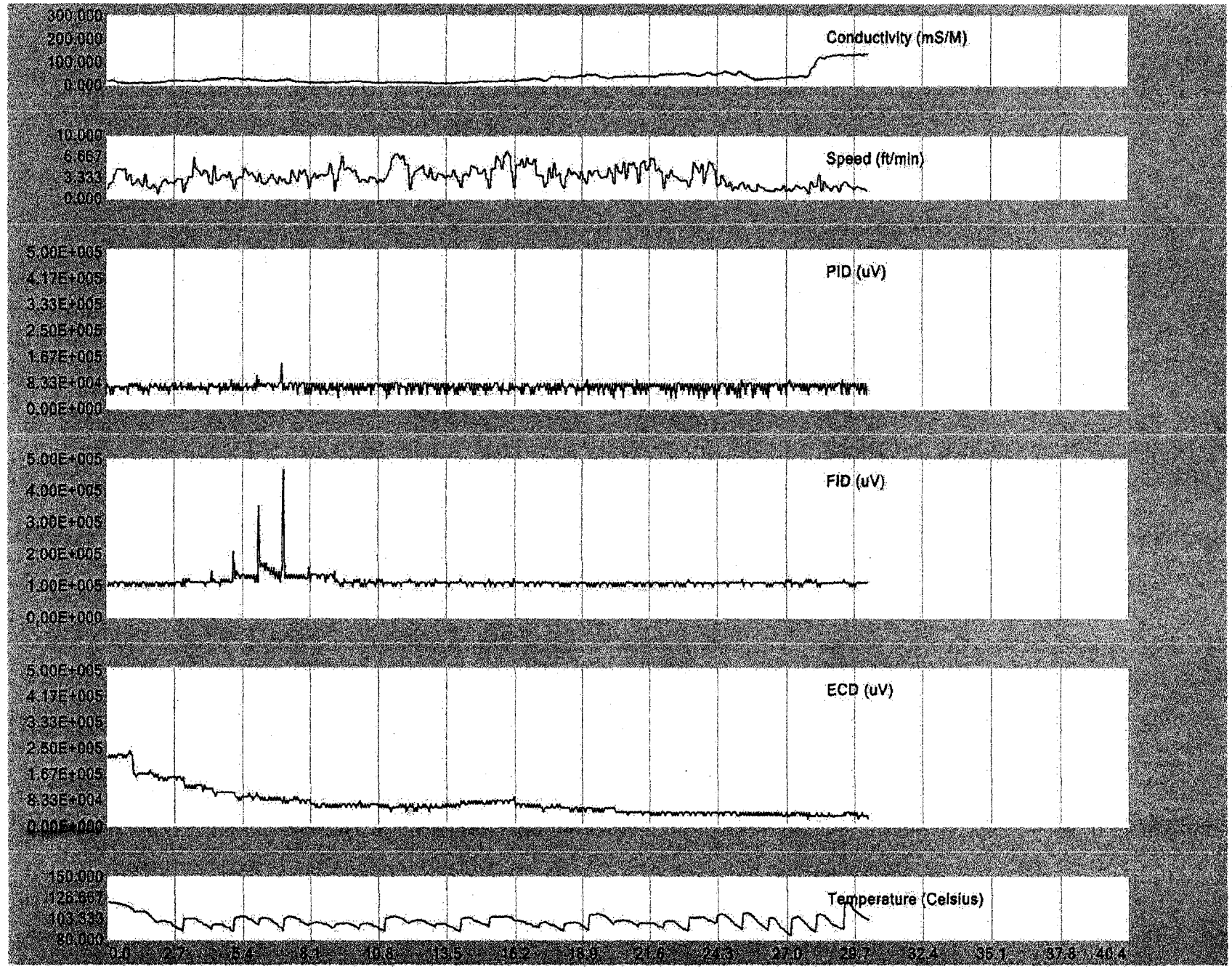

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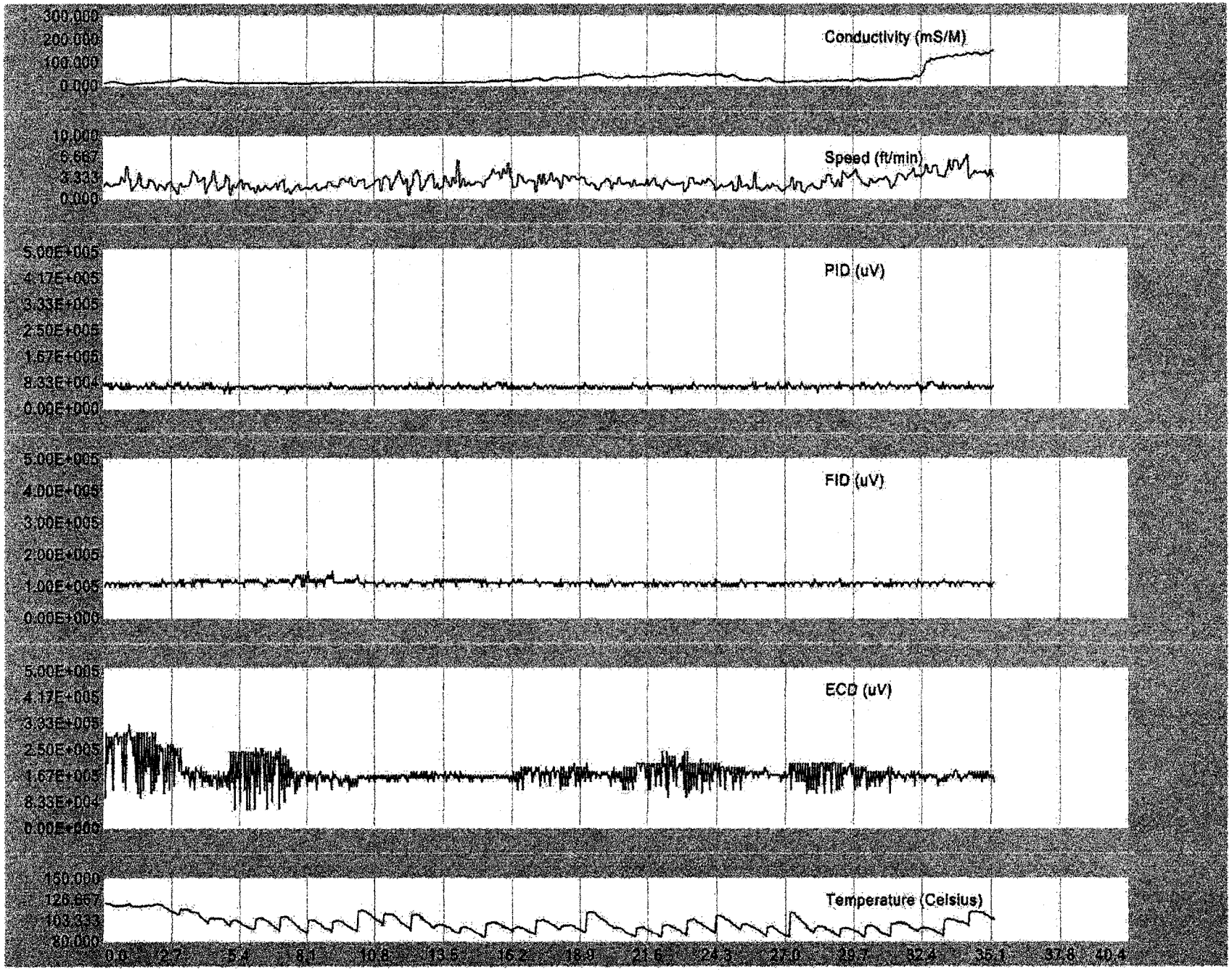

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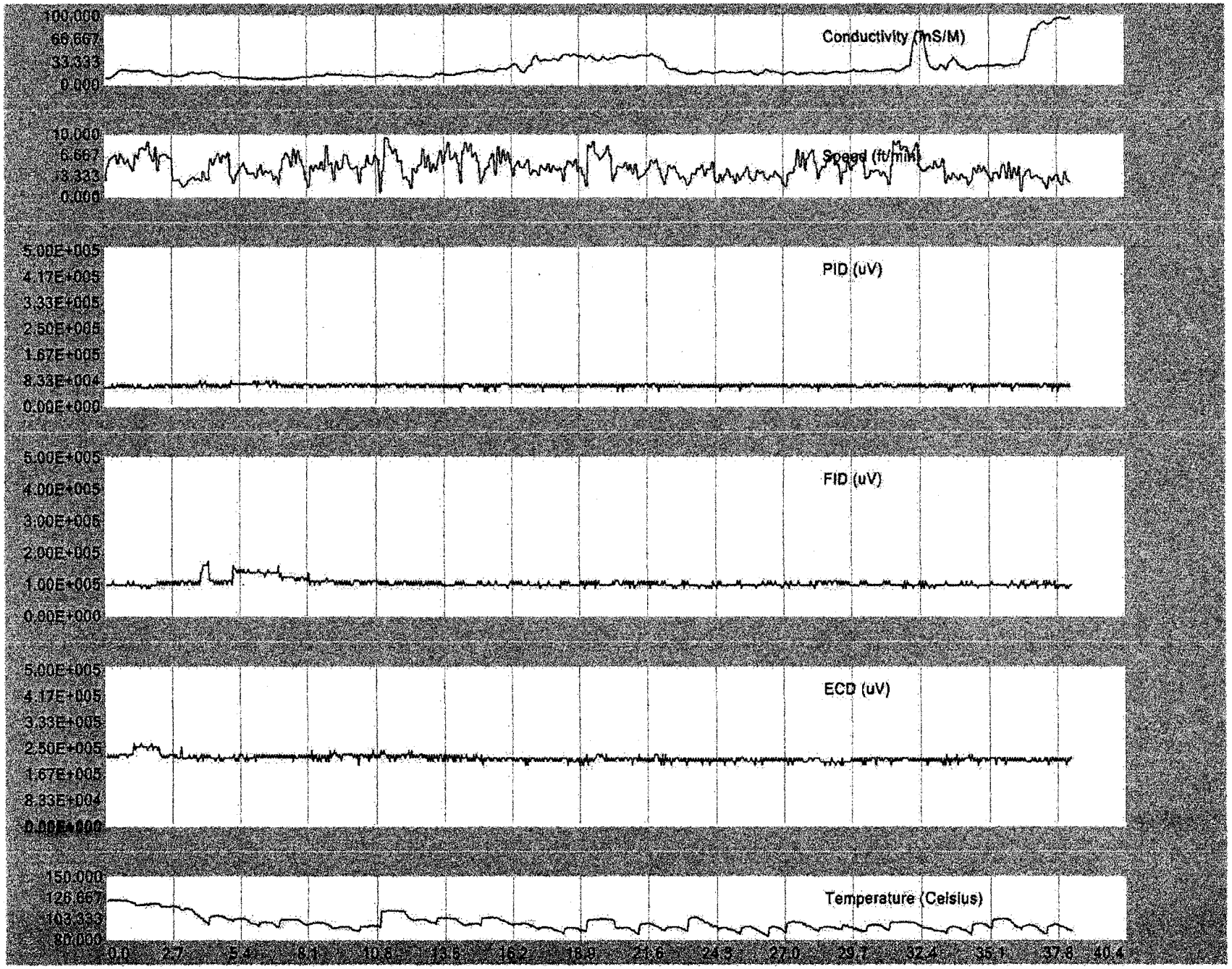

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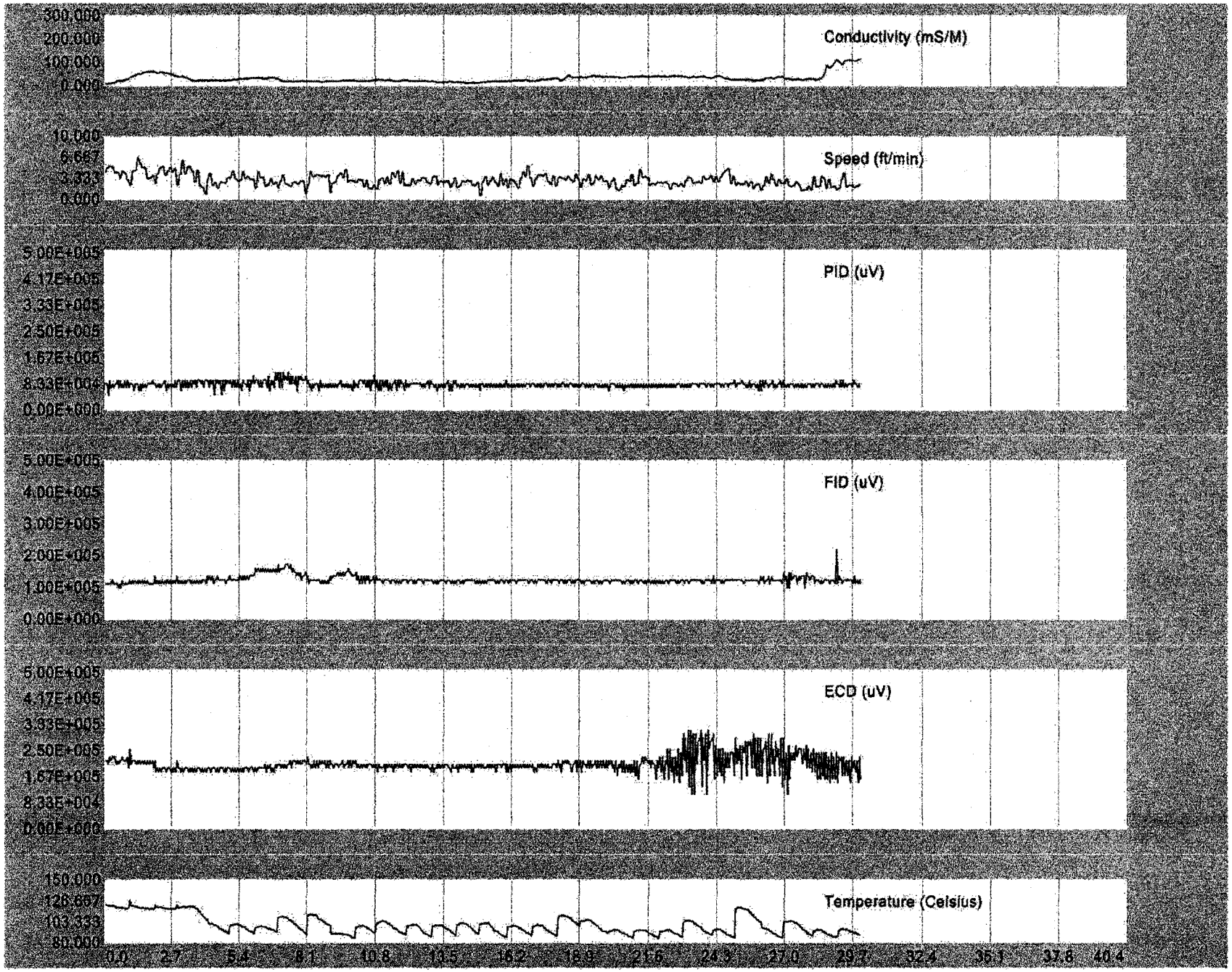

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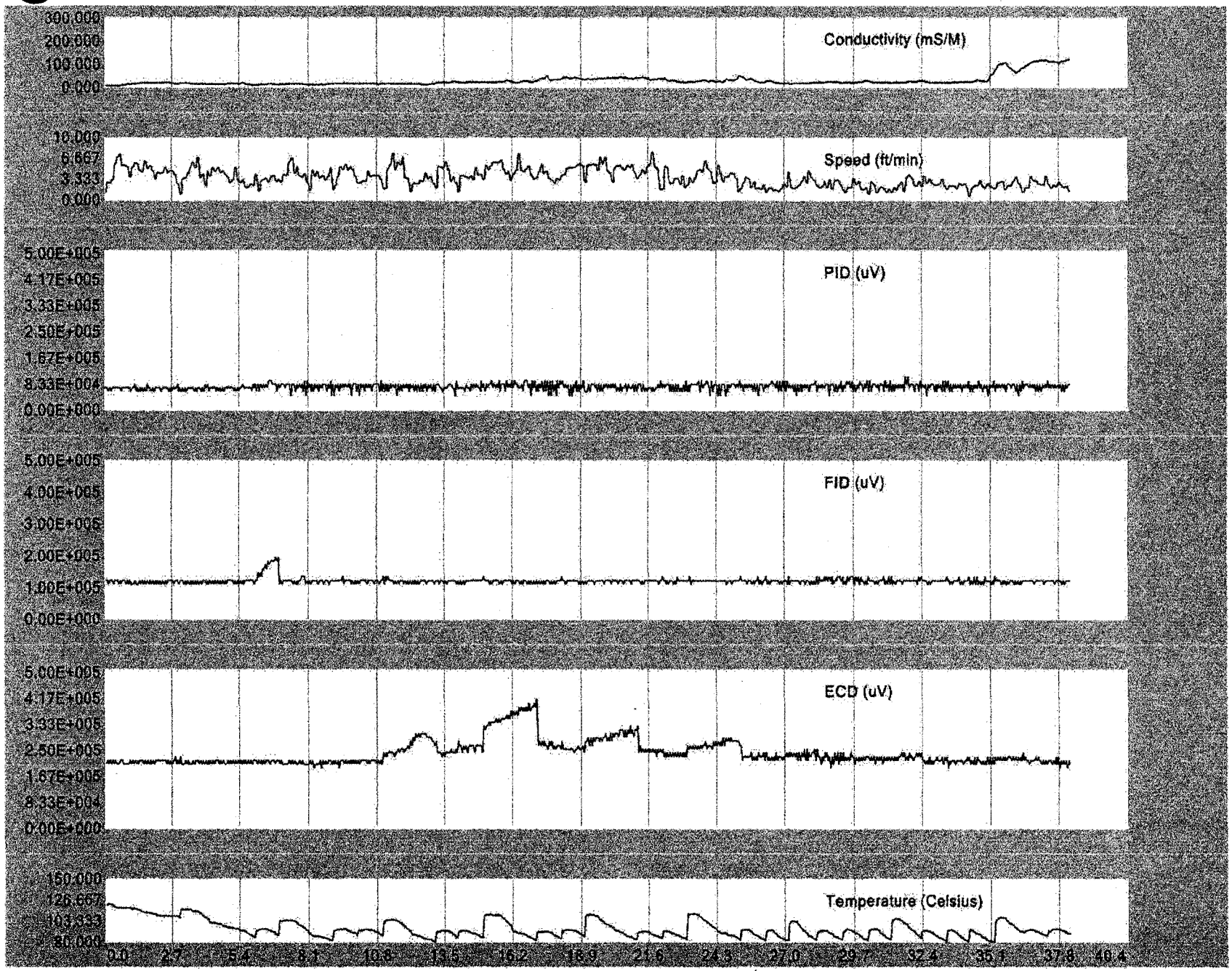

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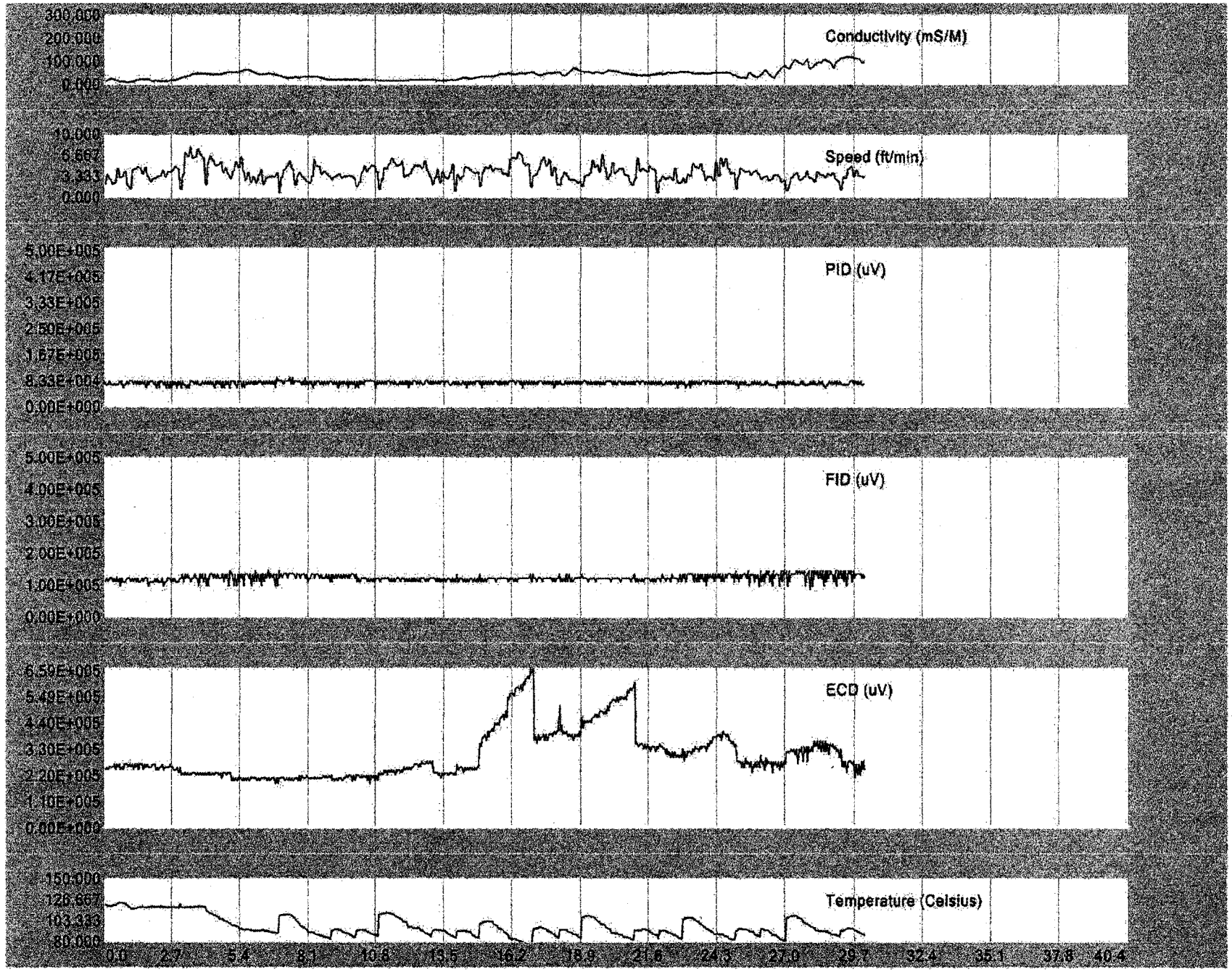

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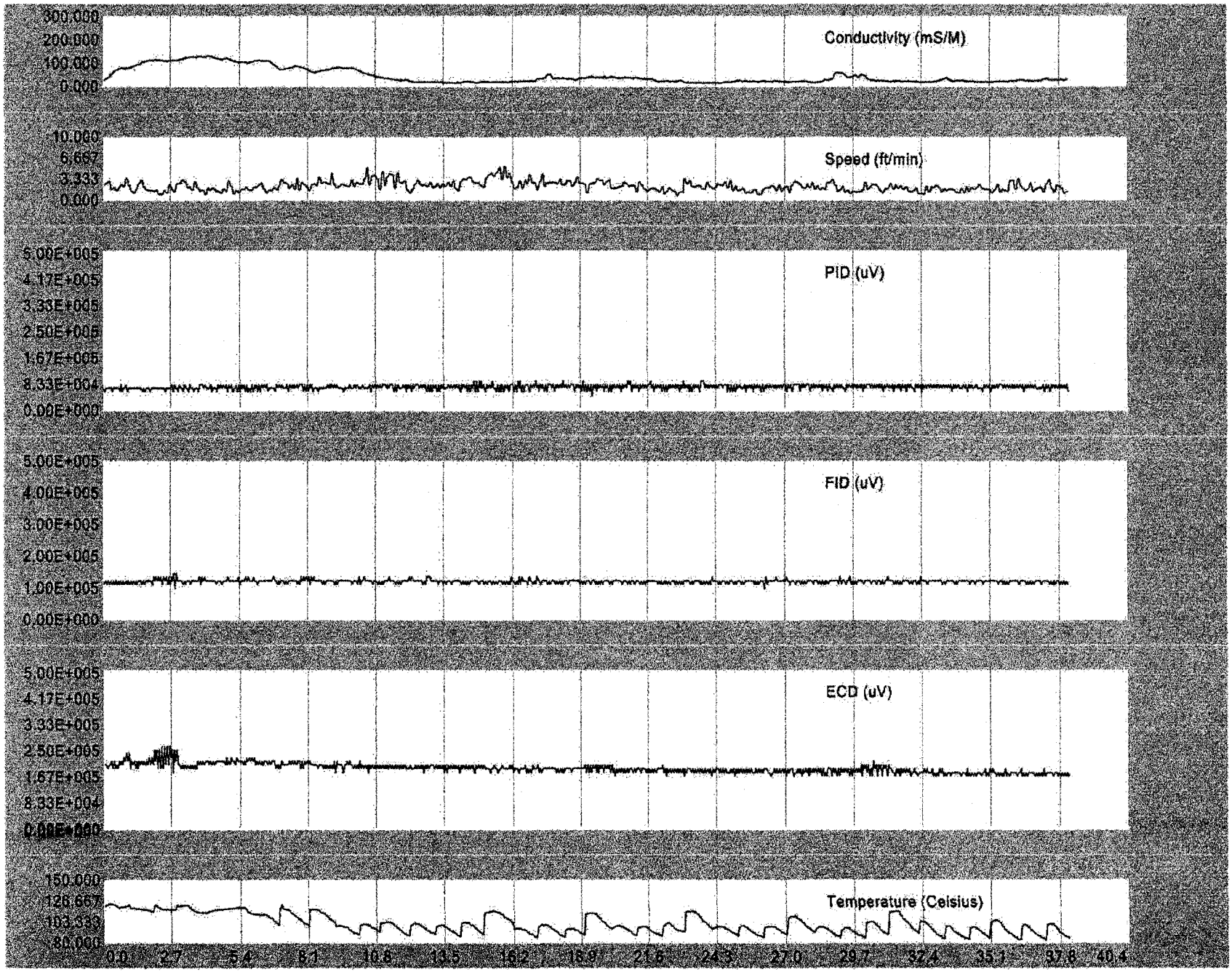

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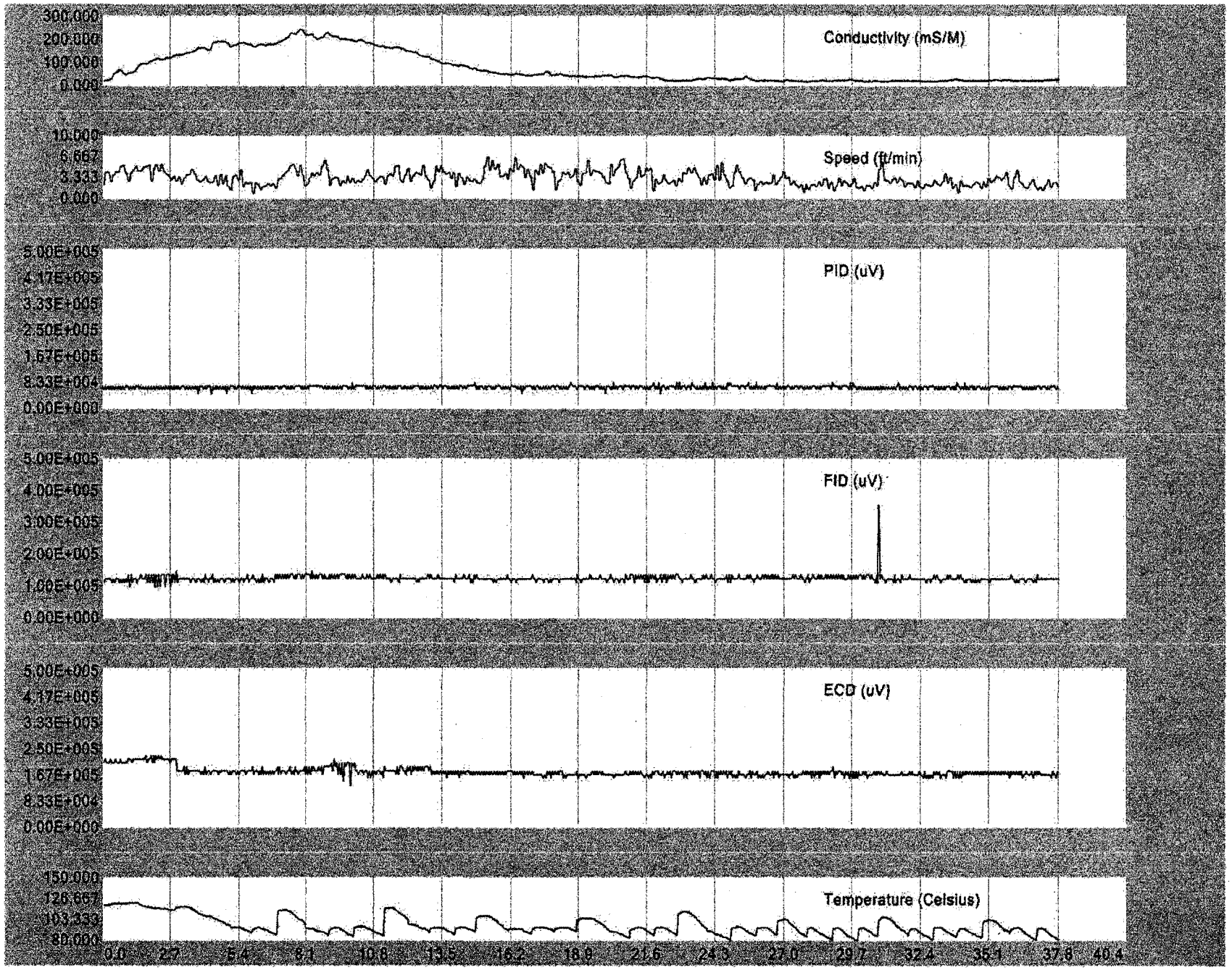

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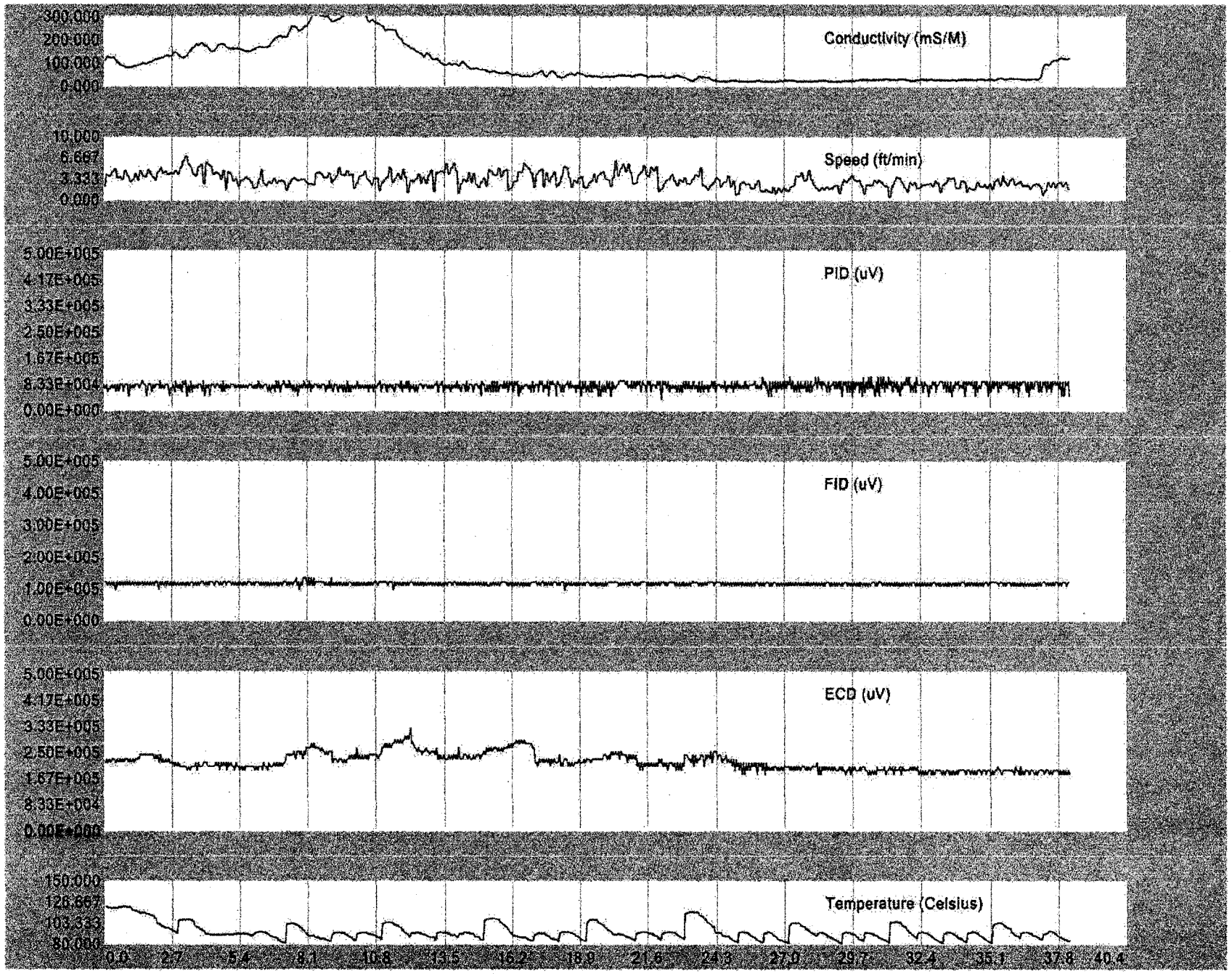

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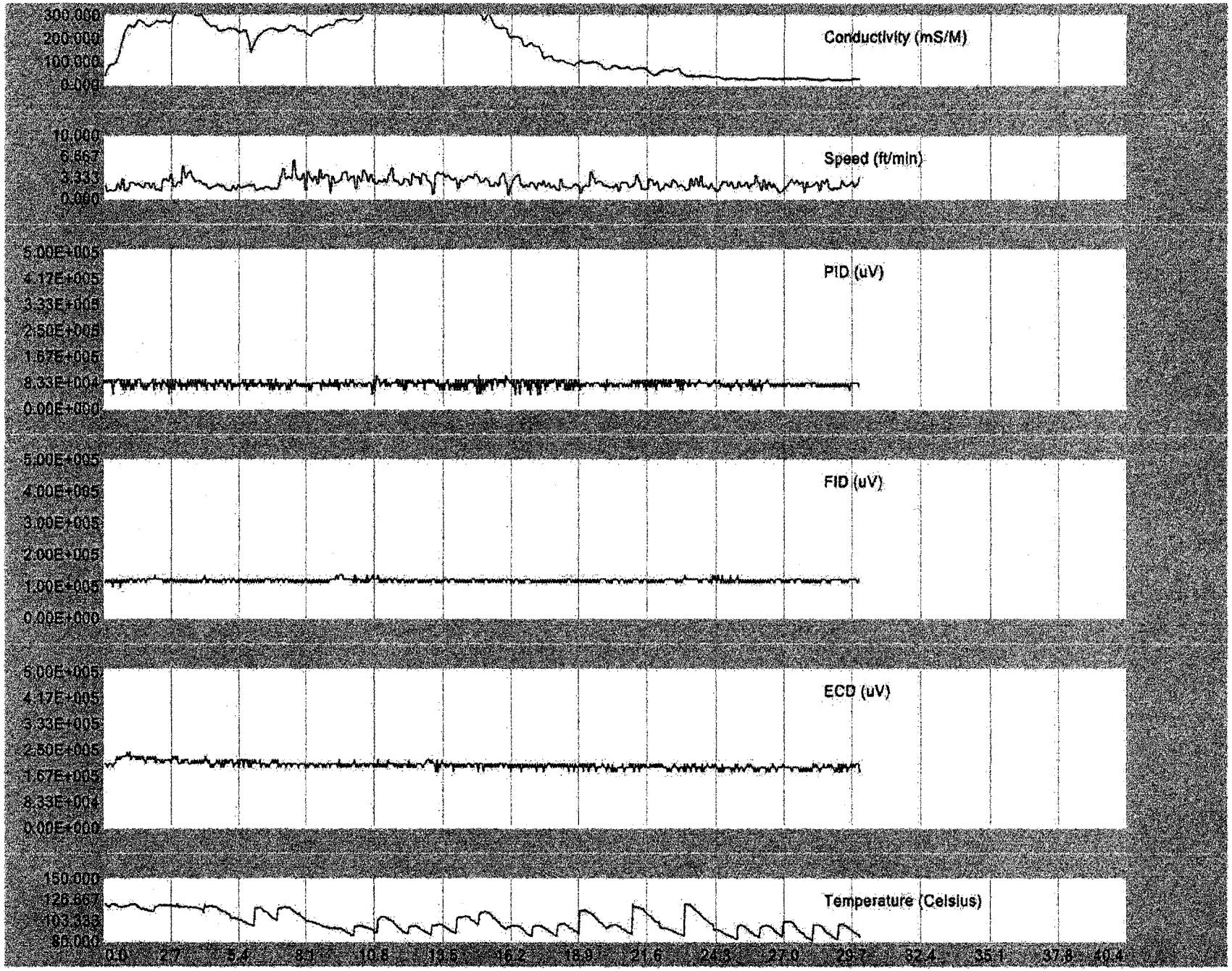

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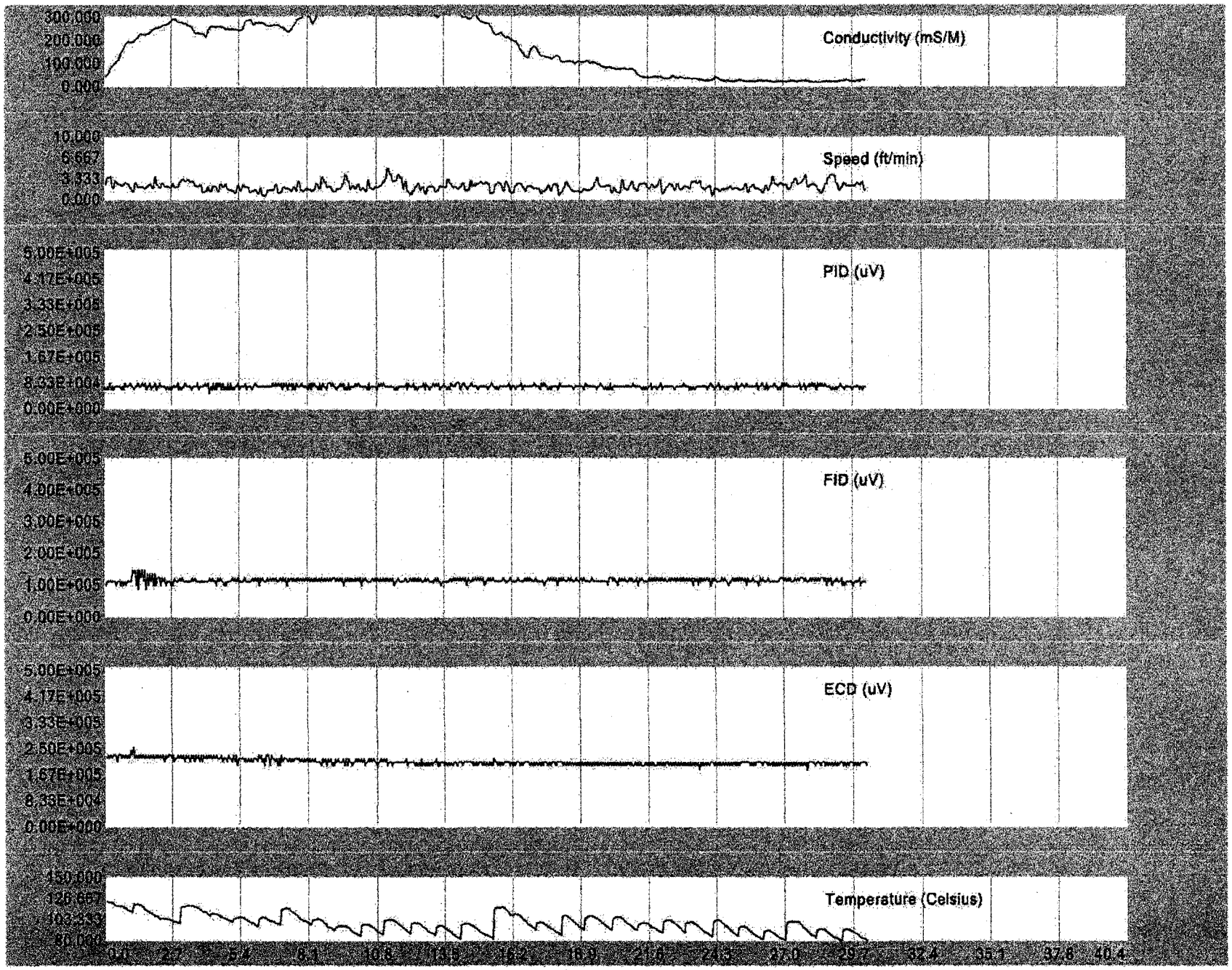

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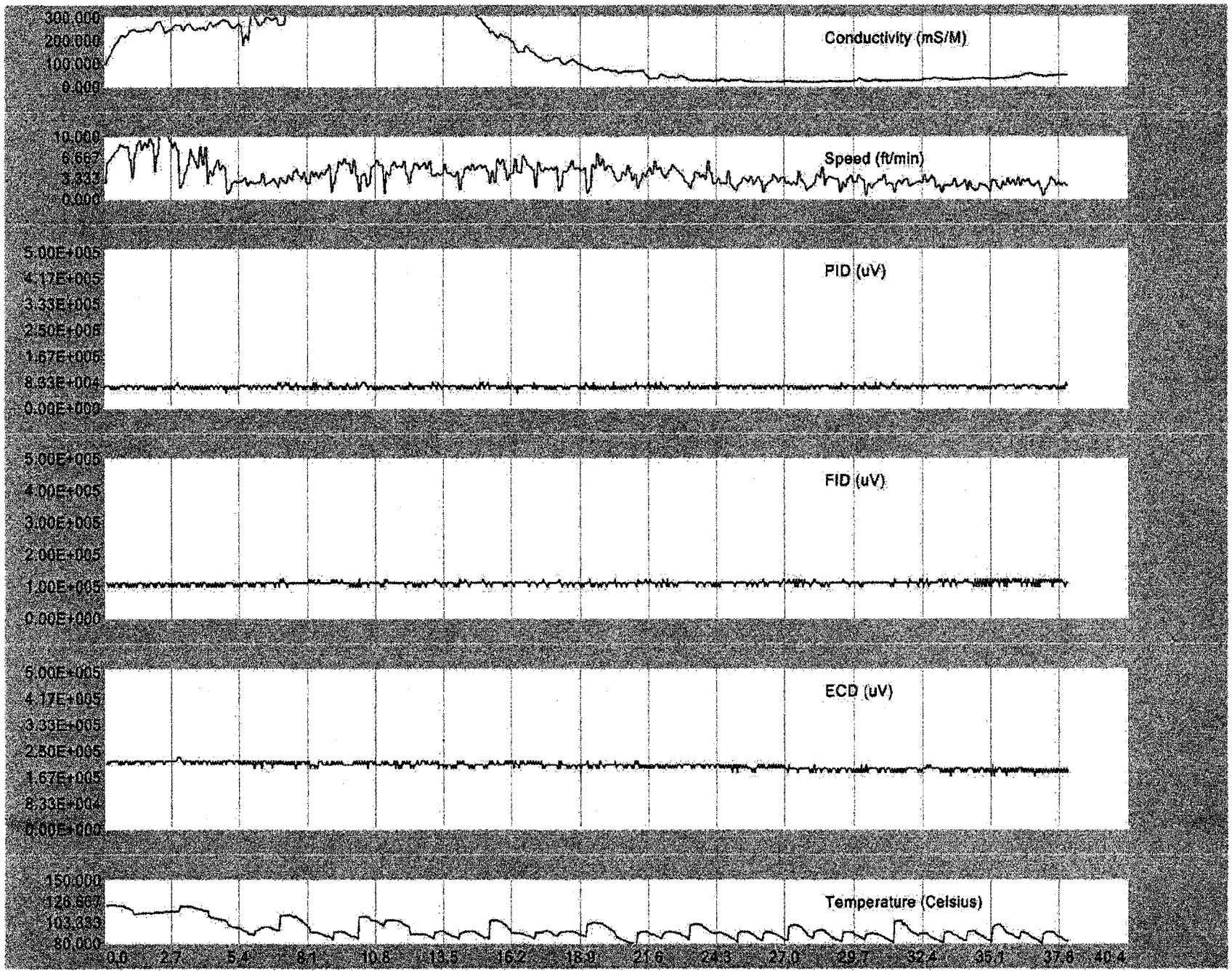

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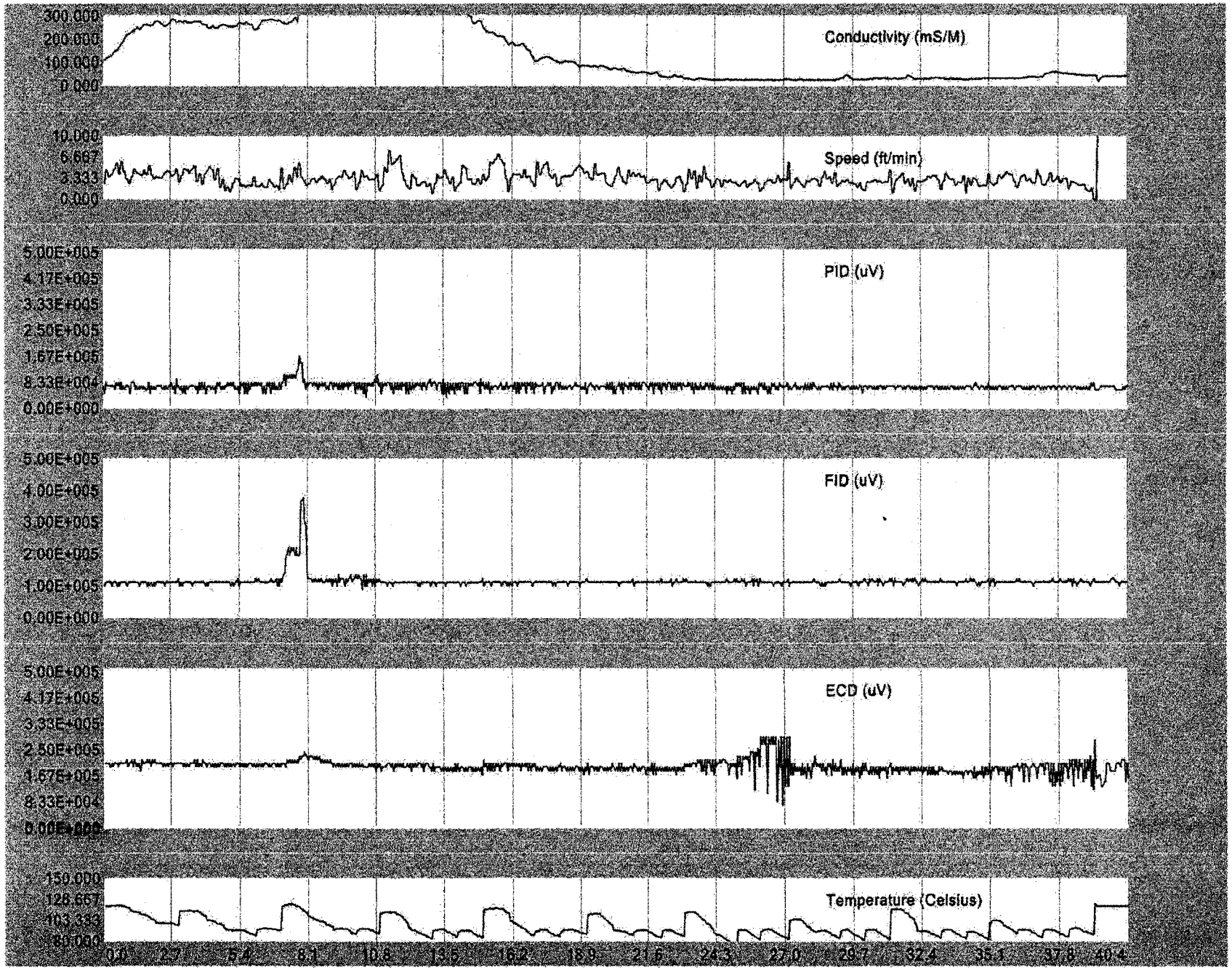

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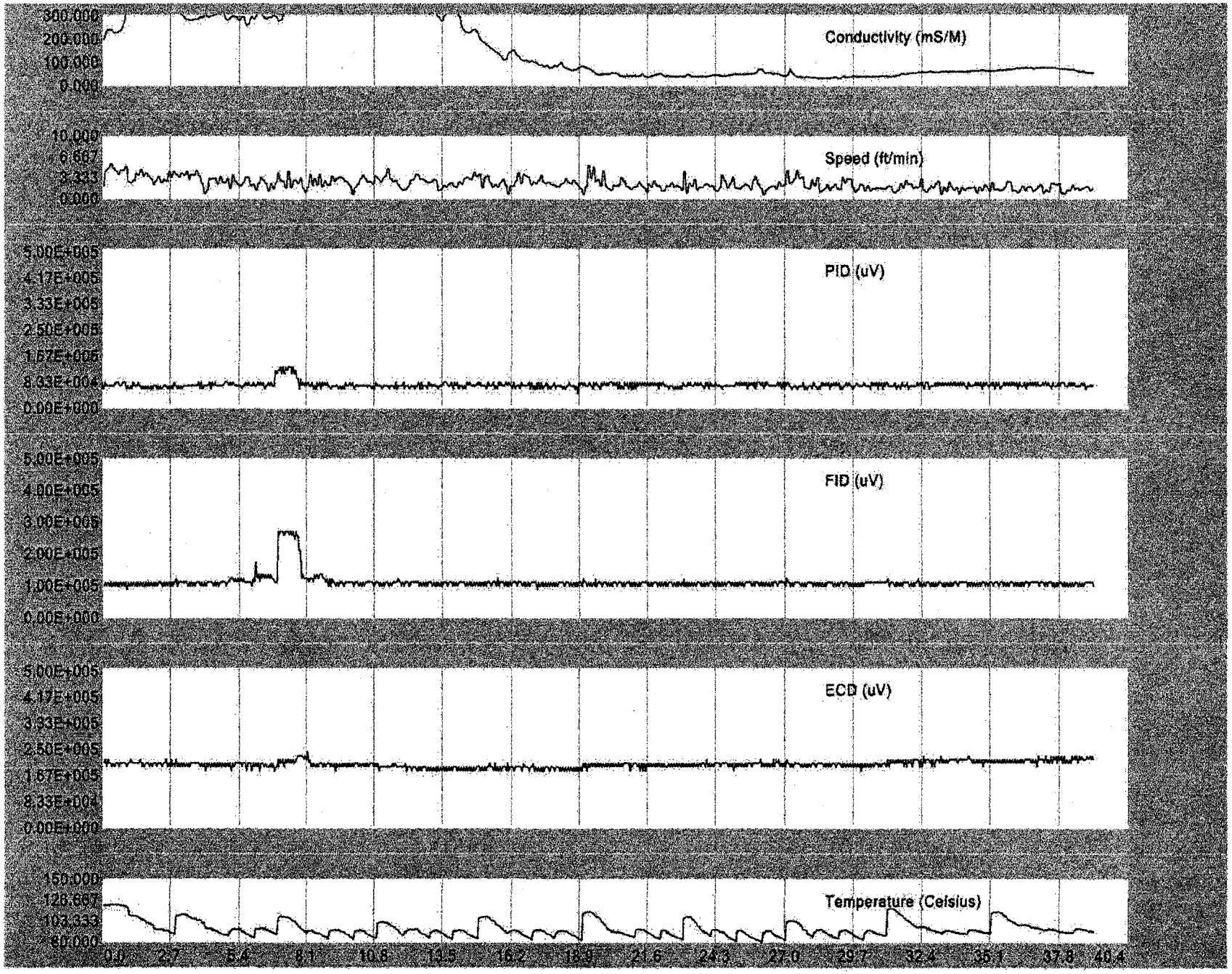

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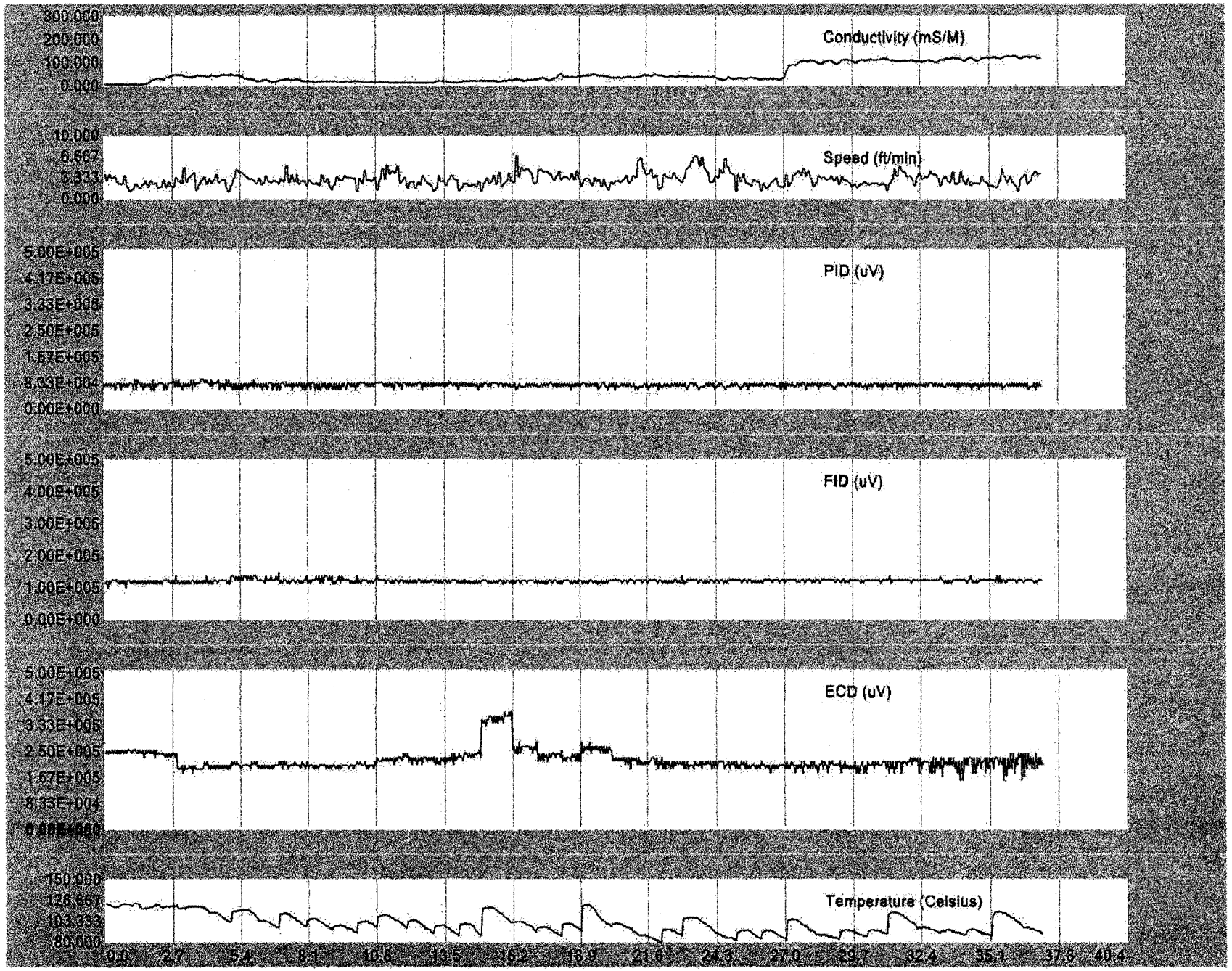

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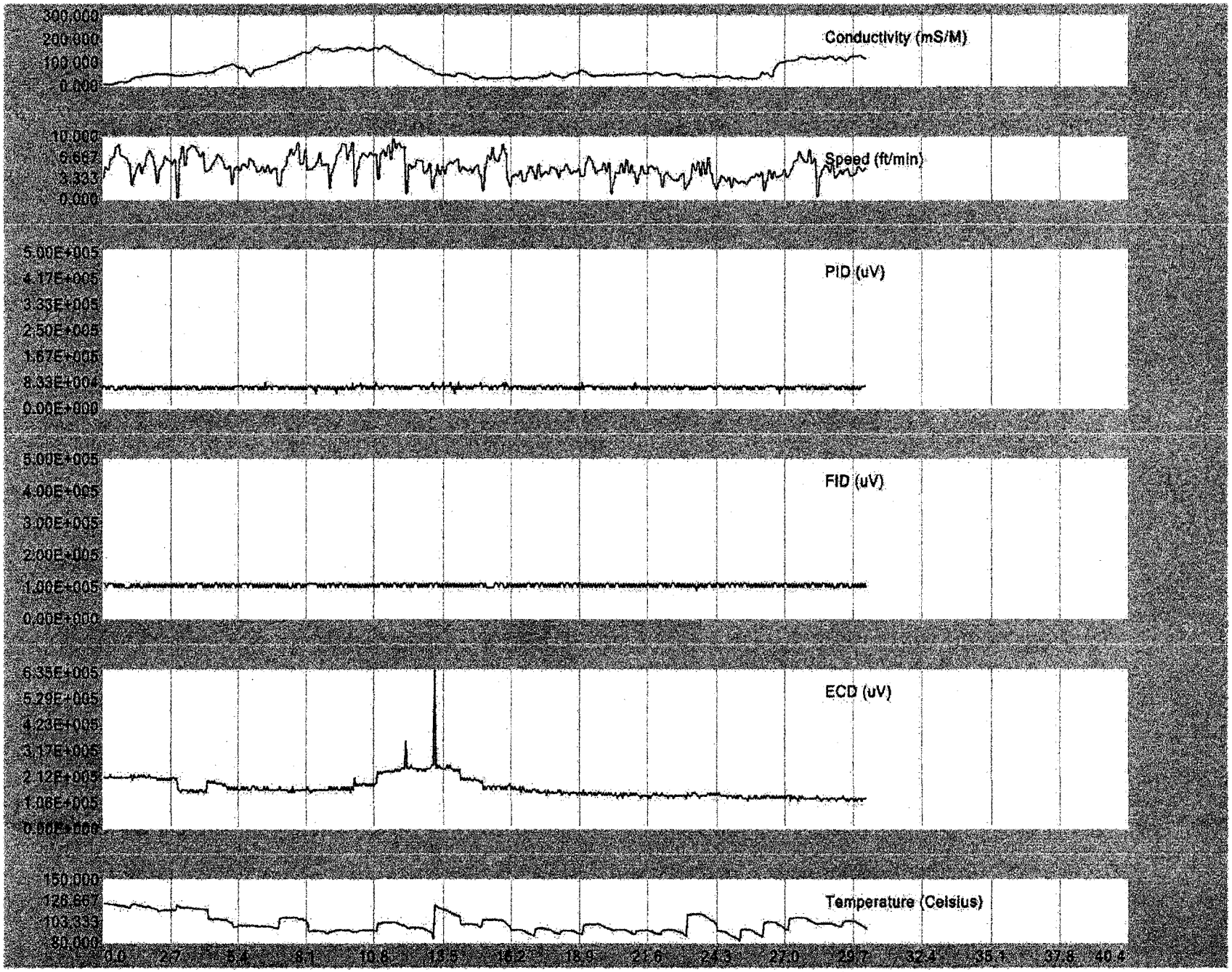

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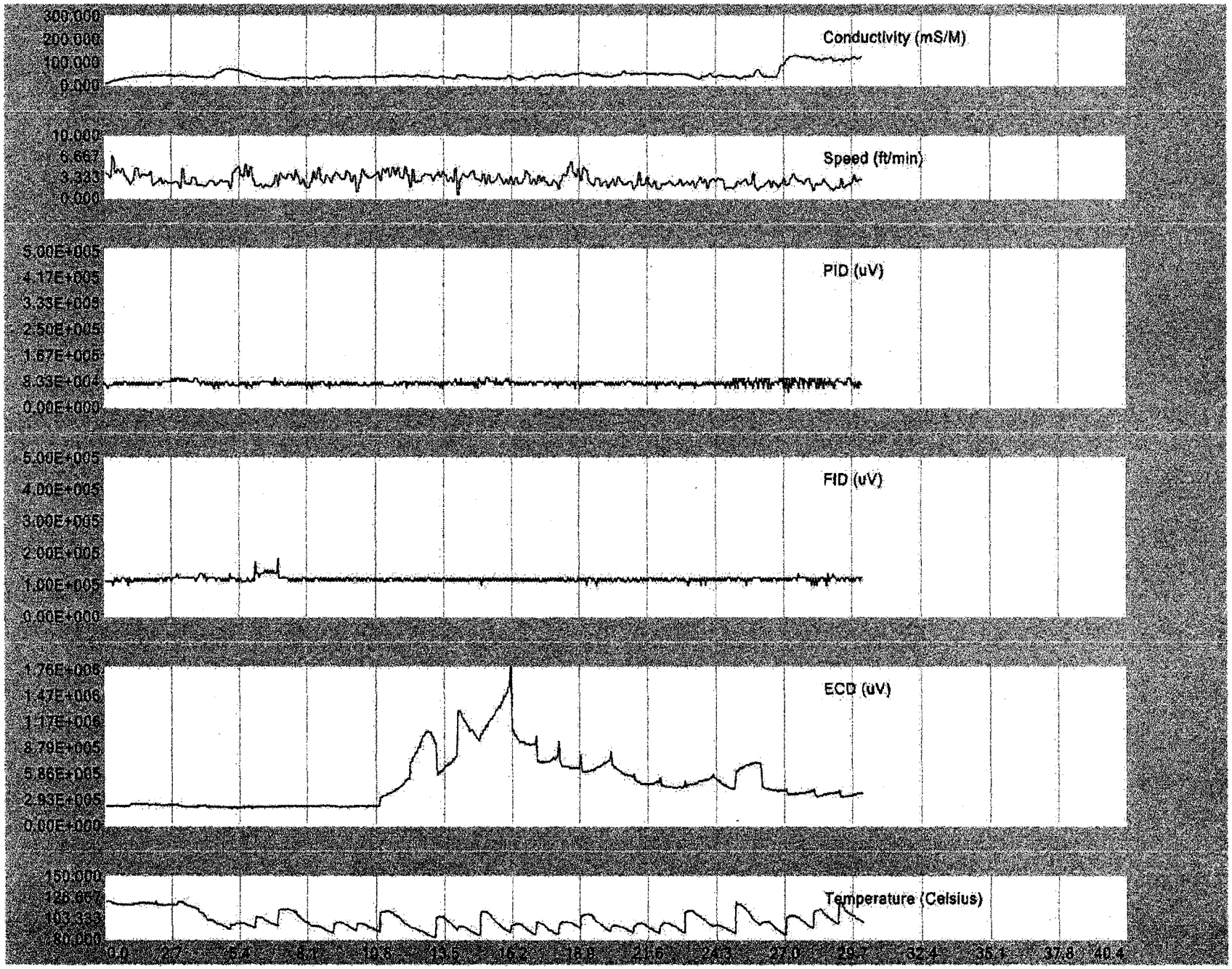

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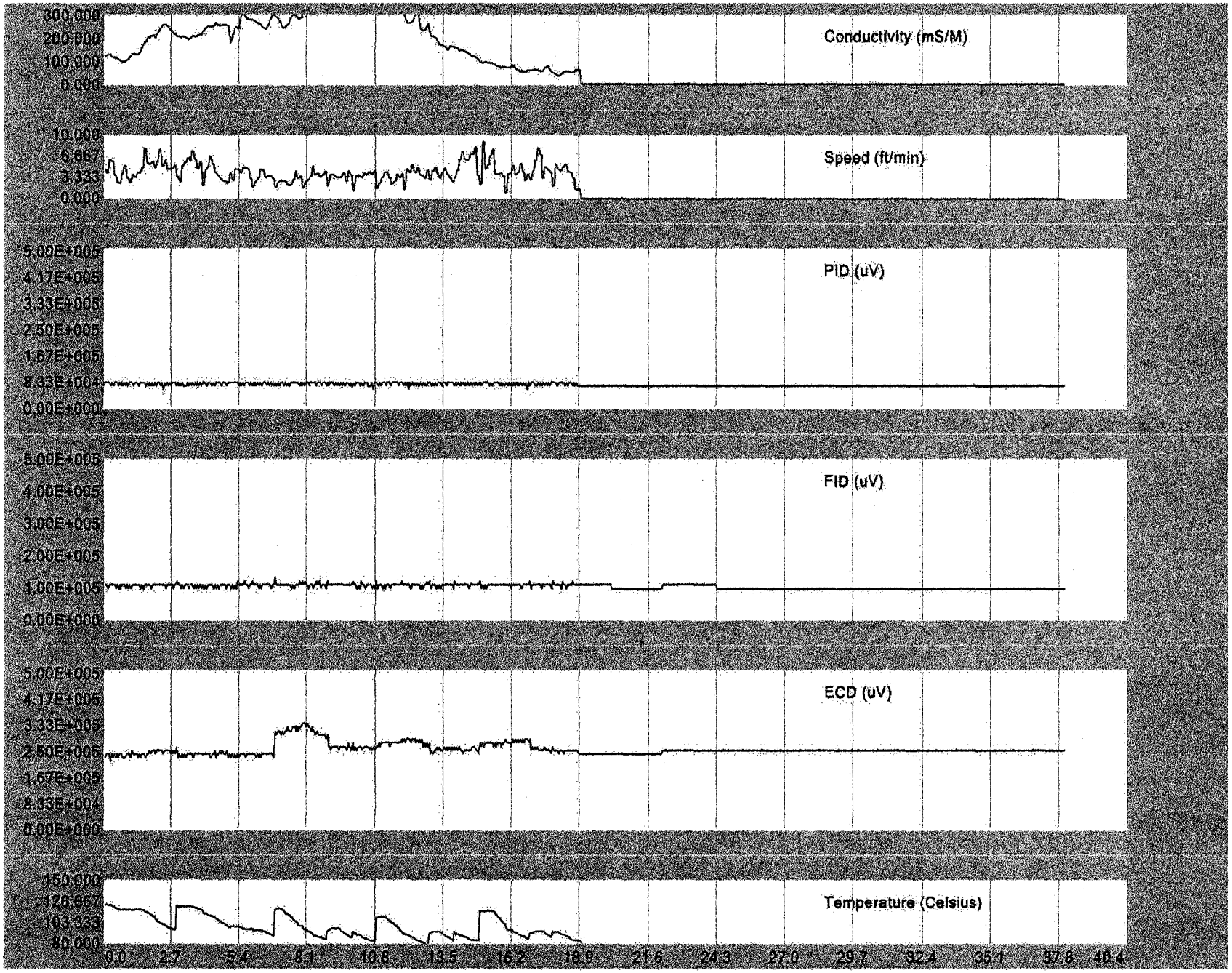

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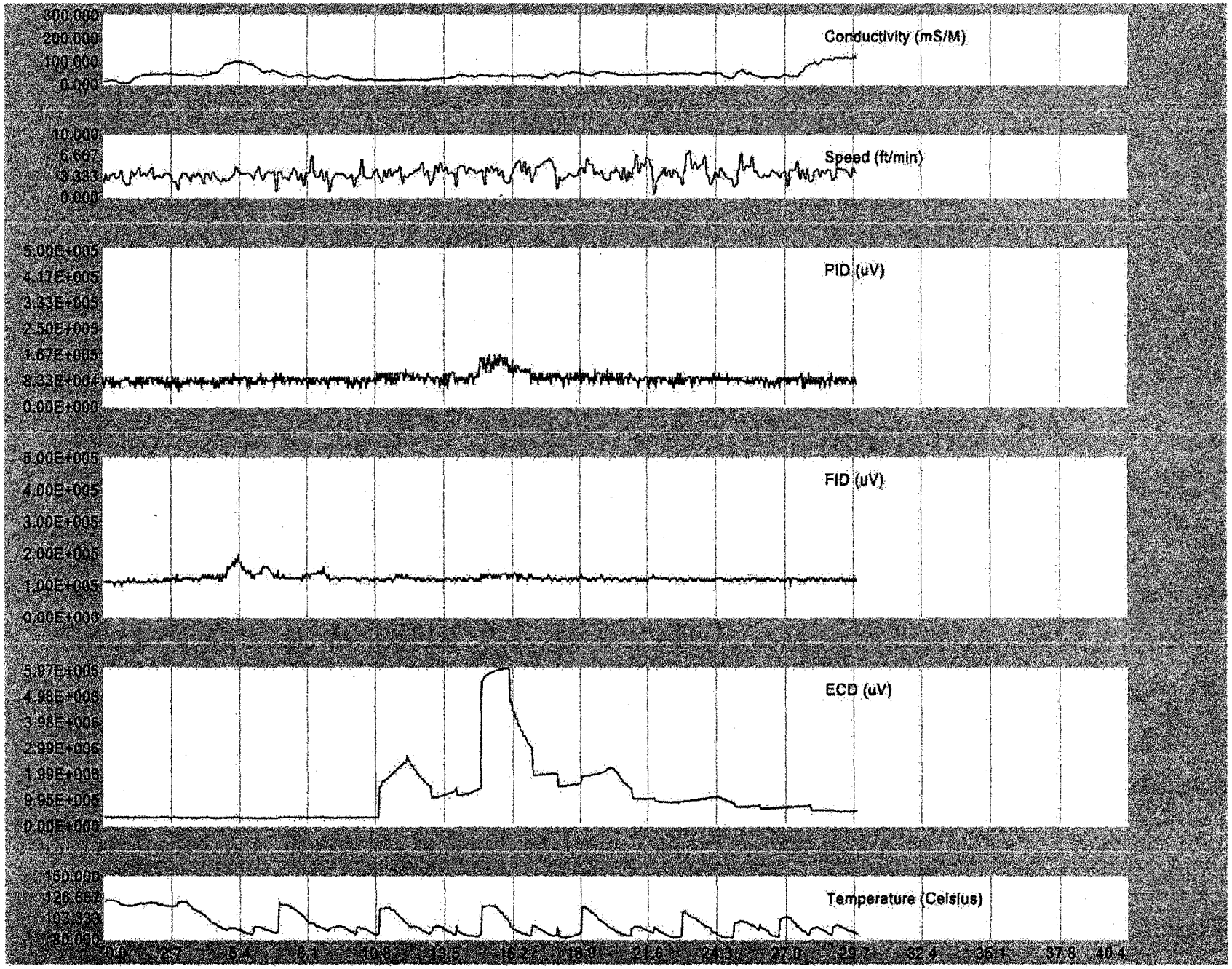

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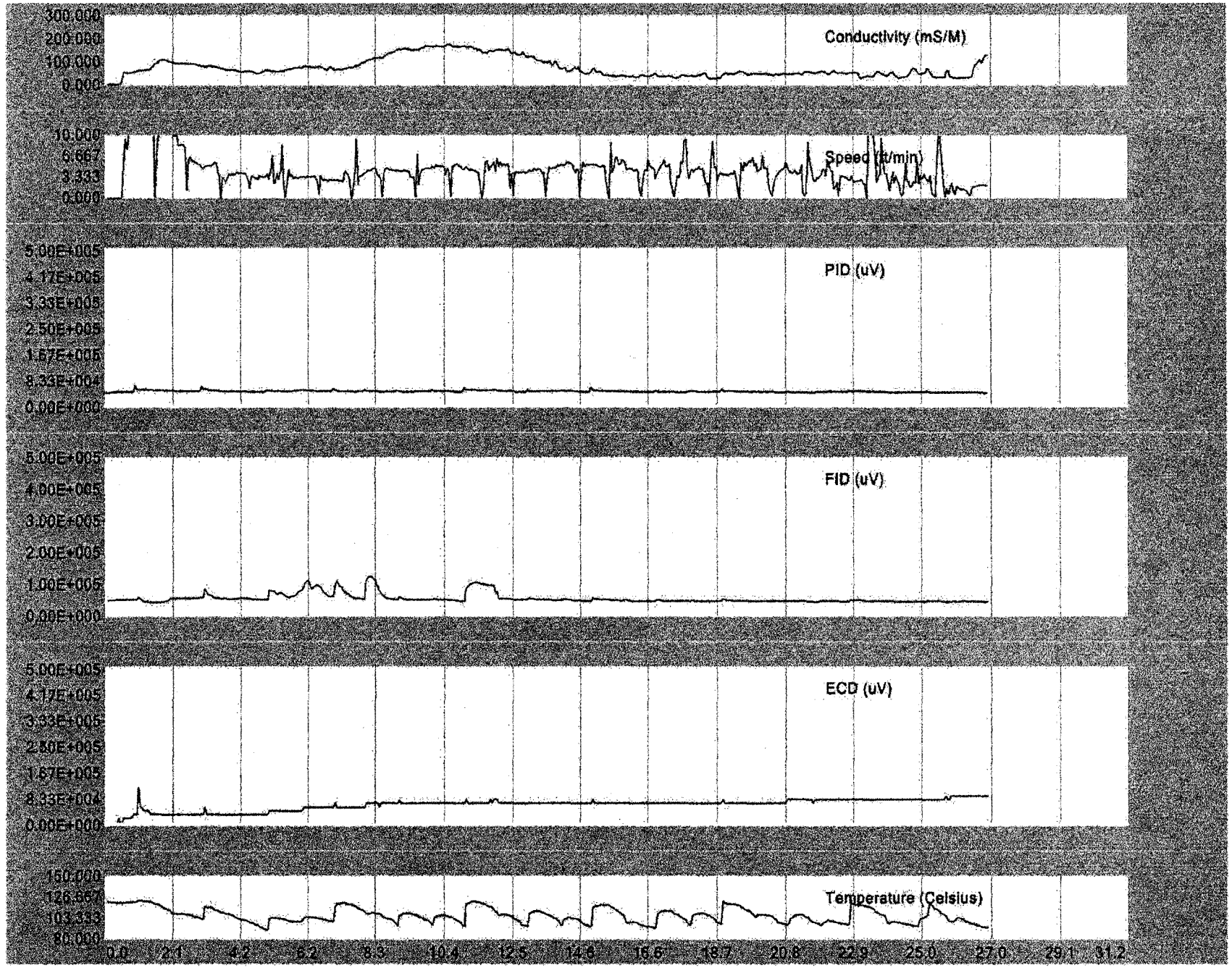

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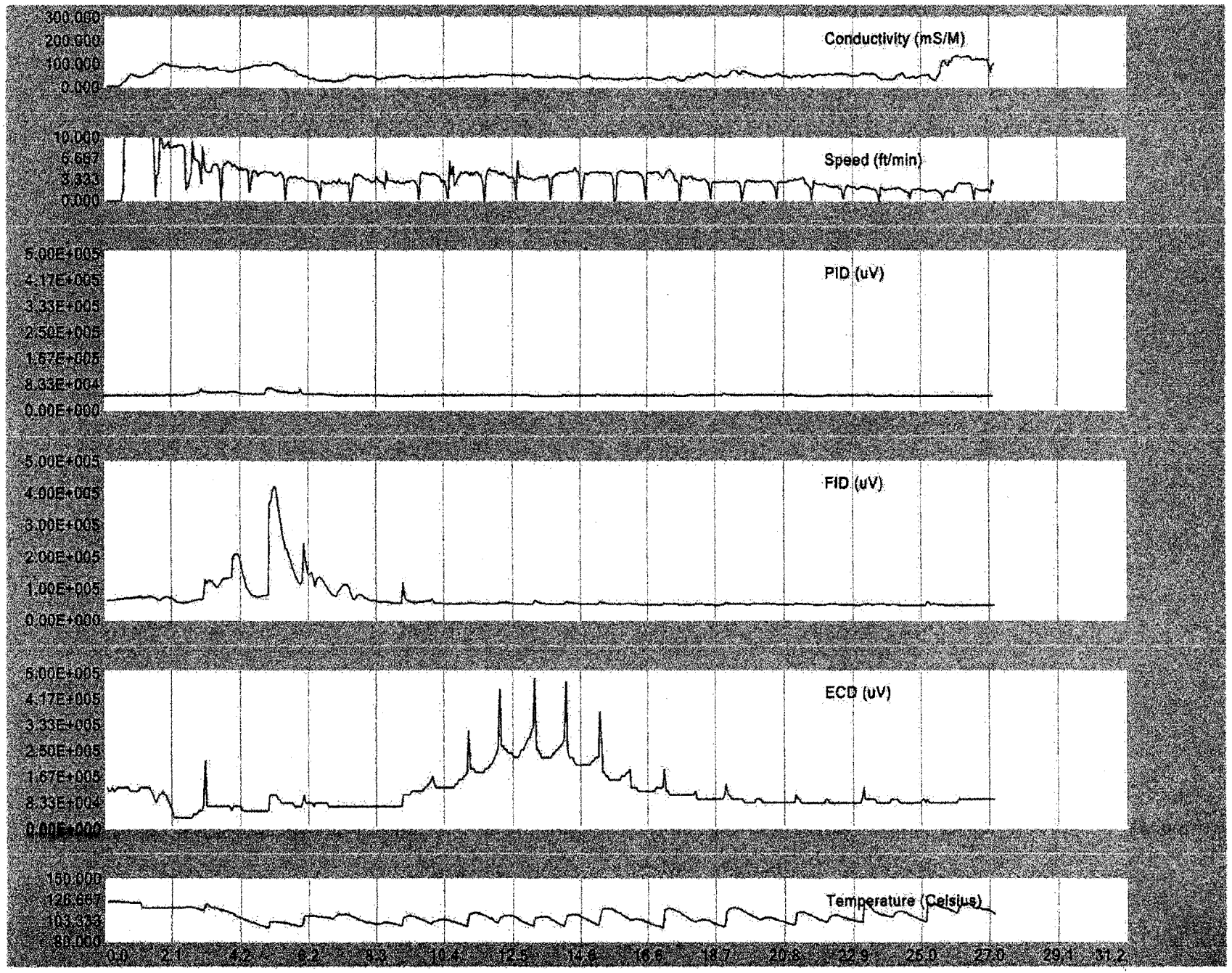

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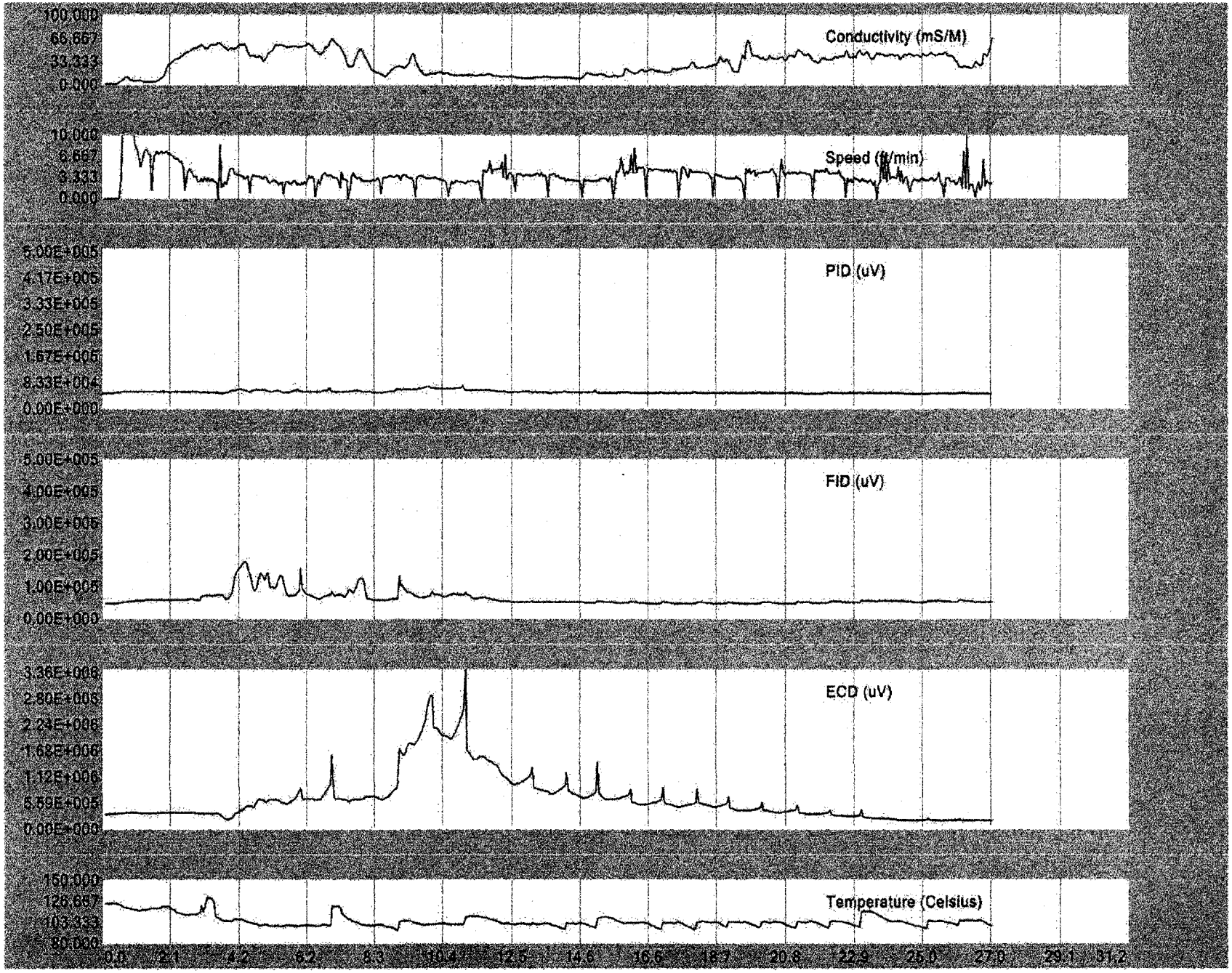

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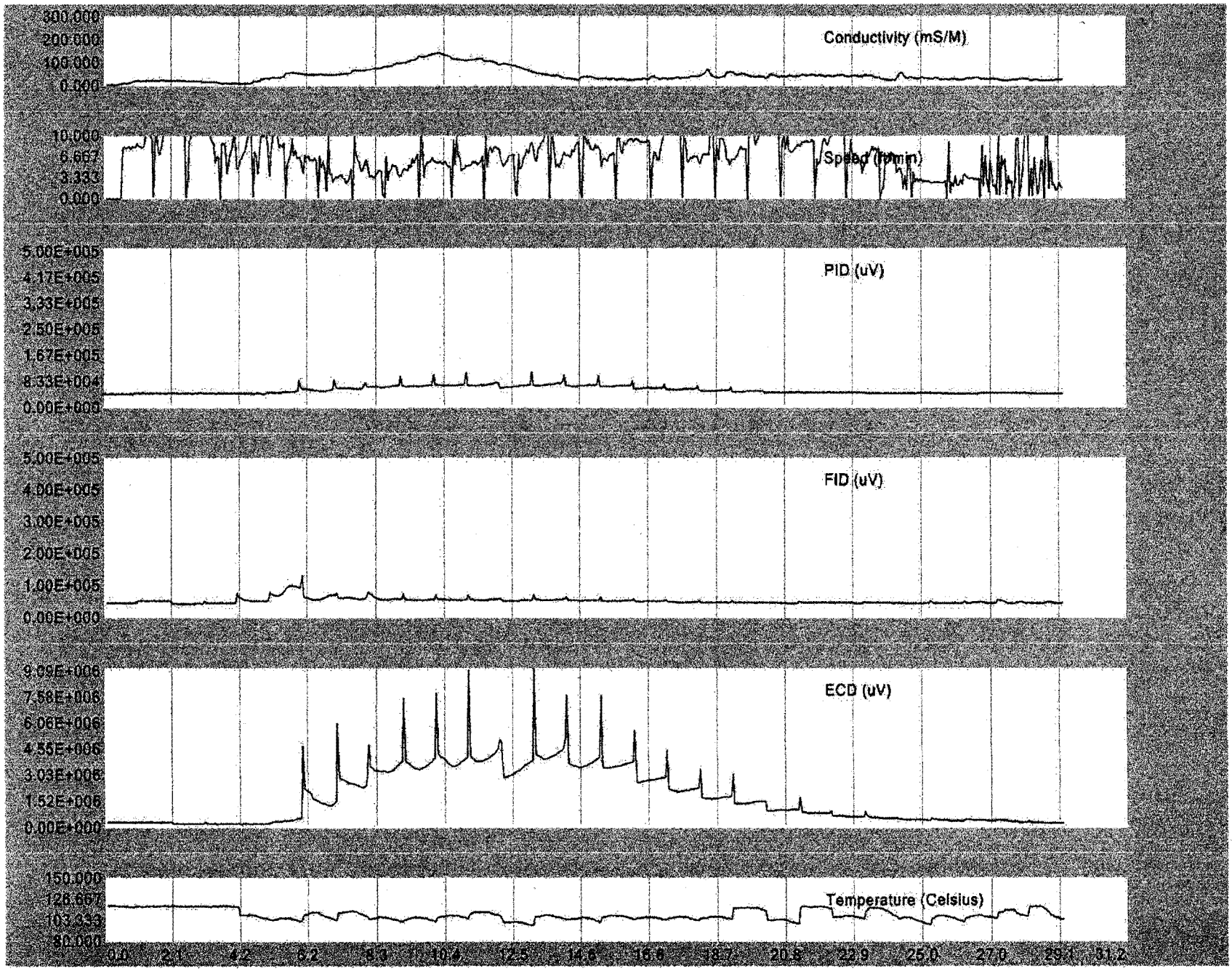

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SWMU 17 Revisit
01/11/05

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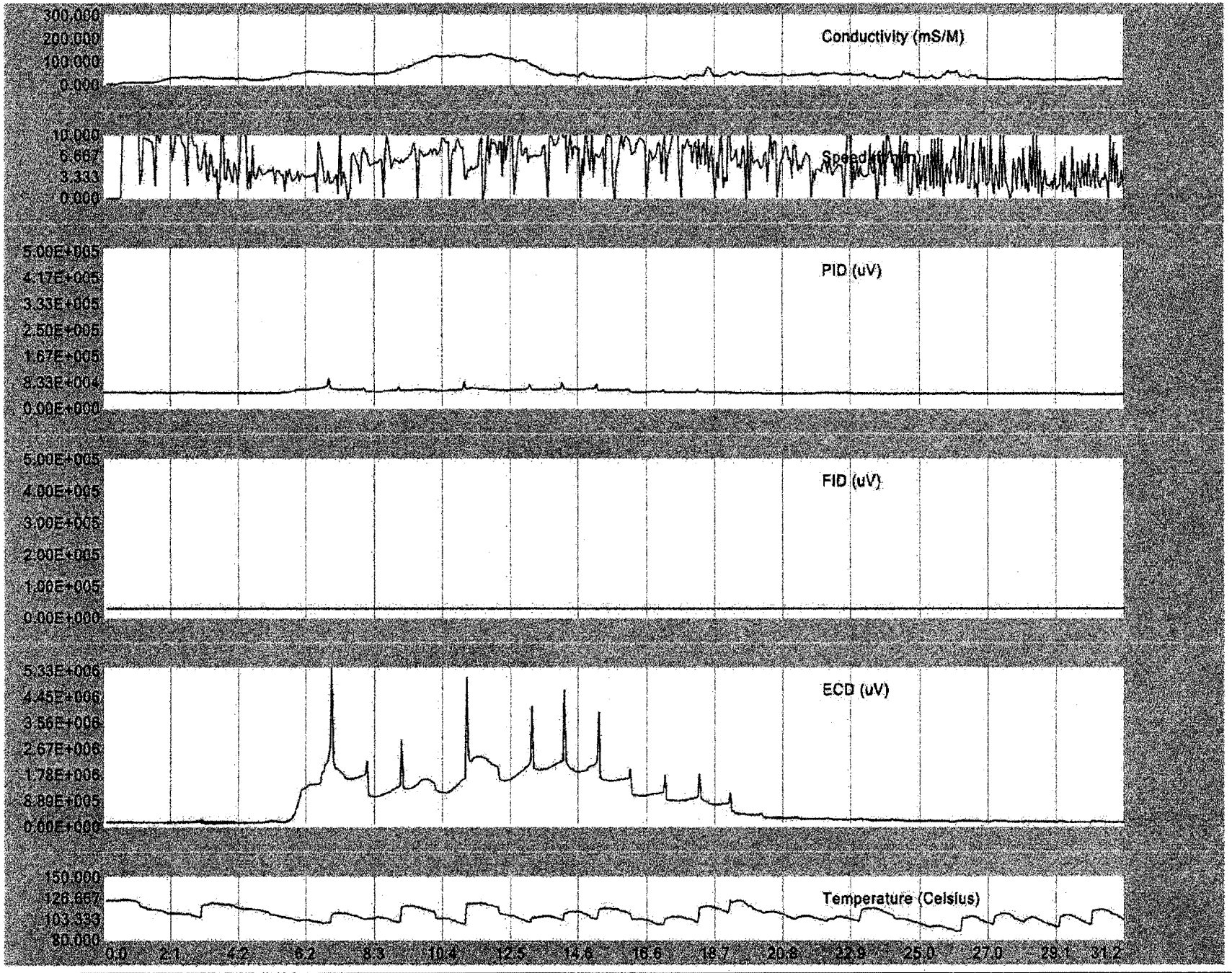
COLUMBIA TECHNOLOGIES

17MIP52



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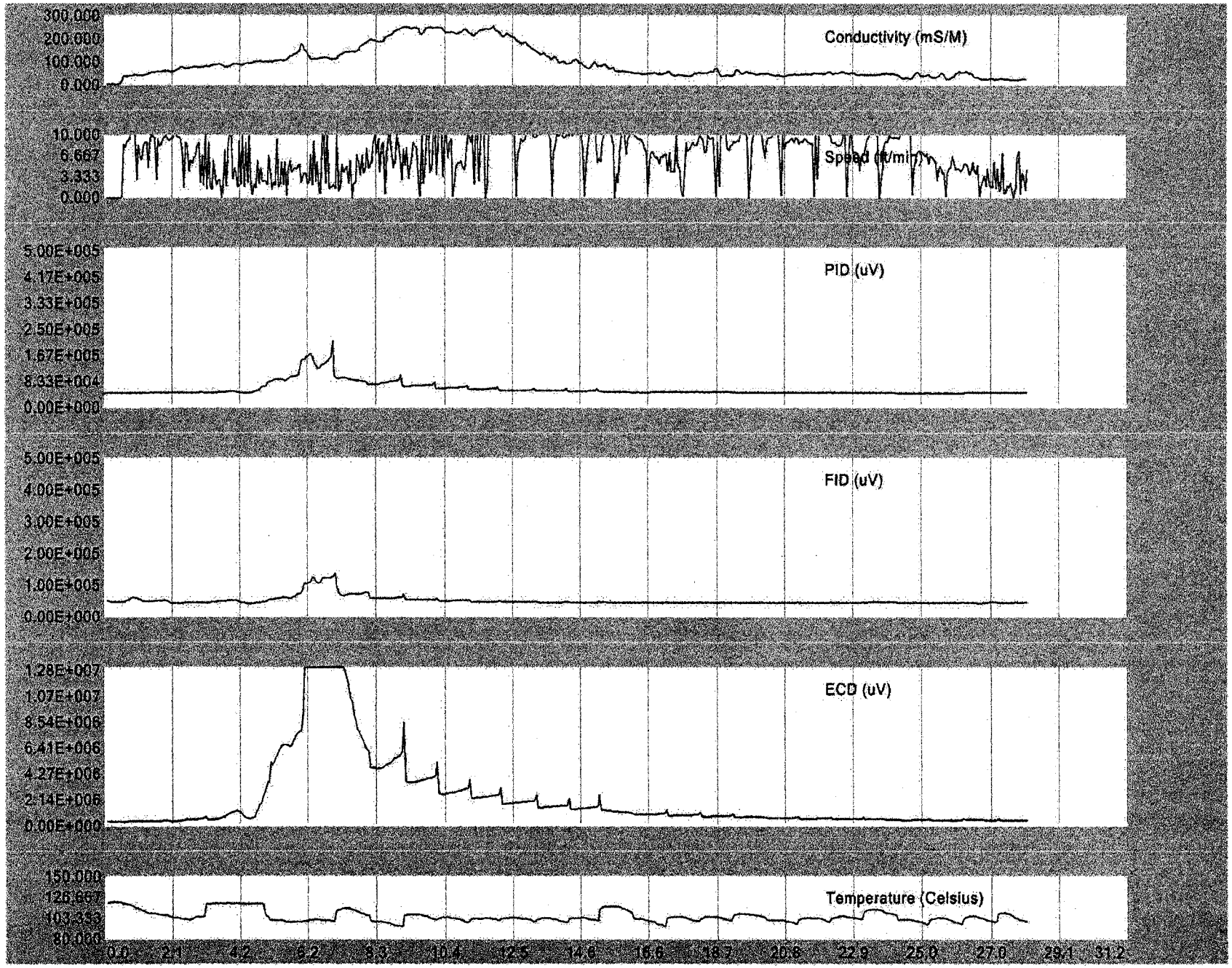

Tetra Tech
SWMU 17 Revisit
01/11/05

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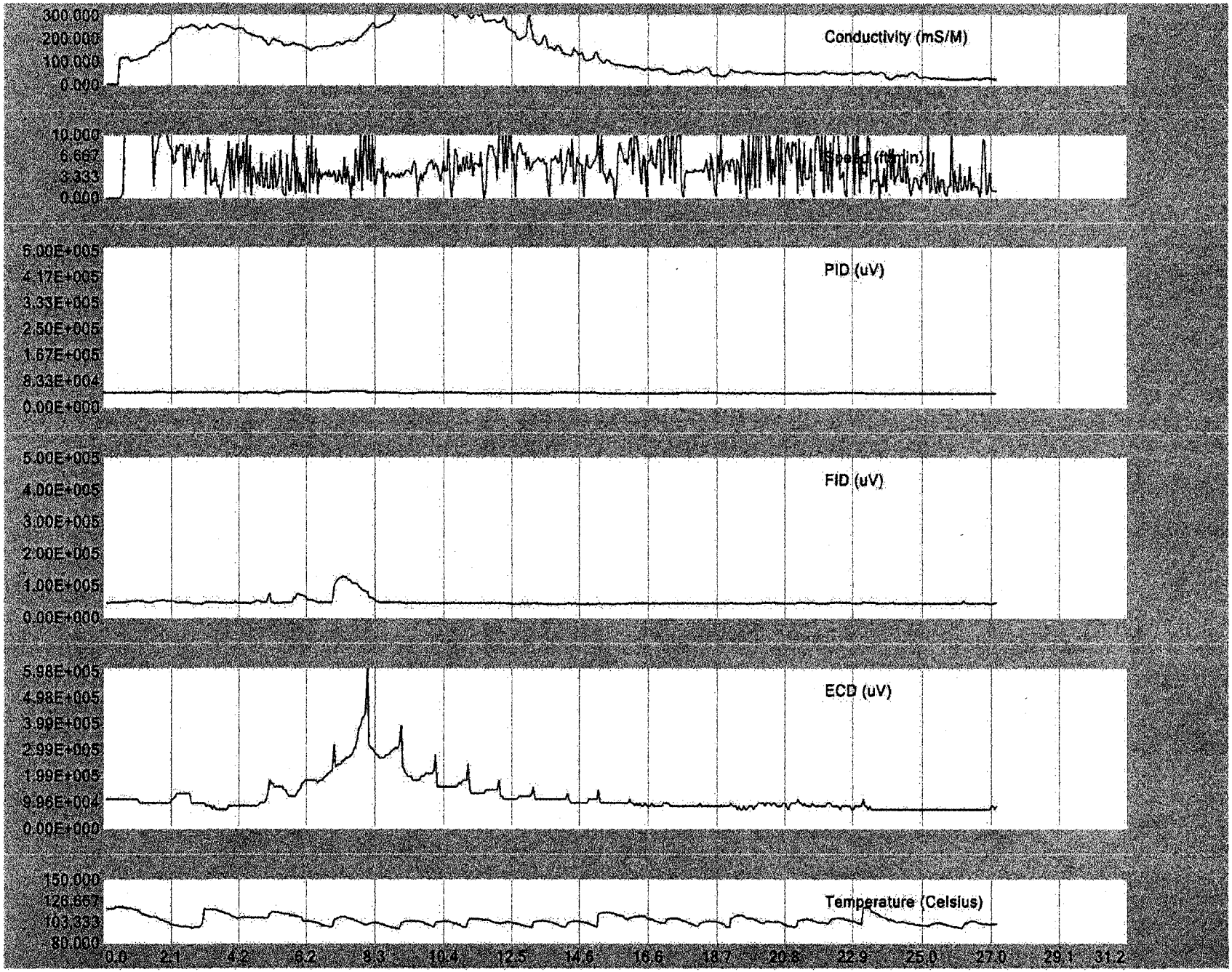
17MIP54



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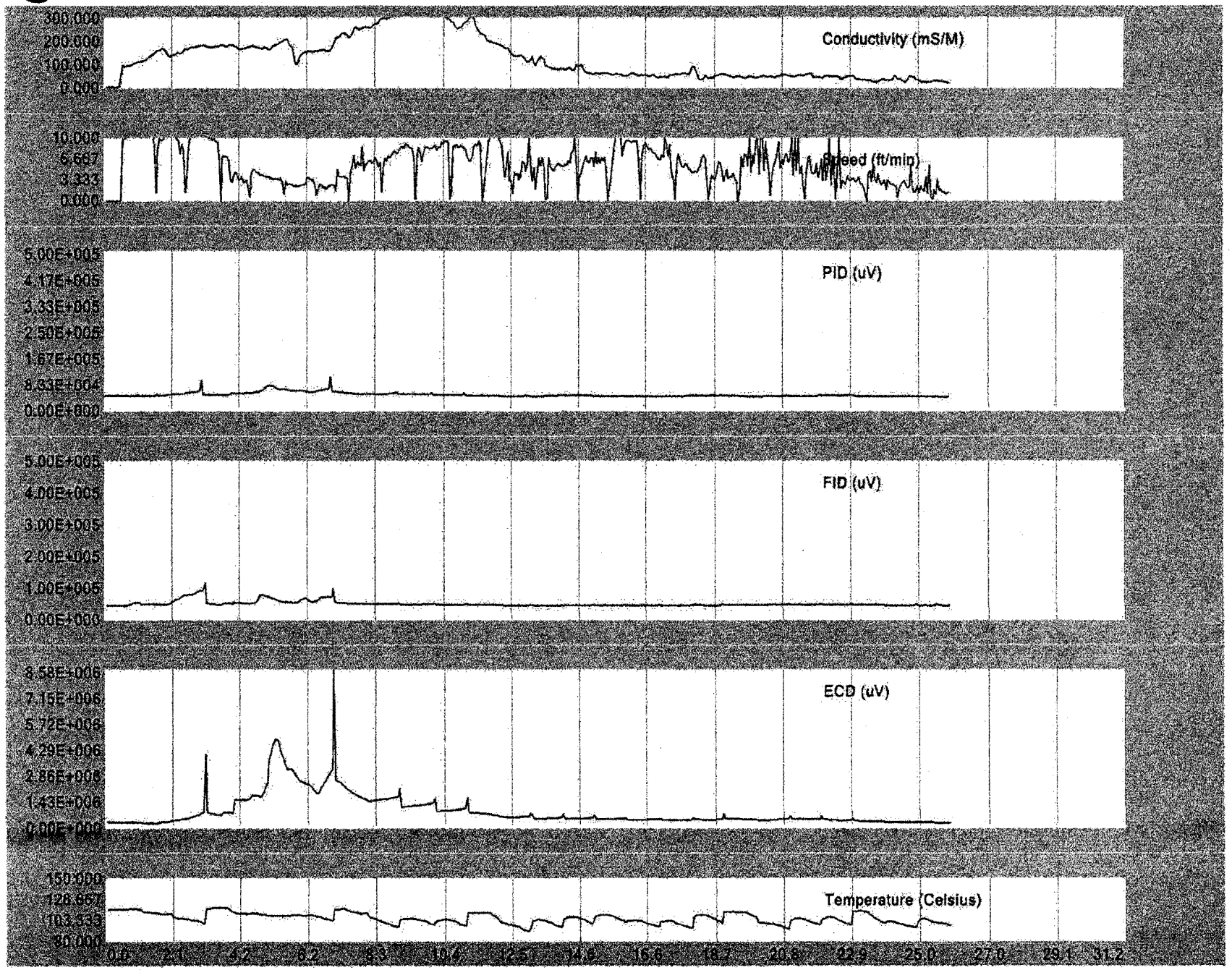
17MIP5



Tetra Tech
SWMU 17 Revisit
01/11/05

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COLUMBIA TECHNOLOGIES

APPENDIX C
REFERENCES

APPENDIX C-1
GEOPHYSICAL SURVEY REPORT

Tetra Tech EM Inc.

Memorandum

To: Tim Evans

From: Raye Lahti, P.G. Geophysicist

Date: 12/11/00

Re: NWS Charleston, Follow-up Geophysical Surveys

Follow-up geophysical surveys were conducted during November 2000 at Solid Waste Management Unit 16 (SWMU 16). The SWMU 16 had been previously surveyed during July 2000. Extremely hot weather, tidal waters and significant vegetation precluded completion of full definition of SWMU 16 using geophysical measurements during July.

At a NWS Charleston team meeting held during August 2000, a concensus was reached regarding goals for SWMU 16. The team decided that Tetra Tech NUS, Inc. (TtNUS) would complete the geophysical survey at SWMU 16 to the extent possible, based upon site conditions. Magnetometer and terrain conductivity surveys would be completed with a minimum of at least a reconnaissance survey to determine whether any additional sizeable anomalies exist, and map the general location.

During November, additional brush cutting and geophysical survey line preparations were conducted to meet the goals of the team meeting. It was determined that with some effort, survey lines could be cut sufficiently, at 50 foot intervals to define the SWMU 16. Survey lines were cut using a chain saw, brush axe, and other cutting tools.

Geophysical surveys were conducted using two geophysical instruments. The Geonics EM31 terrain conductivity meter was used to measure apparent ground conductivity to about 15 feet. Terrain conductivity surveys are often useful in determining the presence of trenches associated with land filling activities. Disturbance of the ground from excavations usually alters the local ground conductivity. In addition to terrain conductivity, the in-phase component of the measured EM31 electromagnetic field, an indication of the presence of metal was measured. A magnetic gradiometer survey was also conducted using a Geometrics 858 for the detection of ferrous metallic objects. Ferrous objects are sensed by a magnetometer to a distance that is related to the size of the object. For example, a 100 pound piece of ferrous metal may be sensed about 20-30 feet from the sensor, and a 5-pound piece of ferrous metal may only be sensed several feet from the sensor. A base station magnetometer was set up on the site and recorded the diurnal variation of the magnetic field.

Data from all geophysical instruments were stored on data logging devices, downloaded to a computer, and processed using geophysical mapping software to create color intensity anomaly maps and interpretation maps.

The geophysical surveys were conducted along lines spaced 50 feet apart. To avoid variations that may be caused by instrument drift, or natural changes in physical

measurement parameters, the entire area was resurveyed using the two geophysical methods. Figure 1 and Figure 2 provides the results of the EM31 apparent conductivity and in-phase data and Figure 3 provides the results of the magnetic gradiometer survey. On the anomaly maps, significant surface debris consisting of mounds, metallic and non-metallic objects, and other surface features are marked as "various debris". The interpreted extent or boundary of the SWMU 16 derived from the geophysical surveys and physical inspection of the site is presented as a bold line surrounding the anomalous areas, and areas of surface debris.

SWMU 16 Results

The area surveyed for SWMU 16 was about 700 feet in the northwest-southeast direction, and 1000 feet in the southwest-northeast direction. An arbitrary grid was laid out roughly southwest to northeast. A land survey has been completed, and results are pending. This data will be used to translate the geophysical survey data to true land coordinates. Lines were measured off of a base line oriented about north 55 degrees west. The original July base line was cut beginning from about 30 feet from the fence line and started about 500 feet south of a road intersection north of the access gate to the site. Because line spacing is 50 feet on this survey of SWMU 16, areas between lines may contain anomalies that were not sensed by the geophysical instrumentation. The interpreted extent of potential landfill activities is presented as a dark line on each geophysical map, (see Figures 1, 2 and 3). Scattered surface metal, and other surface debris are also marked on the maps.

EM31 Data

The EM31 apparent conductivity map is shown as Figure 1. High apparent conductivity measurements are dominant in the southwestern portion of the survey area. This anomalous trend is likely a cause primarily from high salinity in the soils. Some anomalous areas also are a result of scattered subsurface disturbance caused by landfill activities. Lower conductivity measurements in the northeastern portion of the survey area are a result of soils not influenced by salt-water intrusion. A trend of very low, less than 12 milli-Siemens-per-meter, is marked as the edge of dumping area. This area trends roughly north-south, and is evident on the ground surface as an abrupt change in topography, and visible dumping.

The EM31 in-phase data, measured as a change from the primary field in parts-per-thousand, shows anomalous trends similar to the apparent conductivity data. The measurements are high in-phase toward the south-west, and lower in-phase response toward the northeast. Although the in-phase data is an indicator of metal, verification of anomalous areas using the magnetometer may be more reliable for detecting ferrous metals.

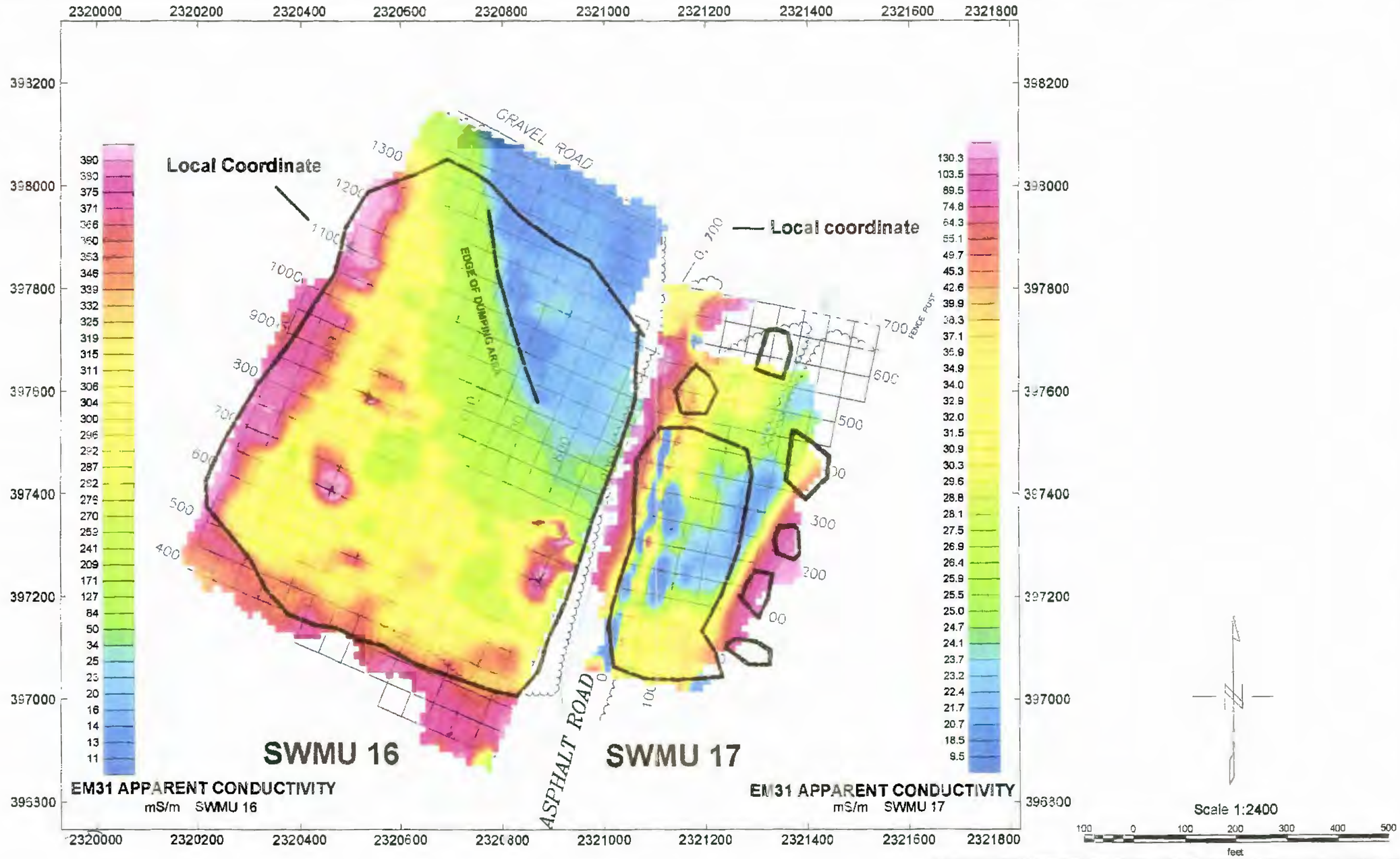
Magnetic Gradient Data

The vertical magnetic gradient data is presented in Figure 3. Anomalous gradient data is widespread throughout the survey area. The anomalous vertical magnetic gradient diminishes at the interpreted boundary line. The boundary of the SWMU 16 is interpreted as illustrated on Figure 3.

Conclusions

The extent of SWMU 16 is defined by the use of apparent conductivity and in-phase data from the Geonics EM31 and from vertical magnetic gradient data collected by a Geometrics 858 cesium vapor magnetometer. In addition, site conditions including tidal areas toward the west and south of the site provide evidence that it would be unlikely that landfill practices continued in these areas. A clear boundary is evident in the geophysical data on

the north. The eastern boundary is restricted by the fence line and roadway, and the adjacent SWMU 17.



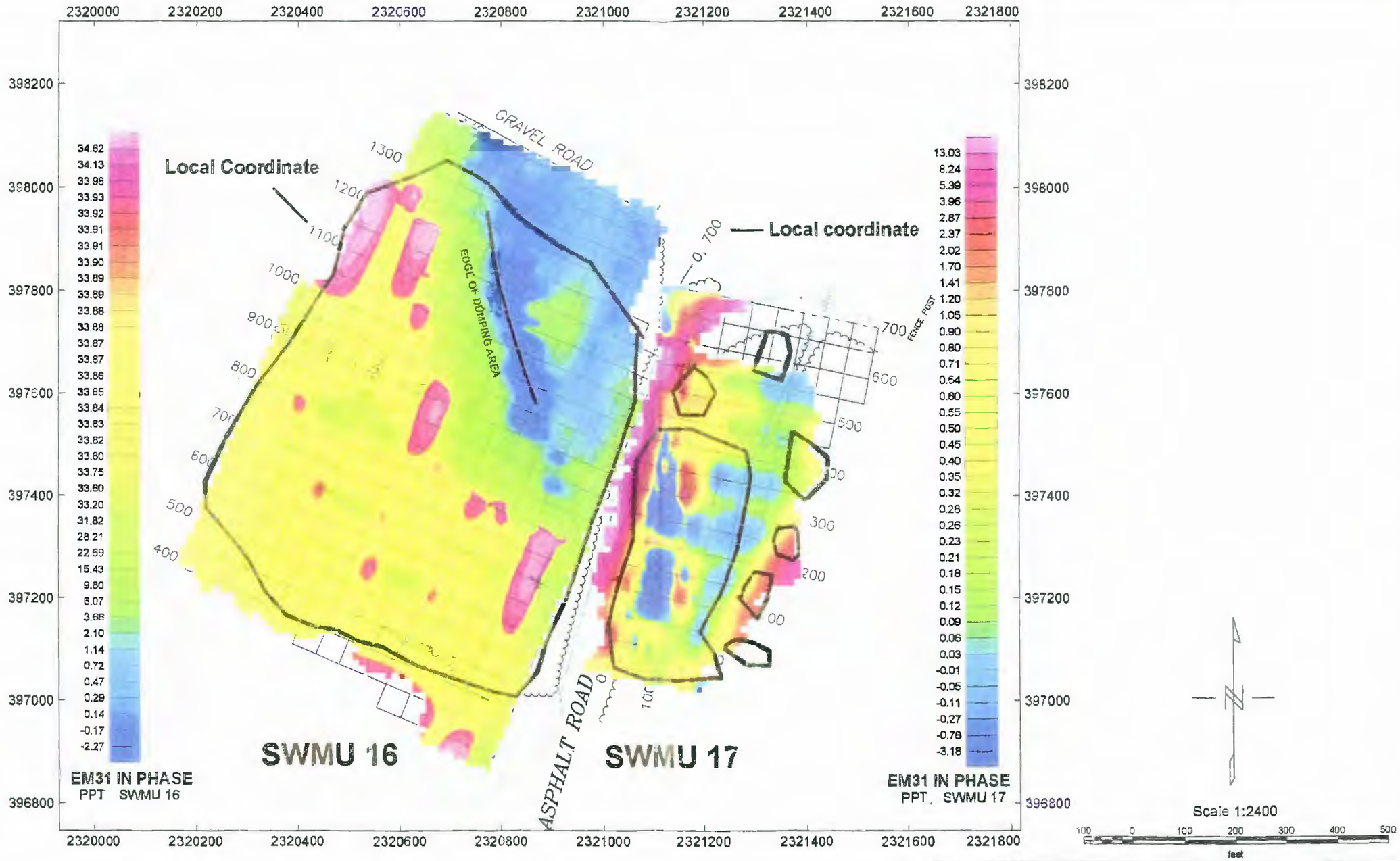
NOTE: Data collection was conducted independently.
Color scale bars are presented for each SWMU.
EM31 apparent conductivity, milli Siemens per meter.
Edge of dumping area indicates approx. slope region.

Combined Interpretation
Debris Area or Boundary

SOLID WASTE MANAGEMENT UNITS 16 & 17

NAVAL WEAPONS STATION, CHARLESTON, SC
GEOPHYSICAL SURVEYS
EM31 APPARENT CONDUCTIVITY DATA

TETRA TECH *FIGURE 1*



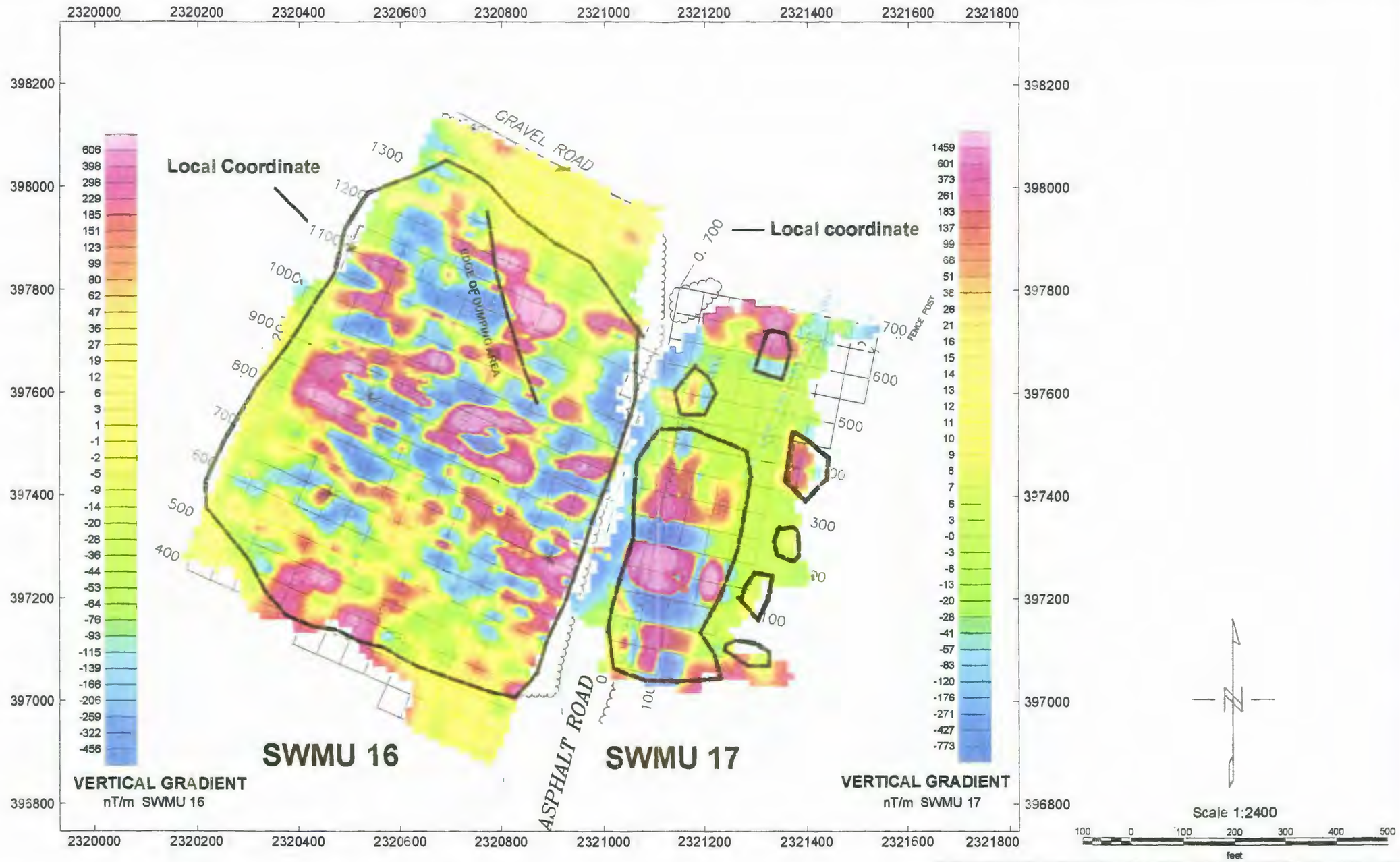
NOTE: Data collection was conducted independently.
Color scale bars are presented for each SWMU.
EM31 In Phase, parts per 1000.
Edge of dumping area indicates approx. slope region.

Combined Interpretation
Debris Area or Boundary

SOLID WASTE MANAGEMENT UNITS 16 & 17

NAVAL WEAPONS STATION, CHARLESTON, SC
GEOPHYSICAL SURVEYS
EM31 IN PHASE DATA

TETRA TECH *FIGURE 2*



NOTE: Data collection was conducted independently.
Color scale bars are presented for each SWMU.
Vertical magnetic gradient, nano Teslas per meter.
Edge of dumping area indicates approx. slope region.

Combined Interpretation
Debris Area or Boundary

SOLID WASTE MANAGEMENT UNITS 16 & 17

NAVAL WEAPONS STATION, CHARLESTON, SC
GEOPHYSICAL SURVEYS
VERTICAL MAGNETIC GRADIENT DATA

TETRA TECH FIGURE 3

Tetra Tech EM Inc.

Memorandum

To: Linda Klink

From: Raye Lahti, P.G. Geophysicist

Date: 8/8/00

Re: NWS Charleston Geophysical Surveys

Geophysical surveys were conducted during the period, July 10 through July 18, 2000 at two Solid Waste Management Units (SWMU), SWMU 16 and SWMU 17. This includes mobilization and demobilization from the site. Both SWMUs were covered by significant vegetation. Brush cutting and geophysical survey line preparations were the most time consuming portion of the field effort. Survey lines were cut using a chain saw, brush axe, power brush cutter and other cutting tools.

Geophysical surveys were conducted using three geophysical instruments. The Geonics EM31 terrain conductivity meter measuring apparent ground conductivity to about 15 feet. Terrain conductivity surveys are often useful in determining the presence of trenches associated with land filling activities. Disturbance of the ground from excavations usually alters the local ground conductivity. In addition to terrain conductivity, the in-phase component of the measured EM31 electromagnetic field, an indication of the presence of metal was measured, but was not used in the interpretation. Two other geophysical instruments better suited for metal detection were used. A Geonics EM61 hand held (HH) metal detector survey was conducted. The EM61 HH measures the presence of all metal on the surface, and to a depth and lateral range of several feet from the sensor. A magnetic gradiometer survey was also conducted using a Geometrics 858 for the detection of ferrous metallic objects. Ferrous objects are sensed by a magnetometer to a distance that is related to the size of the object. For example, a 100 pound piece of ferrous metal may be sensed about 20-30 feet from the sensor, and a 5-pound piece of ferrous metal may only be sensed several feet from the sensor. A base station magnetometer was set up on the site and recorded the diurnal variation of the magnetic field. This data is available, but not necessary for magnetic gradient data correction. Data from all geophysical instruments were stored on data logging devices, downloaded to a computer, and processed using geophysical mapping software to create color intensity anomaly maps and interpretation maps.

The following discussing provides the findings of the geophysical surveys. Figure 1 and Figure 2 provides the combined results of the geophysical surveys for SWMU 17 and SWMU 16, along with mapped indications of surface metal and debris features from sketch maps.

SWMU 17

SWMU 17, an area of about 4 acres, was prepared for geophysical surveys with an average line separation of 50 feet. Lines were measured off of a base line oriented about north 15 degrees east, and positioned along the roadway separating SWMU 16 and SWMU 17. Lines

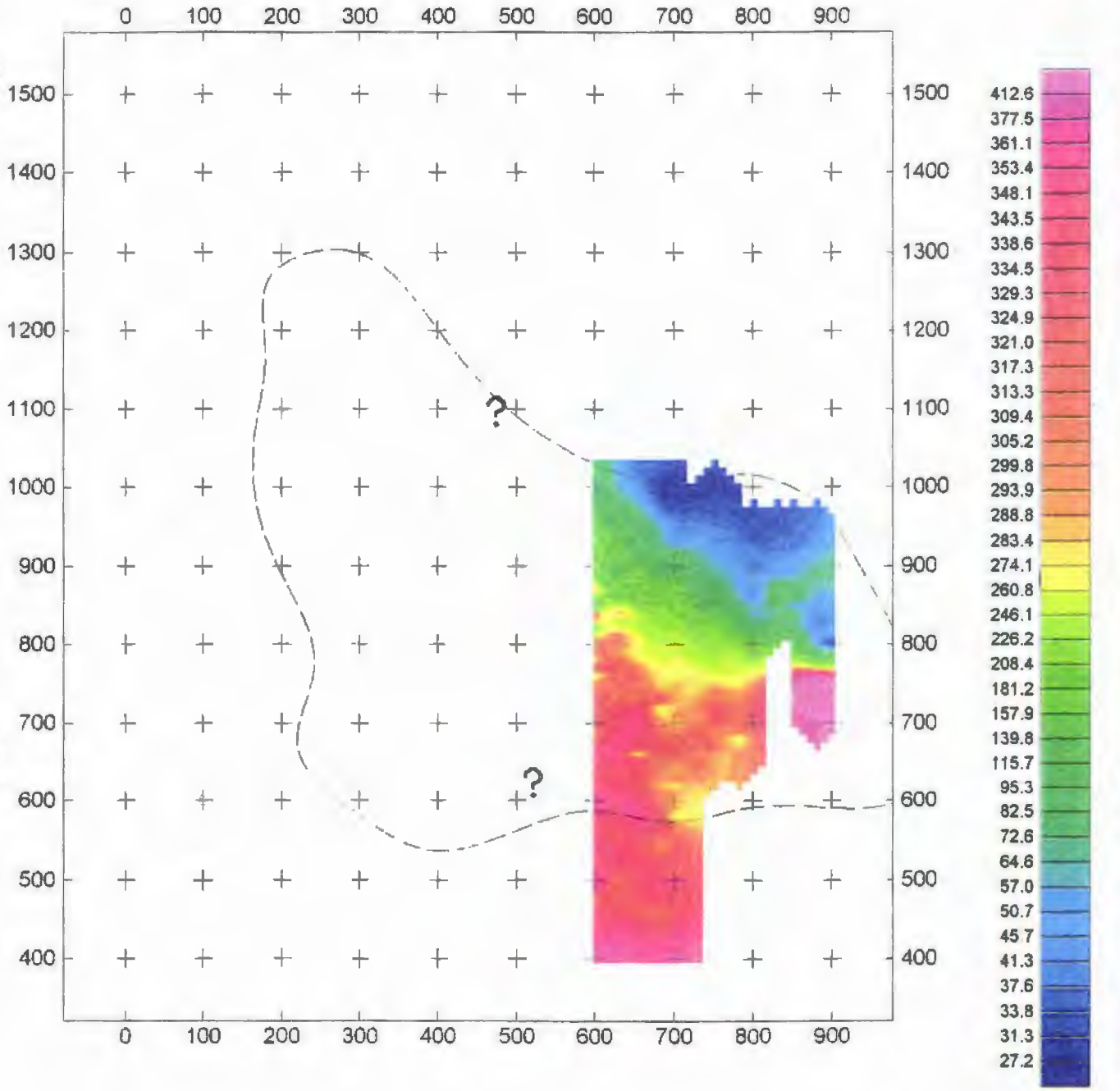
were measured using a standard surveying tape, and pin flags were placed along each line at 25-foot intervals. Figure 1 shows the extent of geophysical anomalies, and the location of surface metal and 55-gallon drums. Because survey lines were placed at about 50 foot intervals, areas between lines may contain anomalies that were not sensed by the geophysical instruments. Interpolation of anomalous areas was done to connect anomalous regions from line to line. One main area is outlined on the interpretation map. The extent of the anomalous area toward the south end of the survey approaches another previously investigated site that has had actions conducted. Five additional smaller anomalous areas are also shown on the survey map. These anomalous areas likely represent smaller near surface or surface disposal areas that may also include debris from power line construction activities.

SWMU 16

SWMU 16, an area of about 8-10 acres, was prepared for geophysical surveys with an average line spacing of 25 feet. Lines were measured off of a base line oriented about north 55 degrees west. The base line was cut beginning from about 30 feet from the fence line and started about 500 feet south of a road intersection north of the access gate to the site. Because line spacing is 25 feet on this SWMU, areas between lines may contain anomalies that were not sensed by the geophysical instrumentation. One main anomalous area is defined from the geophysical survey. The approximate extent of potential landfill activities is presented as a dark dashed line. The extent of this region is unknown toward the west and southeast. The approximate location of the area of oil drums is marked on the map based on previous site figures. No surface indication of drums was present in this marked area. Scattered surface metal, and geophysical anomalies are also marked on the map. The geophysical survey was not completed due the time constraints and a decision to step back and evaluate approaches to complete SWMU 16 evaluation.

Further work including brush clearing, and geophysical measurements may be necessary to define subsurface and surface indications of landfill activities to the southeast, west and northwest. An area of about 2-3 acres in the southwestern portion of the SWMU will require minimal vegetation clearance, while the northern, northwestern and southeastern areas will require considerable vegetation clearance.

Alternatively, SWMU 16 may possibly be defined using hand-held geophysical gear, reconnaissance site walkover, some vegetation clearance, and land surveying. Several days in the field would be required if a reconnaissance approach is used to define SWMU 16.



APPROXIMATE BOUNDARY
(DRAWN FROM MAP 05/09/00)

Scale 1:2400

100 0 100 200

foot

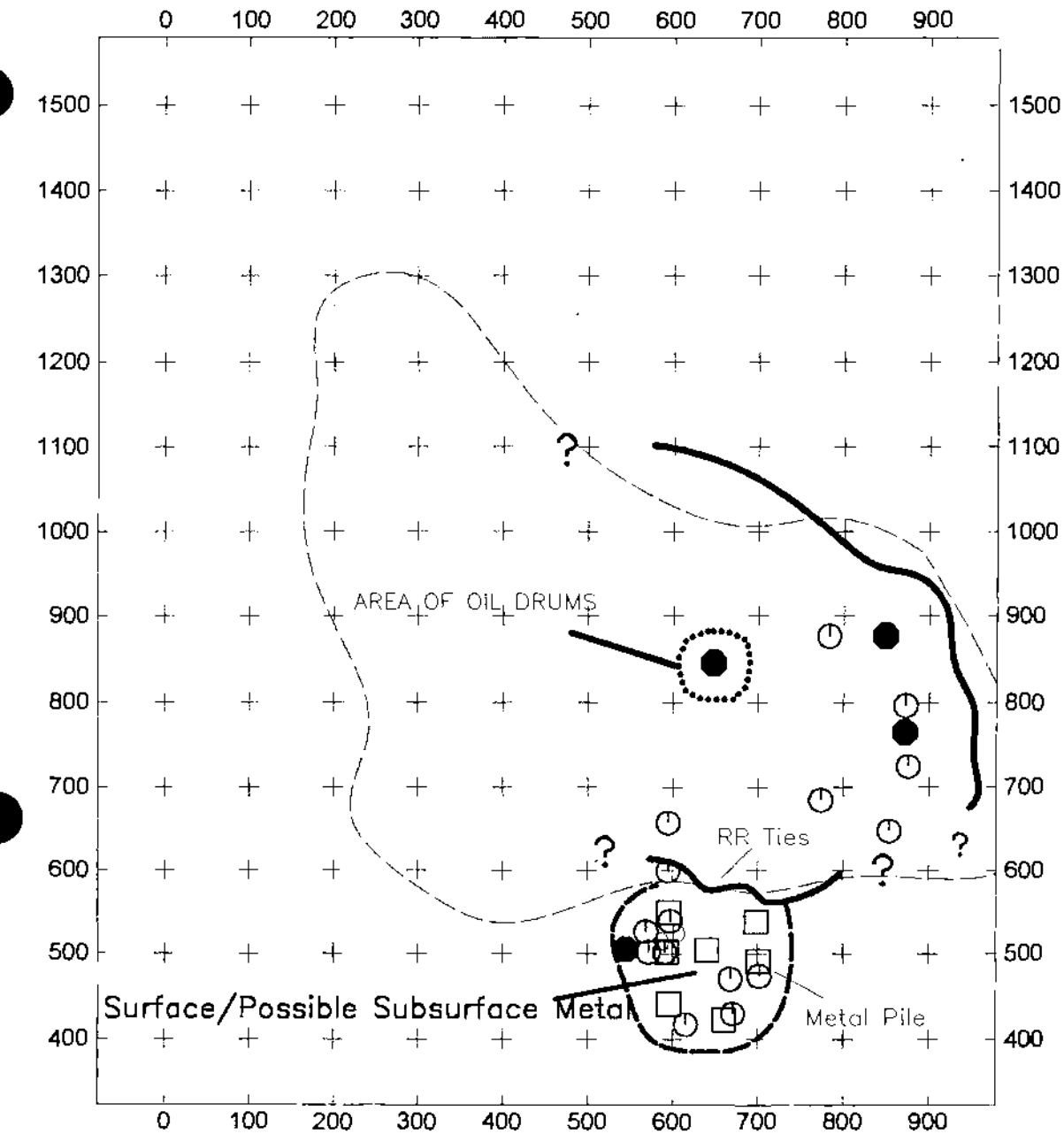
APPARENT CONDUCTIVITY DATA

NAVAL WEAPONS STATION, CHARLESTON SC

SWMU 16

GEOPHYSICAL SURVEY DATA

TETRA TECH



SOIL BORINGS APPROXIMATE LOCATION

AREA OF SURFACE AND POSSIBLE SUBSURFACE METAL

REGION OF MAJOR METALLIC ANOMALIES

APPROXIMATE BOUNDARY
(DRAWN FROM MAP 05/09/00)

METALLIC ANOMALIES

SURFACE METAL

Scale 1:2400

100 0 100 200

foot

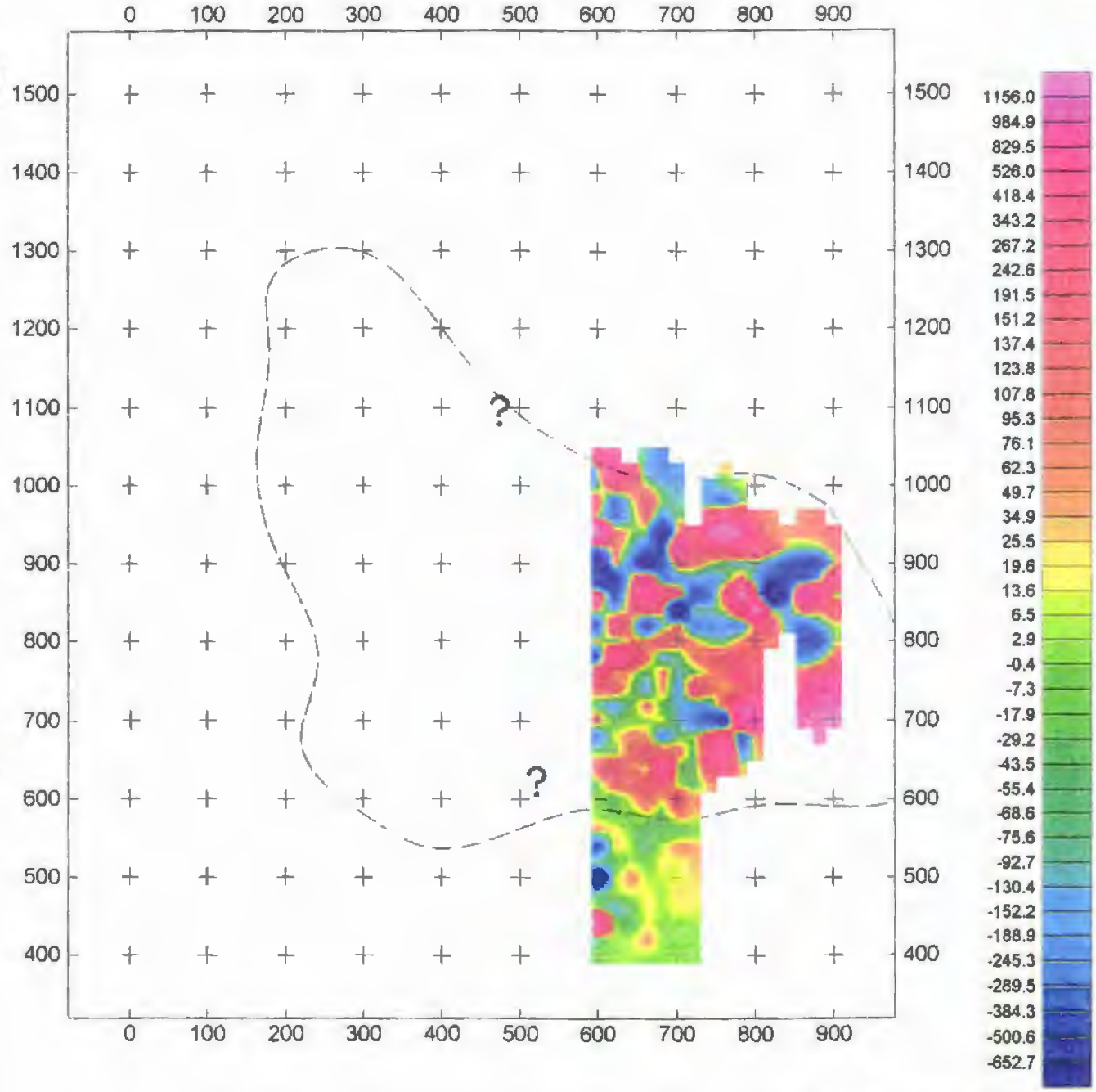
COMBINED INTERPRETATION

NAVAL WEAPONS STATION, CHARLESTON SC

SWMU 16

GEOPHYSICAL SURVEY DATA

TETRA TECH ***FIGURE 2***



Gradient - nanoTeslas/meter

APPROXIMATE BOUNDARY
(DRAWN FROM MAP 05/09/00)

Scale 1:2400

100 0 100 200

foot

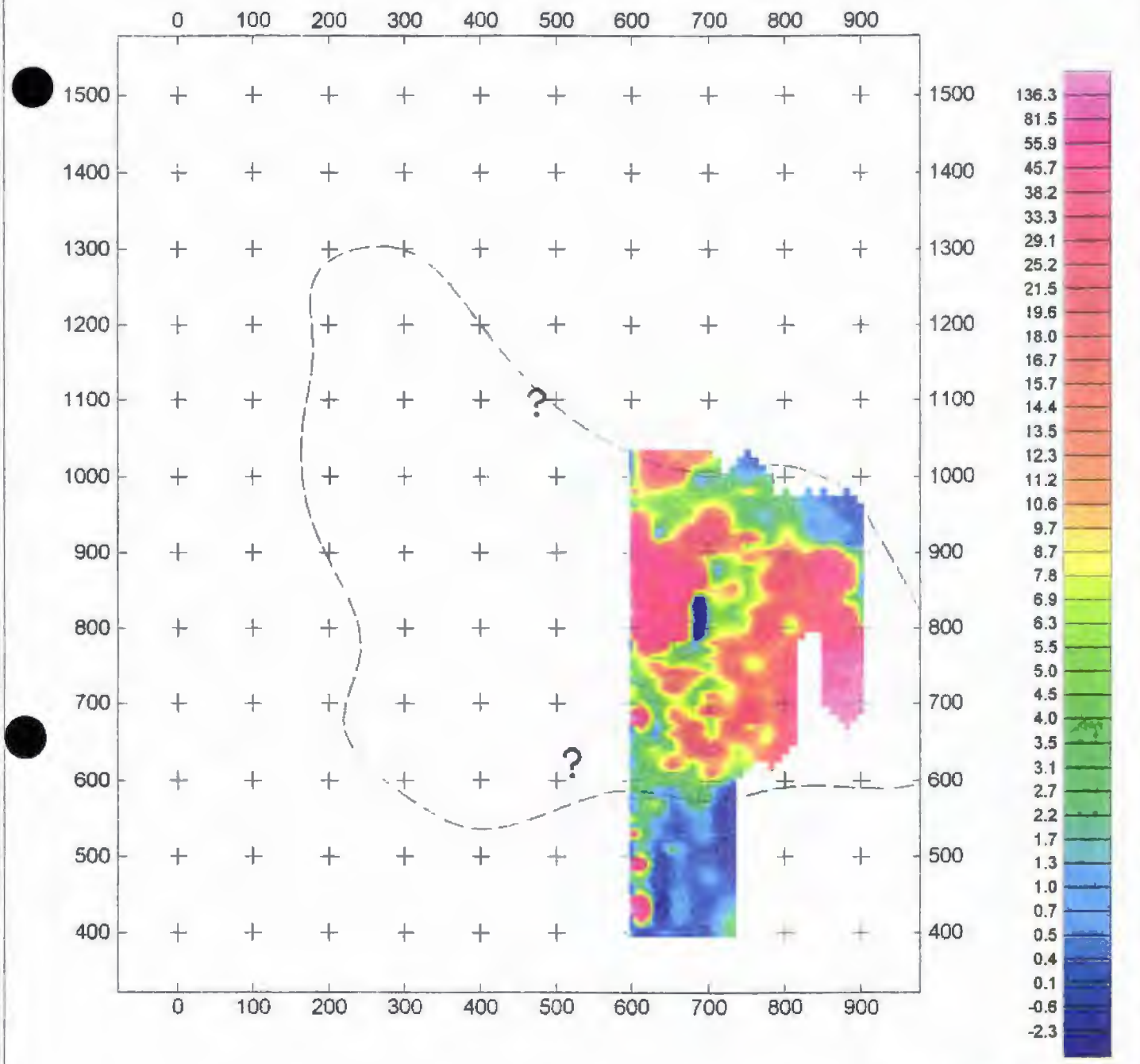
MAGNETIC GRADIENT DATA

NAVAL WEAPONS STATION, CHARLESTON SC

SWMU 16

GEOPHYSICAL SURVEY DATA

TETRA TECH



LATE TIME DATA - mV

APPROXIMATE BOUNDARY
(DRAWN FROM MAP 05/09/00)

EM61 METAL DETECTOR DATA

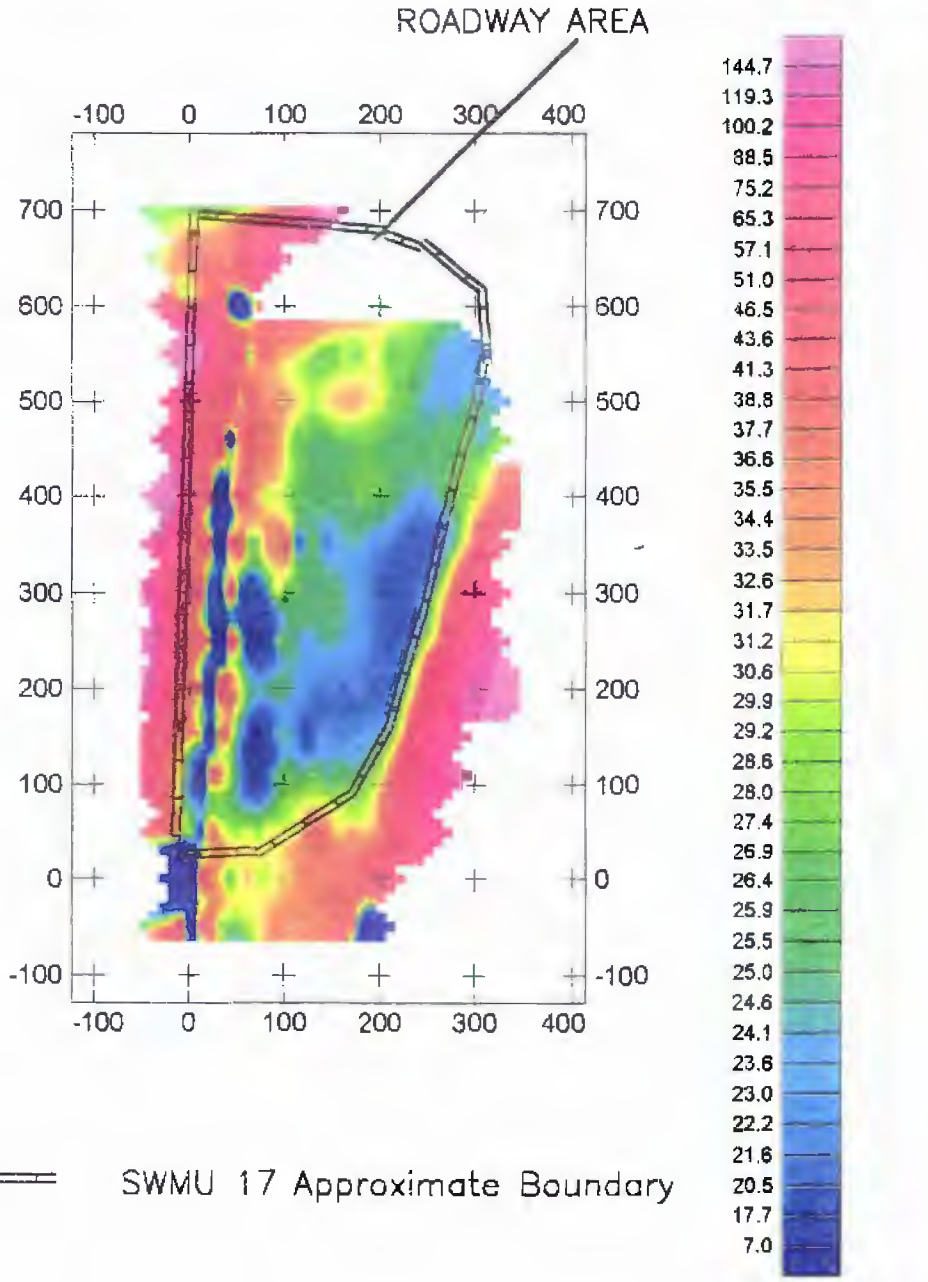
Scale 1:2400

100 0 100 200
feet

NAVAL WEAPONS STATION, CHARLESTON SC

SWMU 16
GEOPHYSICAL SURVEY DATA

TETRA TECH



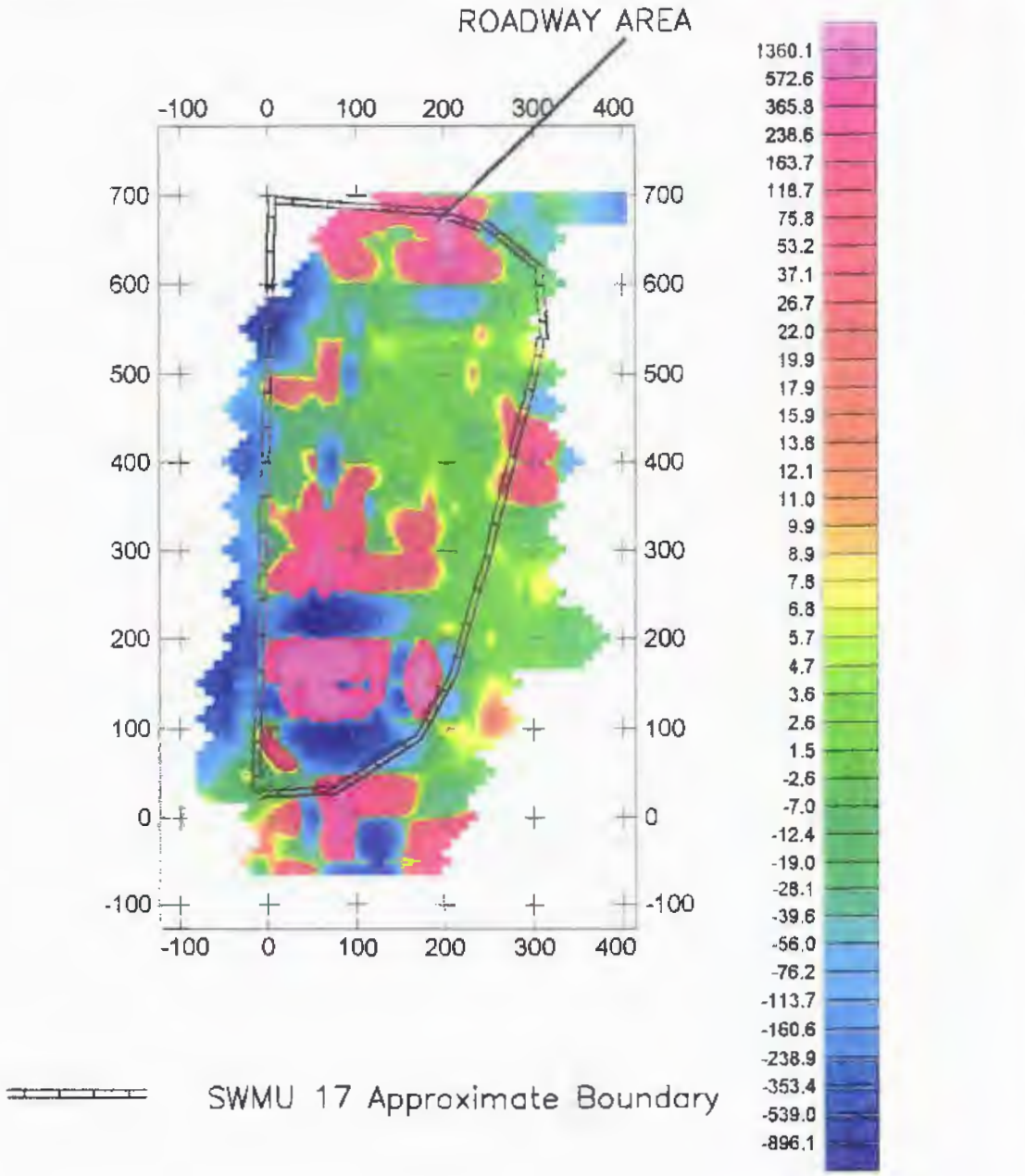
APPARENT CONDUCTIVITY DATA

NAVAL WEAPONS STATION, CHARLESTON SC
SWMU 17 GEOPHYSICAL SURVEY DATA
TETRA TECH

Scale 1:2400

100 0 100

foot



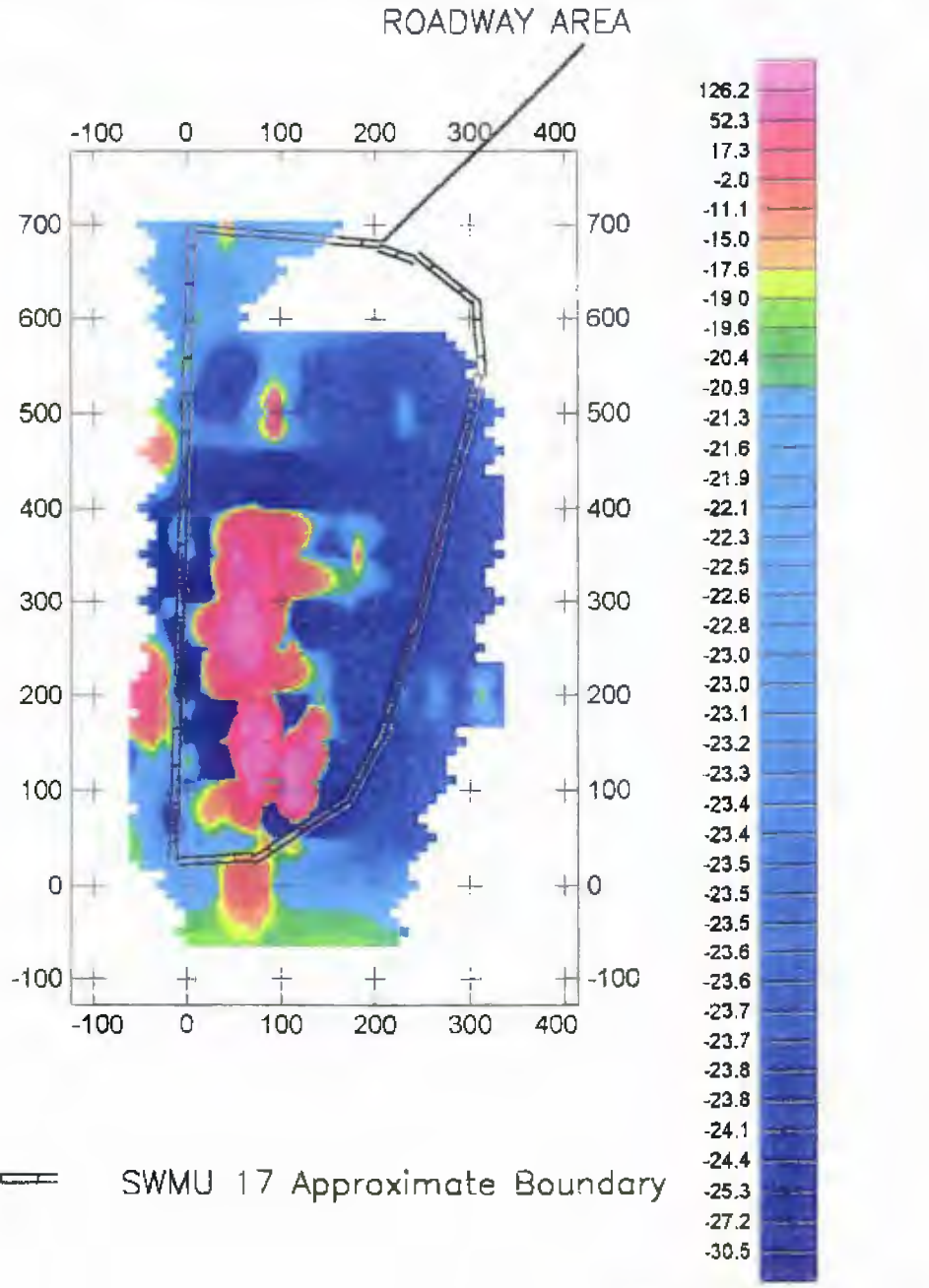
Scale 1:2400

100 0 100

foot

MAGNETIC GRADIENT DATA

NAVAL WEAPONS STATION, CHARLESTON SC
SWMU 17 GEOPHYSICAL SURVEY DATA
TETRA TECH



LATE TIME DATA - mV

Scale 1:2400

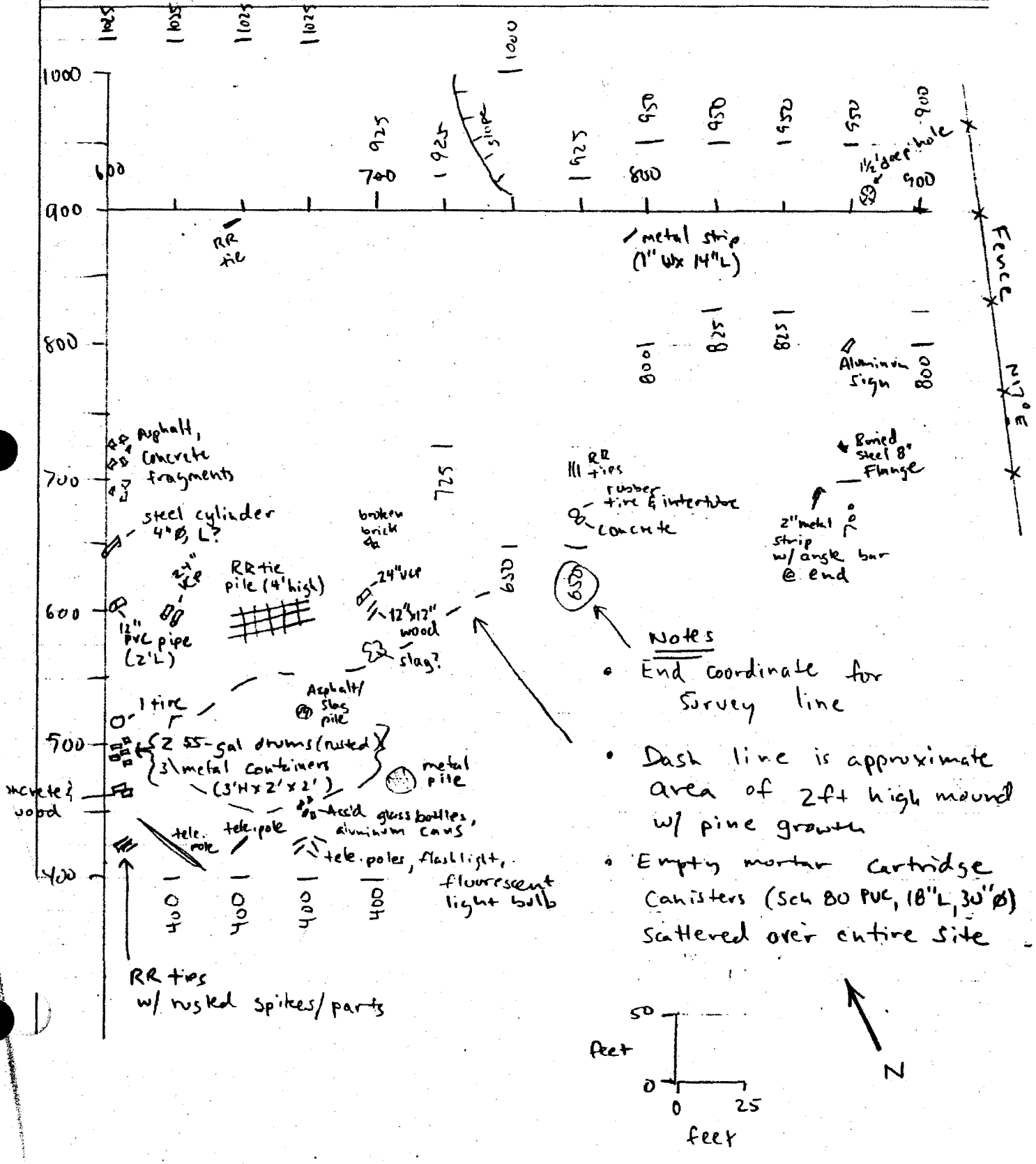
EM61 METAL DETECTOR DATA

NAVAL WEAPONS STATION, CHARLESTON SC
SWMU 17 GEOPHYSICAL SURVEY DATA
TETRA TECH

APPENDIX C-2
FIELD MAPPING OF DEBRIS

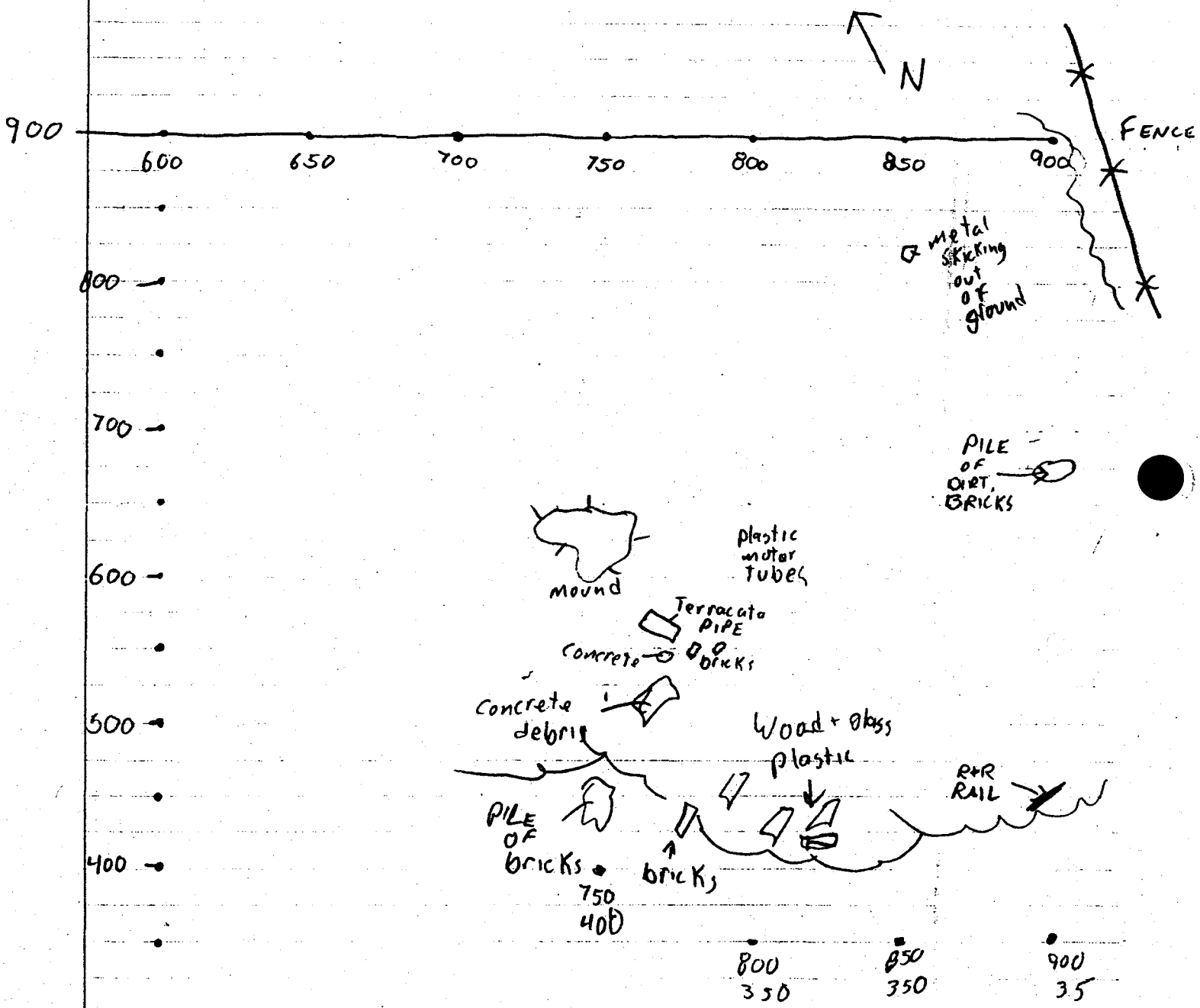
TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT: NWS Charleston	JOB NUMBER: N0528
SUBJECT: SWMU 16 Surface Debris Map	
BASED ON:	DRAWING NUMBER:
BY: T. EVANS 7/16/00	CHECKED BY: / APPROVED BY: / DATE:



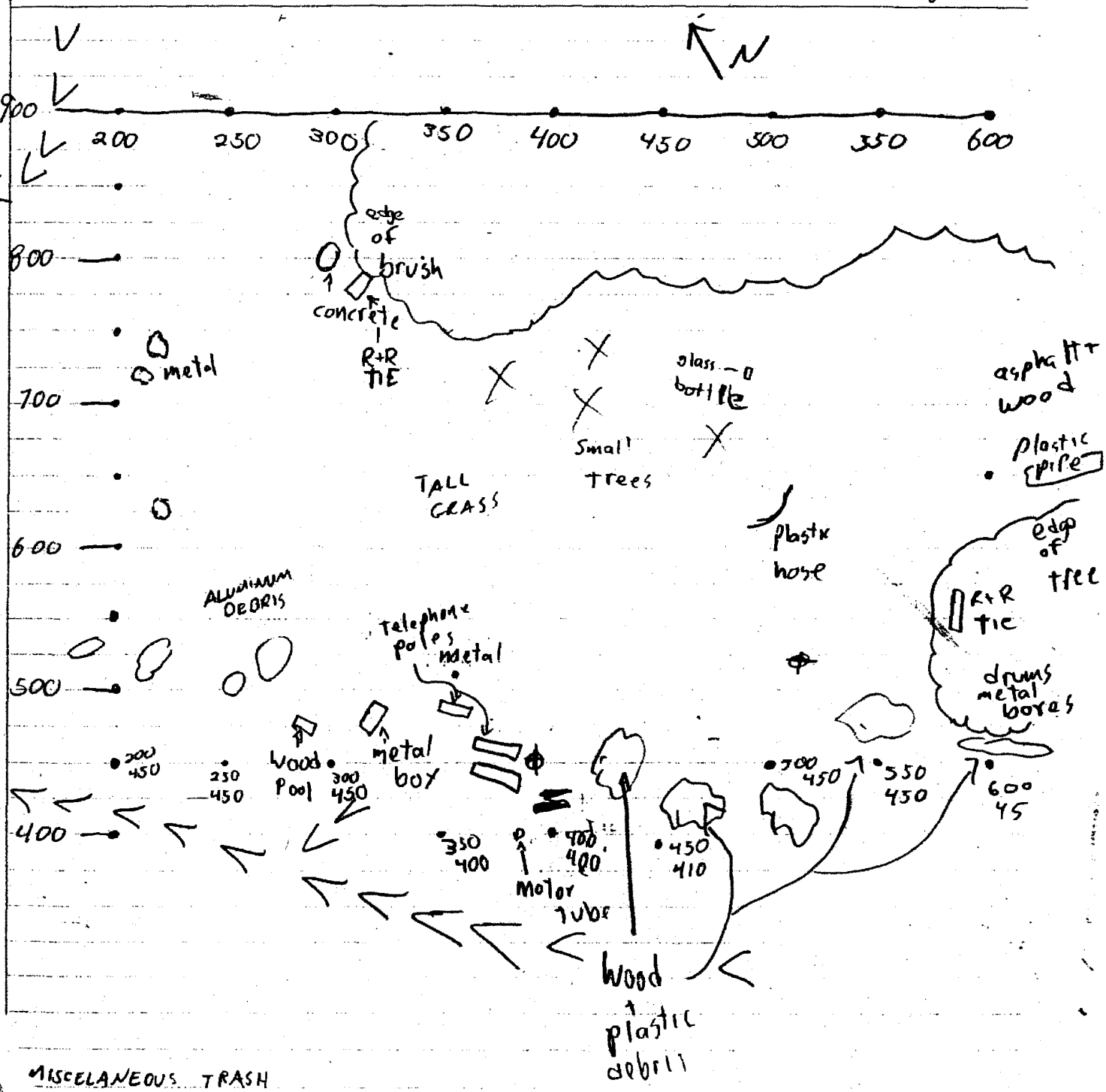
TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE ____ OF ____

CLIENT: NWS CHARLESTON	JOB NUMBER: N0528
SUBJECT: SWMU 16 South EAST AREA debris Map	
BASED ON:	DRAWING NUMBER:
BY: FCW / CHECKED BY:	APPROVED BY: / DATE: 11-11-00



TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE ____ OF ____

CLIENT: NWS CHARLESTON	JOB NUMBER: N0528
SUBJECT: SWMU 16 South West AREA Debris MAP	
BASED ON:	DRAWING NUMBER:
BY: FCW / CHECKED BY:	APPROVED BY: / DATE: 11-10-00

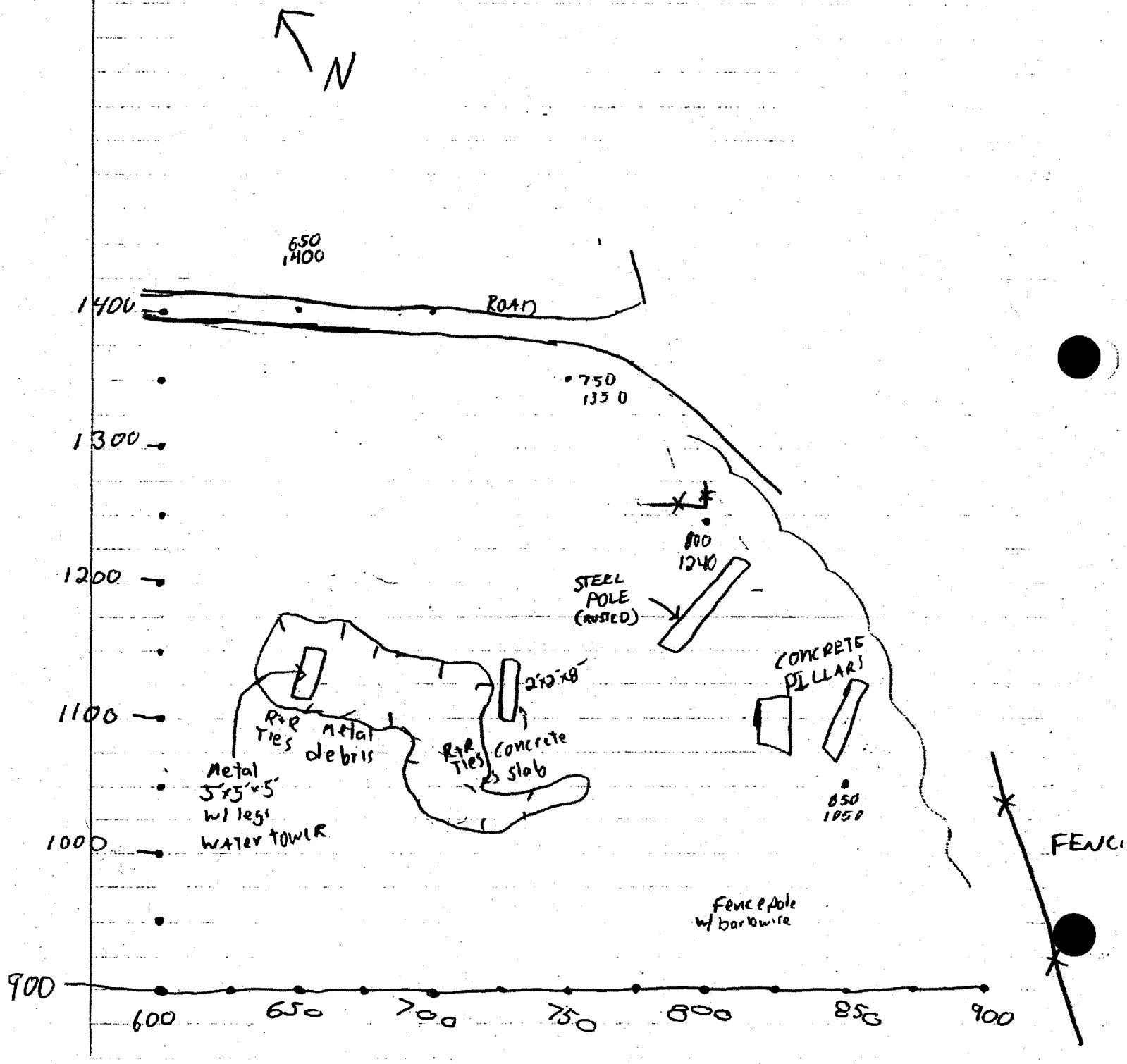


MISCELANEOUS TRASH
THROUGH OUT
Plastic bottles, glass
bottles, cans, etc.

⊕ - Pz

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE ____ OF ____

CLIENT: NWS CHARLESTON	JOB NUMBER: N0528
SUBJECT: SWMU 16 NORTH EAST AREA debris MAP	
BASED ON:	DRAWING NUMBER:
BY: FCW / CHECKED BY:	APPROVED BY: / DATE: 11-11-00



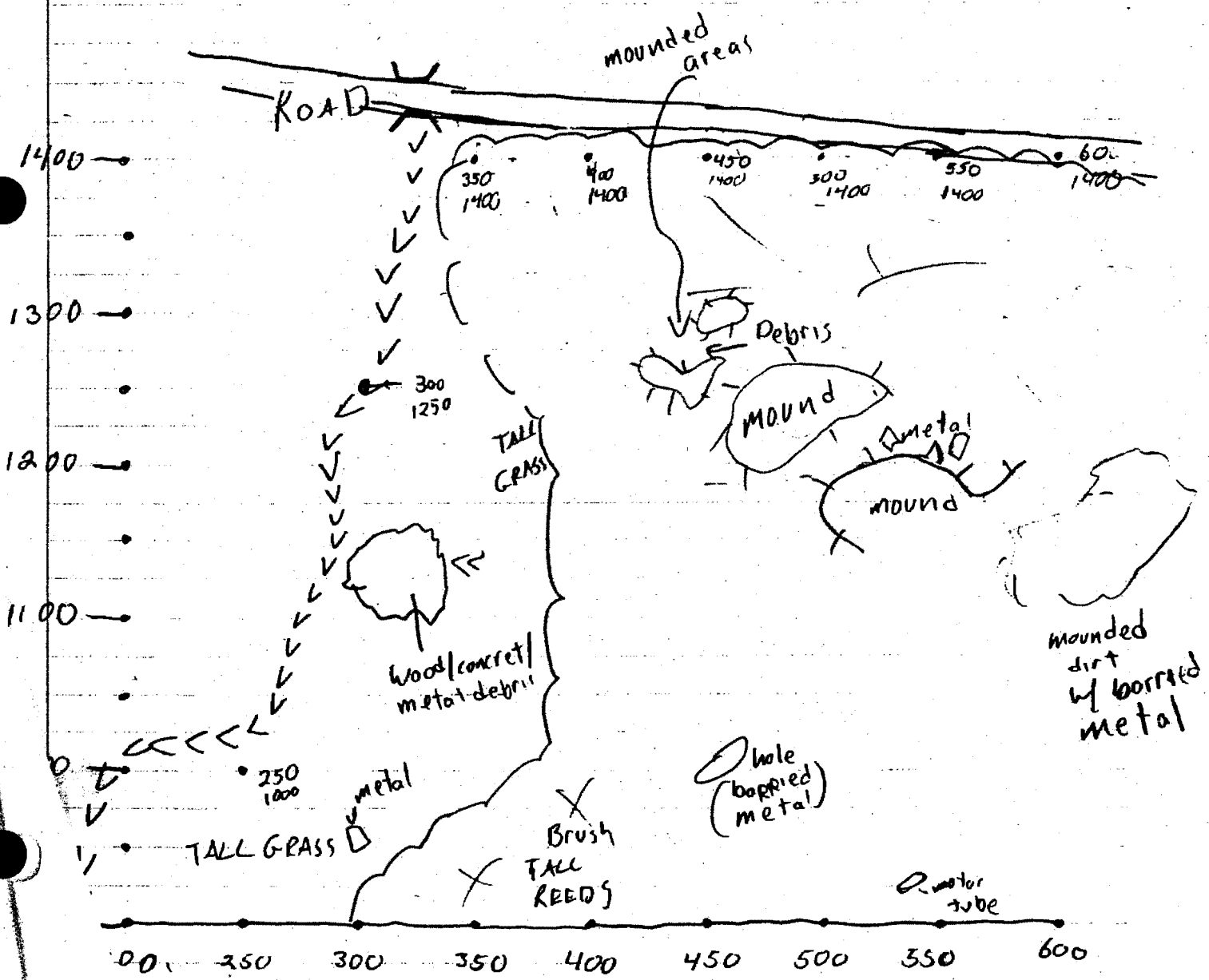
TETRA-TECH NUS, INC. **CALCULATION WORKSHEET** PAGE ____ OF ____

CLIENT NWS CHARLESTON	JOB NUMBER N0528
SUBJECT SWMU 16 NORTH WEST AREA Debris MAP	
BASED ON	DRAWING NUMBER

BY	CHECKED BY	APPROVED BY	DATE
FCW			11-10-00

MISCELANEOUS TRASH SCATTERED THROUGHOUT AREA EX. plastic bottles, cans, glass, ETC

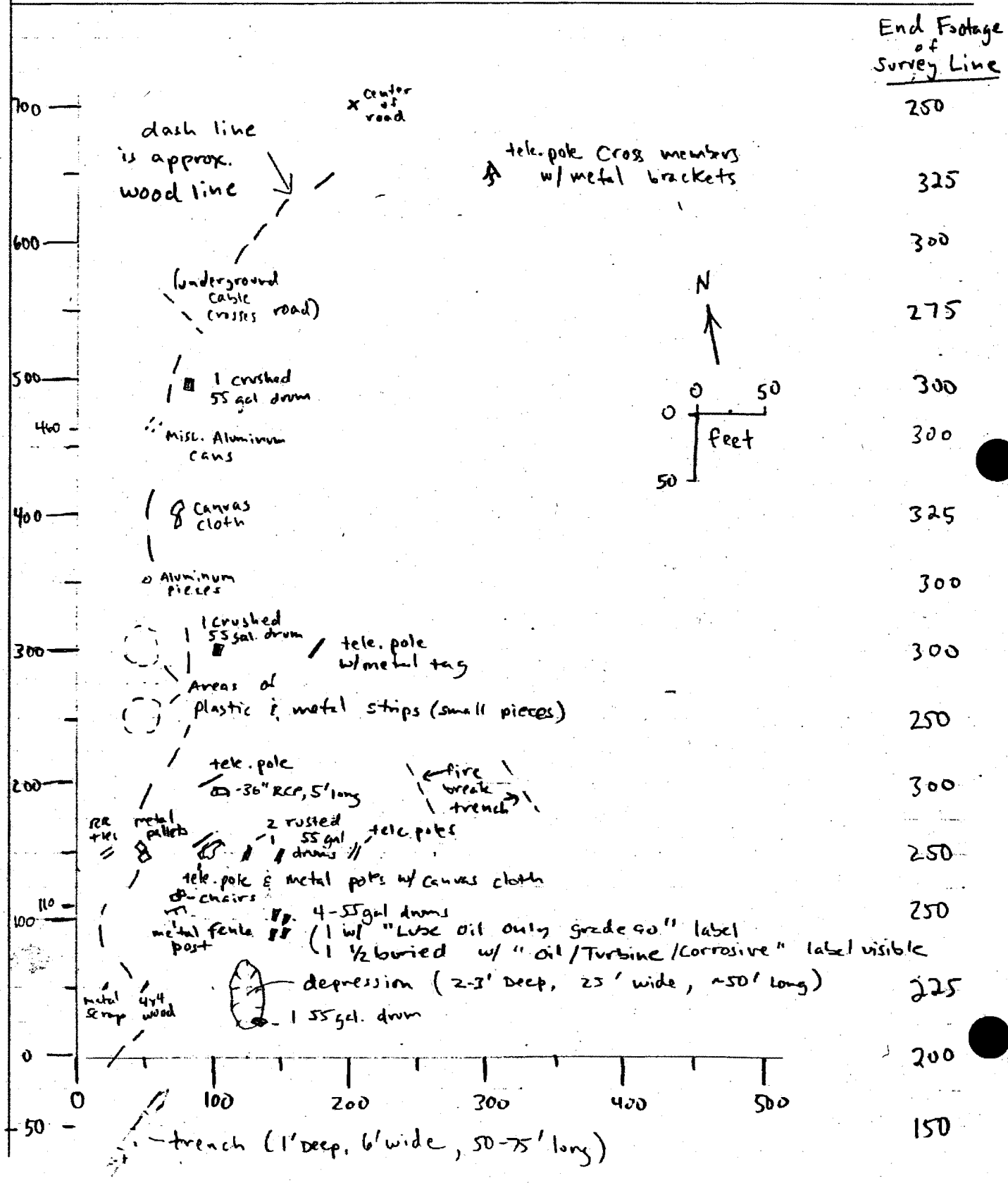
Paths, possible ruts throughout woods



TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT	JOB NUMBER
NWS Charleston	N0528
SUBJECT: SWMU 17 - Surface Debris Map	
BASED ON	DRAWING NUMBER

BY	CHECKED BY	APPROVED BY	DATE
T. Evans 7/17/00			



APPENDIX C-3
HISTORICAL AERIAL PHOTOGRAPHS

Tree Sample Sites
Sample Sites
Contour Line
SWMUU Boundary
NWS Wetlands

SWMU 17 - 1949 Imagery

Charleston Naval Weapons Station
Charleston, South Carolina

0 0.015 0.03 0.06 Miles

Date: 8/12/03

Source: 1999 DOQQ (USGS) Backdrop Image
Site Data provided by Naval Weapons Station

Prepared By: SCDHEC - BLWM

Tree Sample Sites
Sample Sites
Contour Line
SWMUU Boundary
NWS Wetlands

SWMU 17 - 1954 Imagery

Charleston Naval Weapons Station
Charleston, South Carolina

0 0.015 0.03 0.06 Miles

Date: 8/12/03

Source: 1999 DOQQ (USGS) Backdrop image
Site Data provided by Naval Weapons Station

Prepared By: SCDHEC - BLWM

Tree Sample Sites
Sample Sites
Contour Line
SWMU U Boundary
NWS Wetlands

SWMU 17 - 1963 Imagery

Charleston Naval Weapons Station
Charleston, South Carolina

0 0.015 0.03 0.06 Miles

Date: 8/12/03

Source: 1999 DOQQ (USGS) Backdrop Image
Site Data provided by Naval Weapons Station

Prepared By: SCDHEC - BLWM

Tree Sample Sites
Sample Sites
Contour Line
SWMUU Boundary
NWS Wetlands

SWMU 17 - 1969 Imagery

Charleston Naval Weapons Station
Charleston, South Carolina

0 0.015 0.03 0.06 Miles

Date 8/12/03

Source 1969 DOQQ (USGS) Bachelrup Image
Site Data provided by Naval Weapons Station

Prepared By SC DHEC - BLWM

Tree Sample Sites
Sample Sites
Contour Line
SWMUU Boundary
NWS Wetlands

SWMU 17 - 1973 Imagery

Charleston Naval Weapons Station
Charleston, South Carolina

0 0.015 0.03 0.06 Miles

Date: 6/12/03

Source: 1999 DOQQ (USGS) Backdrop Image
Site Data provided by Naval Weapons Station

Prepared By: SCDHEC - BLWM

Tree Sample Sites
Sample Sites
Contour Line
SWMUU Boundary
NWS Wetlands

SWMU 17 - 1975 Imagery

Charleston Naval Weapons Station
Charleston, South Carolina

0 0.015 0.03 0.06 Miles

Date: 3/12/03

Source: 1999 DOQQ (USGS) Backdrop Image
Site Data provided by Naval Weapons Station

Prepared By: SCDHEC - BLWM

Tree Sample Sites
Sample Sites
Contour Line
SWMUU Boundary
NWS Wetlands

SWMU 17 - 1979 Imagery

Charleston Naval Weapons Station
Charleston, South Carolina

0 0.015 0.03 0.06 Miles

Date 8/12/03

Source: 1999 DOQQ (USGS) Backdrop Image
Site Data provided by Naval Weapons Station

Prepared By: SCDHEC - BLWM

Tree Sample Sites
Sample Sites
Contour Line
SWMUU Boundary
NWS Wetlands

SWMU 17 - 1999 Imagery

Charleston Naval Weapons Station
Charleston, South Carolina

0 0.015 0.03 0.06 Miles

Date 8/12/03

Source: 1999 DOQQ (USGS) Backdrop Image
Site Data provided by Naval Weapons Station

Prepared By SCDHEC - BLWM

APPENDIX C-4
TIDE PREDICTION TABLES

All times listed are in Local Time, and all heights are in Feet.

Charleston, South Carolina
Tide Predictions (High and Low Waters) January, 2001
NOAA, National Ocean Service

→ FOR HIGH TIDE TIMES ADD 43 MINUTES
→ FOR LOW TIDE TIMES ~~S~~ ADD 33 MINUTES

Standard Time

Day	Time	Ht.	Time	Ht.	Time	Ht.	Time	Ht.
1 M	550am L	0.7	1203pm H	4.8	633pm L	0.6		
2 Tu	1230am H	4.5	645am L	0.8	1252pm H	4.7	723pm L	0.5
3 W	127am H	4.7	747am L	0.9	148pm H	4.6	818pm L	0.4
4 Th	228am H	4.9	853am L	0.8	248pm H	4.5	915pm L	0.2
5 F	329am H	5.2	958am L	0.6	351pm H	4.6	1013pm L	-0.1
6 Sa	430am H	5.6	1100am L	0.3	452pm H	4.7	1110pm L	-0.4
7 Su	529am H	6.0	1157am L	0.0	551pm H	4.9		
8 M	1204am L	-0.7	626am H	6.3	1251pm L	-0.3	649pm H	5.1
9 Tu	1258am L	-1.0	721am H	6.5	143pm L	-0.5	744pm H	5.2
10 W	150am L	-1.1	814am H	6.7	234pm L	-0.7	839pm H	5.3
11 Th	242am L	-1.1	907am H	6.6	325pm L	-0.7	934pm H	5.4
12 F	335am L	-1.0	1000am H	6.5	415pm L	-0.7	1029pm H	5.4
13 Sa	428am L	-0.8	1052am H	6.2	506pm L	-0.6	1125pm H	5.4
14 Su	523am L	-0.5	1145am H	5.8	558pm L	-0.4		
15 M	1222am H	5.3	621am L	-0.2	1239pm H	5.4	652pm L	-0.2
16 Tu	120am H	5.3	721am L	0.1	134pm H	5.0	747pm L	-0.1
17 W	219am H	5.2	822am L	0.3	231pm H	4.7	842pm L	0.1
18 Th	317am H	5.2	923am L	0.4	327pm H	4.5	937pm L	0.1
19 F	413am H	5.3	1020am L	0.4	421pm H	4.4	1029pm L	0.1
20 Sa	505am H	5.4	1112am L	0.4	513pm H	4.4	1118pm L	0.0
21 Su	554am H	5.5	1200pm L	0.3	600pm H	4.5		
22 M	1204am L	-0.1	639am H	5.5	1244pm L	0.2	644pm H	4.5
23 Tu	1247am L	-0.2	720am H	5.5	126pm L	0.1	725pm H	4.6
24 W	128am L	-0.2	759am H	5.5	205pm L	0.1	803pm H	4.6
25 Th	207am L	-0.2	835am H	5.5	243pm L	0.1	838pm H	4.6
26 F	244am L	-0.1	909am H	5.4	320pm L	0.1	913pm H	4.6
27 Sa	321am L	0.0	941am H	5.2	356pm L	0.2	947pm H	4.6
28 Su	358am L	0.1	1012am H	5.1	432pm L	0.2	1023pm H	4.7
29 M	437am L	0.3	1046am H	4.9	510pm L	0.3	1104pm H	4.7
30 Tu	521am L	0.4	1124am H	4.7	551pm L	0.3	1151pm H	4.8
31 W	612am L	0.6	1210pm H	4.6	639pm L	0.3		

Charleston, South Carolina
Tide Predictions (High and Low Waters) February, 2001
NOAA, National Ocean Service

Standard Time

Day	Time	Ht.	Time	Ht.	Time	Ht.	Time	Ht.
1 Th	1247am H	4.9	712am L	0.7	106pm H	4.4	735pm L	0.2
2 F	150am H	5.0	819am L	0.7	211pm H	4.3	838pm L	0.1
3 Sa	257am H	5.2	929am L	0.6	321pm H	4.4	943pm L	-0.1
4 Su	404am H	5.5	1035am L	0.3	429pm H	4.5	1046pm L	-0.4
5 M	508am H	5.9	1136am L	0.0	533pm H	4.8	1146pm L	-0.8
6 Tu	608am H	6.2	1232pm L	-0.4	634pm H	5.1		
7 W	1242am L	-1.0	705am H	6.4	124pm L	-0.7	730pm H	5.4
8 Th	135am L	-1.2	758am H	6.5	214pm L	-0.9	824pm H	5.6
9 F	227am L	-1.3	850am H	6.5	303pm L	-0.9	917pm H	5.8
10 Sa	319am L	-1.2	940am H	6.3	351pm L	-0.9	1009pm H	5.8
11 Su	410am L	-0.9	1029am H	6.0	438pm L	-0.7	1101pm H	5.7
12 M	502am L	-0.6	1119am H	5.6	526pm L	-0.5	1154pm H	5.5
13 Tu	556am L	-0.2	1209pm H	5.1	616pm L	-0.2		
14 W	1248am H	5.3	651am L	0.2	102pm H	4.7	709pm L	0.1
15 Th	144am H	5.2	750am L	0.5	156pm H	4.4	804pm L	0.3
16 F	242am H	5.1	850am L	0.7	253pm H	4.3	902pm L	0.4
17 Sa	339am H	5.0	948am L	0.7	350pm H	4.2	958pm L	0.4
18 Su	434am H	5.1	1042am L	0.6	444pm H	4.3	1051pm L	0.3
19 M	525am H	5.2	1131am L	0.5	533pm H	4.4	1139pm L	0.2
20 Tu	611am H	5.3	1217pm L	0.3	619pm H	4.5		
21 W	1224am L	0.0	654am H	5.4	1259pm L	0.2	700pm H	4.7
22 Th	106am L	-0.1	732am H	5.4	138pm L	0.1	738pm H	4.8
23 F	145am L	-0.1	808am H	5.4	215pm L	0.0	814pm H	4.9
24 Sa	223am L	-0.1	842am H	5.3	251pm L	0.0	848pm H	5.0
25 Su	300am L	-0.1	913am H	5.2	325pm L	0.0	921pm H	5.1
26 M	338am L	0.0	944am H	5.1	400pm L	0.1	957pm H	5.2
27 Tu	417am L	0.2	1017am H	4.9	437pm L	0.1	1037pm H	5.2
28 W	500am L	0.3	1056am H	4.7	518pm L	0.2	1123pm H	5.2

Charleston, South Carolina
Tide Predictions (High and Low Waters) March, 2001
NOAA, National Ocean Service

Standard Time

Day	Time	Ht.	Time	Ht.	Time	Ht.	Time	Ht.
1 Th	549am L	0.5	1143am H	4.6	606pm L	0.2		
2 F	1219am H	5.3	648am L	0.6	1241pm H	4.4	704pm L	0.3
3 Sa	123am H	5.3	756am L	0.7	150pm H	4.4	811pm L	0.2
4 Su	234am H	5.4	907am L	0.6	303pm H	4.4	921pm L	0.1
5 M	344am H	5.6	1014am L	0.4	414pm H	4.7	1028pm L	-0.2
6 Tu	450am H	5.9	1116am L	0.0	520pm H	5.1	1130pm L	-0.6
7 W	551am H	6.1	1211pm L	-0.3	619pm H	5.5		
8 Th	1227am L	-0.9	647am H	6.3	102pm L	-0.7	714pm H	5.8
9 F	120am L	-1.1	739am H	6.4	151pm L	-0.8	806pm H	6.1
10 Sa	211am L	-1.1	829am H	6.3	237pm L	-0.9	856pm H	6.2
11 Su	301am L	-1.0	916am H	6.1	323pm L	-0.8	945pm H	6.2
12 M	350am L	-0.7	1003am H	5.8	407pm L	-0.6	1034pm H	6.0
13 Tu	438am L	-0.4	1050am H	5.4	452pm L	-0.2	1122pm H	5.8
14 W	528am L	0.0	1137am H	5.0	539pm L	0.1		
15 Th	1213am H	5.5	620am L	0.4	1227pm H	4.6	629pm L	0.4
16 F	106am H	5.2	715am L	0.7	120pm H	4.4	724pm L	0.7
17 Sa	202am H	5.0	812am L	0.9	217pm H	4.2	823pm L	0.8
18 Su	259am H	4.9	911am L	0.9	315pm H	4.2	922pm L	0.8
19 M	356am H	5.0	1006am L	0.9	410pm H	4.3	1019pm L	0.7
20 Tu	448am H	5.1	1057am L	0.7	502pm H	4.5	1110pm L	0.5
21 W	536am H	5.2	1143am L	0.5	548pm H	4.8	1157pm L	0.3
22 Th	620am H	5.3	1226pm L	0.3	631pm H	5.0		
23 F	1240am L	0.1	700am H	5.4	106pm L	0.1	710pm H	5.2
24 Sa	121am L	0.0	737am H	5.4	143pm L	0.0	746pm H	5.4
25 Su	201am L	0.0	812am H	5.3	219pm L	0.0	822pm H	5.5
26 M	240am L	0.0	846am H	5.2	255pm L	0.0	857pm H	5.7
27 Tu	319am L	0.1	920am H	5.1	331pm L	0.0	935pm H	5.7
28 W	400am L	0.2	956am H	4.9	410pm L	0.1	1017pm H	5.7
29 Th	445am L	0.3	1038am H	4.8	453pm L	0.2	1106pm H	5.7
30 F	535am L	0.5	1129am H	4.6	545pm L	0.3		
31 Sa	1203am H	5.6	634am L	0.6	1231pm H	4.5	646pm L	0.4

Charleston, South Carolina
Tide Predictions (High and Low Waters) April, 2001
NOAA, National Ocean Service

Day	Time	Ht.	Time	Ht.	Time	Ht.	Time	Ht.
Daylight Saving Time begins at 0200								
1 Su	108am H	5.6	840am L	0.7	242pm H	4.5	855pm L	0.4
2 M	318am H	5.6	949am L	0.6	355pm H	4.7	1006pm L	0.2
3 Tu	427am H	5.7	1055am L	0.4	503pm H	5.0	1113pm L	0.0
4 W	531am H	5.9	1154am L	0.0	606pm H	5.4		
5 Th	1214am L	-0.3	631am H	6.0	1248pm L	-0.3	703pm H	5.9
6 F	111am L	-0.6	726am H	6.1	138pm L	-0.6	756pm H	6.2
7 Sa	203am L	-0.7	816am H	6.1	225pm L	-0.7	846pm H	6.4
8 Su	253am L	-0.8	905am H	6.0	309pm L	-0.7	934pm H	6.5
9 M	341am L	-0.7	951am H	5.8	353pm L	-0.5	1020pm H	6.4
10 Tu	427am L	-0.4	1036am H	5.5	436pm L	-0.3	1105pm H	6.2
11 W	513am L	-0.1	1120am H	5.1	519pm L	0.0	1150pm H	5.9
12 Th	600am L	0.2	1205pm H	4.8	603pm L	0.4		
13 F	1237am H	5.6	648am L	0.6	1252pm H	4.5	651pm L	0.7
14 Sa	126am H	5.3	739am L	0.8	143pm H	4.4	743pm L	0.9
15 Su	219am H	5.1	833am L	1.0	238pm H	4.3	841pm L	1.1
16 M	314am H	4.9	930am L	1.0	335pm H	4.3	942pm L	1.1
17 Tu	410am H	4.9	1025am L	0.9	431pm H	4.5	1041pm L	1.0
18 W	503am H	5.0	1117am L	0.8	524pm H	4.7	1135pm L	0.8
19 Th	553am H	5.1	1204pm L	0.6	612pm H	5.0		
20 F	1225am L	0.6	639am H	5.2	1248pm L	0.3	656pm H	5.3
21 Sa	111am L	0.4	721am H	5.2	129pm L	0.2	737pm H	5.6
22 Su	155am L	0.2	802am H	5.2	209pm L	0.0	817pm H	5.8
23 M	237am L	0.1	840am H	5.2	247pm L	0.0	856pm H	6.0
24 Tu	319am L	0.0	919am H	5.1	326pm L	-0.1	936pm H	6.1
25 W	402am L	0.0	959am H	5.0	406pm L	-0.1	1018pm H	6.2
26 Th	446am L	0.1	1042am H	4.9	449pm L	0.0	1105pm H	6.1
27 F	534am L	0.2	1130am H	4.8	538pm L	0.1	1156pm H	6.0
28 Sa	626am L	0.4	1226pm H	4.7	632pm L	0.3		
29 Su	1254am H	5.9	725am L	0.5	130pm H	4.7	735pm L	0.4
30 M	158am H	5.8	828am L	0.5	239pm H	4.8	843pm L	0.4

Charleston, South Carolina
Tide Predictions (High and Low Waters) May, 2001
NOAA, National Ocean Service

Daylight Saving Time

Day	Time	Ht.	Time	Ht.	Time	Ht.	Time	Ht.
1 Tu	304am H	5.7	932am L	0.4	347pm H	5.0	952pm L	0.3
2 W	409am H	5.7	1033am L	0.2	451pm H	5.4	1058pm L	0.2
3 Th	511am H	5.7	1130am L	-0.1	551pm H	5.8	1158pm L	-0.1
4 F	608am H	5.7	1223pm L	-0.3	646pm H	6.1		
5 Sa	1254am L	-0.3	702am H	5.7	111pm L	-0.5	737pm H	6.4
6 Su	146am L	-0.4	752am H	5.7	157pm L	-0.5	825pm H	6.5
7 M	234am L	-0.4	839am H	5.5	241pm L	-0.5	911pm H	6.5
8 Tu	320am L	-0.3	925am H	5.3	324pm L	-0.3	955pm H	6.4
9 W	405am L	-0.1	1008am H	5.1	406pm L	-0.1	1037pm H	6.2
10 Th	448am L	0.1	1050am H	4.9	447pm L	0.2	1120pm H	5.9
11 F	532am L	0.3	1133am H	4.6	530pm L	0.5		
12 Sa	1203am H	5.6	617am L	0.6	1218pm H	4.5	614pm L	0.8
13 Su	1247am H	5.3	704am L	0.8	105pm H	4.3	703pm L	1.0
14 M	135am H	5.1	754am L	0.9	157pm H	4.3	758pm L	1.2
15 Tu	225am H	4.9	846am L	0.9	252pm H	4.4	857pm L	1.2
16 W	318am H	4.8	939am L	0.9	347pm H	4.5	957pm L	1.2
17 Th	411am H	4.8	1031am L	0.7	440pm H	4.8	1055pm L	1.0
18 F	502am H	4.8	1120am L	0.5	530pm H	5.1	1148pm L	0.8
19 Sa	552am H	4.9	1206pm L	0.3	617pm H	5.4		
20 Su	1239am L	0.5	639am H	4.9	1250pm L	0.1	703pm H	5.8
21 M	127am L	0.3	724am H	5.0	134pm L	-0.1	747pm H	6.1
22 Tu	213am L	0.1	809am H	5.0	217pm L	-0.2	832pm H	6.3
23 W	259am L	0.0	854am H	5.0	301pm L	-0.3	917pm H	6.4
24 Th	345am L	-0.1	941am H	5.0	346pm L	-0.3	1005pm H	6.5
25 F	433am L	0.0	1031am H	4.9	434pm L	-0.2	1056pm H	6.4
26 Sa	523am L	0.0	1125am H	4.9	526pm L	-0.1	1149pm H	6.3
27 Su	616am L	0.1	1224pm H	4.9	623pm L	0.1		
28 M	1247am H	6.1	713am L	0.1	127pm H	4.9	725pm L	0.2
29 Tu	147am H	5.9	811am L	0.1	231pm H	5.1	830pm L	0.3
30 W	248am H	5.7	911am L	0.1	334pm H	5.3	937pm L	0.3
31 Th	349am H	5.5	1009am L	0.0	435pm H	5.6	1041pm L	0.3

Charleston, South Carolina
Tide Predictions (High and Low Waters) June, 2001
NOAA, National Ocean Service

Daylight Saving Time

Day	Time	Ht.	Time	Ht.	Time	Ht.	Time	Ht.
1 F	448am H	5.4	1104am L	-0.2	533pm H	5.9	1140pm L	0.1
2 Sa	544am H	5.3	1156am L	-0.3	626pm H	6.2		
3 Su	1236am L	0.0	638am H	5.2	1245pm L	-0.4	717pm H	6.3
4 M	126am L	-0.1	728am H	5.2	131pm L	-0.4	804pm H	6.4
5 Tu	214am L	-0.1	815am H	5.0	215pm L	-0.3	848pm H	6.4
6 W	258am L	0.0	859am H	4.9	257pm L	-0.2	931pm H	6.2
7 Th	341am L	0.1	941am H	4.8	338pm L	0.0	1011pm H	6.0
8 F	423am L	0.2	1022am H	4.7	419pm L	0.2	1051pm H	5.8
9 Sa	504am L	0.4	1103am H	4.5	459pm L	0.5	1130pm H	5.5
10 Su	546am L	0.5	1144am H	4.4	541pm L	0.7		
11 M	1210am H	5.3	629am L	0.6	1228pm H	4.4	626pm L	0.9
12 Tu	1251am H	5.1	714am L	0.7	115pm H	4.4	716pm L	1.1
13 W	136am H	4.9	801am L	0.7	206pm H	4.5	811pm L	1.2
14 Th	224am H	4.8	851am L	0.7	259pm H	4.6	910pm L	1.2
15 F	315am H	4.7	942am L	0.6	353pm H	4.9	1011pm L	1.1
16 Sa	409am H	4.6	1033am L	0.4	446pm H	5.2	1110pm L	0.9
17 Su	503am H	4.6	1123am L	0.2	538pm H	5.5		
18 M	1206am L	0.7	556am H	4.7	1213pm L	0.0	630pm H	5.9
19 Tu	1258am L	0.4	649am H	4.8	102pm L	-0.2	720pm H	6.2
20 W	149am L	0.1	741am H	4.9	151pm L	-0.4	811pm H	6.5
21 Th	239am L	-0.1	834am H	5.0	240pm L	-0.5	901pm H	6.6
22 F	328am L	-0.2	927am H	5.0	330pm L	-0.6	953pm H	6.7
23 Sa	418am L	-0.3	1021am H	5.1	421pm L	-0.5	1045pm H	6.6
24 Su	509am L	-0.3	1117am H	5.1	515pm L	-0.4	1139pm H	6.4
25 M	601am L	-0.3	1215pm H	5.2	611pm L	-0.2		
26 Tu	1234am H	6.2	654am L	-0.2	115pm H	5.3	711pm L	0.1
27 W	130am H	5.9	750am L	-0.1	215pm H	5.4	814pm L	0.3
28 Th	228am H	5.6	846am L	-0.1	316pm H	5.5	918pm L	0.4
29 F	326am H	5.3	942am L	-0.1	415pm H	5.7	1021pm L	0.4
30 Sa	424am H	5.1	1037am L	-0.1	512pm H	5.9	1120pm L	0.4

Charleston, South Carolina

Tide Predictions (High and Low Waters) July, 2001
NOAA, National Ocean Service

Daylight Saving Time

Day	Time	Ht.	Time	Ht.	Time	Ht.	Time	Ht.
1 Su	520am H	4.9	1130am L	-0.1	605pm H	6.0		
2 M	1215am L	0.3	614am H	4.9	1219pm L	-0.1	656pm H	6.1
3 Tu	106am L	0.2	704am H	4.8	106pm L	-0.1	743pm H	6.2
4 W	152am L	0.2	751am H	4.8	151pm L	-0.1	827pm H	6.1
5 Th	236am L	0.2	835am H	4.7	233pm L	0.0	908pm H	6.0
6 F	317am L	0.2	916am H	4.7	314pm L	0.1	947pm H	5.9
7 Sa	357am L	0.3	955am H	4.7	353pm L	0.2	1024pm H	5.7
8 Su	436am L	0.3	1033am H	4.6	432pm L	0.4	1059pm H	5.6
9 M	515am L	0.4	1111am H	4.6	512pm L	0.6	1134pm H	5.4
10 Tu	554am L	0.5	1150am H	4.6	553pm L	0.8		
11 W	1209am H	5.2	634am L	0.6	1233pm H	4.6	638pm L	1.0
12 Th	1248am H	5.0	716am L	0.6	119pm H	4.7	728pm L	1.1
13 F	131am H	4.8	802am L	0.6	210pm H	4.9	825pm L	1.2
14 Sa	221am H	4.7	852am L	0.6	306pm H	5.1	928pm L	1.2
15 Su	318am H	4.6	947am L	0.5	404pm H	5.3	1032pm L	1.0
16 M	418am H	4.6	1043am L	0.3	503pm H	5.7	1134pm L	0.8
17 Tu	520am H	4.6	1140am L	0.0	601pm H	6.0		
18 W	1232am L	0.5	620am H	4.8	1235pm L	-0.2	657pm H	6.3
19 Th	126am L	0.2	719am H	5.0	129pm L	-0.5	752pm H	6.6
20 F	219am L	-0.1	816am H	5.2	222pm L	-0.7	846pm H	6.8
21 Sa	309am L	-0.3	912am H	5.4	315pm L	-0.7	938pm H	6.8
22 Su	359am L	-0.5	1007am H	5.6	407pm L	-0.7	1030pm H	6.8
23 M	449am L	-0.5	1102am H	5.7	501pm L	-0.5	1122pm H	6.5
24 Tu	539am L	-0.5	1158am H	5.7	556pm L	-0.3		
25 W	1215am H	6.2	630am L	-0.3	1255pm H	5.8	653pm L	0.0
26 Th	109am H	5.8	723am L	-0.2	153pm H	5.8	753pm L	0.3
27 F	204am H	5.5	817am L	0.0	252pm H	5.8	855pm L	0.6
28 Sa	301am H	5.1	913am L	0.1	350pm H	5.8	957pm L	0.7
29 Su	359am H	4.9	1009am L	0.2	448pm H	5.8	1057pm L	0.7
30 M	456am H	4.8	1104am L	0.3	542pm H	5.9	1152pm L	0.7
31 Tu	550am H	4.7	1155am L	0.3	633pm H	6.0		

Charleston, South Carolina
Tide Predictions (High and Low Waters) August, 2001
NOAA, National Ocean Service

Daylight Saving Time

Day	Time	Ht.	Time	Ht.	Time	Ht.	Time	Ht.
1 W	1242am L	0.6	641am H	4.7	1244pm L	0.2	720pm H	6.0
2 Th	128am L	0.5	728am H	4.8	129pm L	0.2	804pm H	6.0
3 F	211am L	0.4	811am H	4.9	211pm L	0.2	843pm H	6.0
4 Sa	251am L	0.4	851am H	4.9	251pm L	0.2	921pm H	5.9
5 Su	329am L	0.4	928am H	5.0	330pm L	0.3	955pm H	5.8
6 M	406am L	0.4	1004am H	5.0	407pm L	0.5	1020pm H	5.7
7 Tu	443am L	0.4	1039am H	5.0	445pm L	0.6	1059pm H	5.5
8 W	518am L	0.5	1115am H	5.0	524pm L	0.8	1131pm H	5.3
9 Th	554am L	0.6	1153am H	5.1	605pm L	1.0		
10 F	1205am H	5.1	633am L	0.6	1236pm H	5.2	652pm L	1.1
11 Sa	1246am H	4.9	717am L	0.7	127pm H	5.3	748pm L	1.3
12 Su	137am H	4.8	808am L	0.7	225pm H	5.4	851pm L	1.3
13 M	237am H	4.7	907am L	0.6	328pm H	5.6	1000pm L	1.2
14 Tu	345am H	4.6	1010am L	0.5	433pm H	5.9	1106pm L	1.0
15 W	454am H	4.8	1114am L	0.2	537pm H	6.2		
16 Th	1208am L	0.7	600am H	5.0	1214pm L	-0.1	637pm H	6.5
17 F	104am L	0.3	701am H	5.3	111pm L	-0.4	734pm H	6.8
18 Sa	157am L	-0.1	800am H	5.7	206pm L	-0.6	828pm H	7.0
19 Su	248am L	-0.3	855am H	6.0	259pm L	-0.7	920pm H	7.0
20 M	336am L	-0.5	949am H	6.2	352pm L	-0.7	1010pm H	6.9
21 Tu	424am L	-0.5	1042am H	6.3	444pm L	-0.5	1101pm H	6.6
22 W	513am L	-0.4	1136am H	6.3	537pm L	-0.1	1151pm H	6.2
23 Th	601am L	-0.2	1230pm H	6.2	632pm L	0.2		
24 F	1243am H	5.8	652am L	0.1	126pm H	6.1	729pm L	0.6
25 Sa	137am H	5.4	745am L	0.3	223pm H	6.0	828pm L	0.9
26 Su	233am H	5.1	841am L	0.6	322pm H	5.8	930pm L	1.1
27 M	332am H	4.8	939am L	0.7	420pm H	5.8	1029pm L	1.1
28 Tu	430am H	4.8	1036am L	0.8	516pm H	5.8	1125pm L	1.1
29 W	525am H	4.8	1130am L	0.7	607pm H	5.9		
30 Th	1215am L	1.0	616am H	4.9	1220pm L	0.6	654pm H	6.0
31 F	101am L	0.0	703am H	5.1	105pm L	0.5	736pm H	6.0

Charleston, South Carolina

Tide Predictions (High and Low Waters) September, 2001
NOAA, National Ocean Service

Daylight Saving Time

Day	Time	Ht.	Time	Ht.	Time	Ht.	Time	Ht.
1 Sa	143am L	0.7	745am H	5.2	148pm L	0.5	815pm H	6.1
2 Su	222am L	0.6	824am H	5.3	228pm L	0.4	852pm H	6.0
3 M	259am L	0.5	901am H	5.4	306pm L	0.5	925pm H	5.9
4 Tu	335am L	0.5	935am H	5.5	344pm L	0.6	957pm H	5.8
5 W	409am L	0.5	1008am H	5.6	421pm L	0.7	1027pm H	5.6
6 Th	443am L	0.6	1042am H	5.6	459pm L	0.9	1057pm H	5.4
7 F	518am L	0.7	1119am H	5.7	539pm L	1.0	1131pm H	5.2
8 Sa	556am L	0.7	1202pm H	5.7	626pm L	1.2		
9 Su	1213am H	5.0	641am L	0.8	1254pm H	5.7	720pm L	1.4
10 M	106am H	4.9	734am L	0.9	154pm H	5.8	825pm L	1.5
11 Tu	211am H	4.8	837am L	0.8	302pm H	5.9	935pm L	1.4
12 W	325am H	4.8	946am L	0.7	411pm H	6.1	1043pm L	1.1
13 Th	438am H	5.1	1054am L	0.5	517pm H	6.3	1145pm L	0.8
14 F	545am H	5.4	1157am L	0.1	618pm H	6.6		
15 Sa	1242am L	0.4	646am H	5.8	1256pm L	-0.2	714pm H	6.9
16 Su	134am L	0.0	743am H	6.3	150pm L	-0.4	807pm H	7.0
17 M	223am L	-0.3	837am H	6.6	243pm L	-0.5	858pm H	7.0
18 Tu	311am L	-0.4	929am H	6.8	334pm L	-0.5	947pm H	6.8
19 W	357am L	-0.4	1020am H	6.9	425pm L	-0.2	1036pm H	6.5
20 Th	443am L	-0.2	1111am H	6.8	515pm L	0.1	1125pm H	6.1
21 F	530am L	0.0	1202pm H	6.6	607pm L	0.5		
22 Sa	1215am H	5.7	619am L	0.4	1255pm H	6.3	701pm L	0.9
23 Su	107am H	5.3	710am L	0.7	151pm H	6.0	758pm L	1.2
24 M	203am H	5.0	806am L	1.0	248pm H	5.8	857pm L	1.4
25 Tu	301am H	4.8	905am L	1.2	346pm H	5.7	956pm L	1.4
26 W	359am H	4.8	1004am L	1.2	442pm H	5.7	1052pm L	1.4
27 Th	455am H	4.9	1100am L	1.2	533pm H	5.8	1142pm L	1.2
28 F	547am H	5.1	1152am L	1.0	620pm H	5.9		
29 Sa	1228am L	1.0	633am H	5.3	1239pm L	0.9	703pm H	6.0
30 Su	110am L	0.8	716am H	5.5	122pm L	0.7	742pm H	6.0

Charleston, South Carolina
Tide Predictions (High and Low Waters) October, 2001
NOAA, National Ocean Service

Day	Time	Ht.	Time	Ht.	Time	Ht.	Time	Ht.
1 M	149am L	0.6	755am H	5.7	203pm L	0.6	819pm H	6.0
2 Tu	226am L	0.5	831am H	5.9	243pm L	0.6	854pm H	5.9
3 W	302am L	0.5	906am H	6.0	321pm L	0.7	926pm H	5.7
4 Th	337am L	0.5	941am H	6.1	359pm L	0.7	958pm H	5.6
5 F	412am L	0.6	1016am H	6.1	439pm L	0.9	1031pm H	5.4
6 Sa	448am L	0.6	1055am H	6.1	521pm L	1.0	1108pm H	5.2
7 Su	528am L	0.7	1140am H	6.1	608pm L	1.2	1154pm H	5.1
8 M	616am L	0.8	1233pm H	6.0	703pm L	1.3		
9 Tu	1251am H	4.9	712am L	0.9	135pm H	6.0	807pm L	1.4
10 W	201am H	4.9	818am L	0.9	243pm H	6.0	916pm L	1.3
11 Th	315am H	5.0	929am L	0.8	352pm H	6.1	1022pm L	1.0
12 F	427am H	5.3	1038am L	0.6	457pm H	6.3	1123pm L	0.7
13 Sa	532am H	5.8	1142am L	0.3	557pm H	6.5		
14 Su	1219am L	0.3	631am H	6.2	1240pm L	0.0	653pm H	6.7
15 M	110am L	-0.1	726am H	6.6	135pm L	-0.2	746pm H	6.7
16 Tu	158am L	-0.3	818am H	6.9	226pm L	-0.3	835pm H	6.6
17 W	244am L	-0.4	908am H	7.1	316pm L	-0.3	924pm H	6.4
18 Th	330am L	-0.3	957am H	7.1	404pm L	-0.1	1011pm H	6.1
19 F	415am L	-0.1	1045am H	6.9	453pm L	0.2	1058pm H	5.8
20 Sa	500am L	0.2	1133am H	6.6	541pm L	0.6	1146pm H	5.4
21 Su	546am L	0.6	1223pm H	6.2	631pm L	0.9		
22 M	1235am H	5.1	635am L	0.9	115pm H	5.9	724pm L	1.2
23 Tu	128am H	4.9	728am L	1.2	209pm H	5.7	819pm L	1.4
24 W	224am H	4.7	826am L	1.4	304pm H	5.5	916pm L	1.5
25 Th	322am H	4.7	926am L	1.4	359pm H	5.5	1011pm L	1.4
26 F	418am H	4.9	1024am L	1.4	451pm H	5.5	1102pm L	1.2
27 Sa	510am H	5.1	1118am L	1.2	539pm H	5.6	1149pm L	1.0

Standard Time begins

28 Su	458am H	5.3	1107am L	1.0	524pm H	5.6	1133pm L	0.7
29 M	542am H	5.6	1153am L	0.8	605pm H	5.7		
30 Tu	1213am L	0.6	622am H	5.9	1237pm L	0.7	644pm H	5.6
31 W	1252am L	0.4	701am H	6.1	118pm L	0.6	721pm H	5.6

Charleston, South Carolina

NOAA/NOS CO-OPS

2005 Tide Predictions: Cooper River, Goose Creek entrance

(Reference station: Charleston, Corrections Applied: Times: High +0 hr. 43 min., Low +0 hr. 33 min., Heights: High *1.03, Low *1.00)

January

Date	Day	Time	Height		Time	Height		Time	Height		Time	Height		Ti
01/01/2005	Sat	05:39AM LST	0.6	L	11:54AM LST	5.2	H	06:10PM LST	0.5	L				
01/02/2005	Sun	12:27AM LST	4.5	H	06:29AM LST	0.7	L	12:38PM LST	4.9	H	06:55PM LST	0.5	L	
01/03/2005	Mon	01:19AM LST	4.7	H	07:27AM LST	0.7	L	01:29PM LST	4.8	H	07:45PM LST	0.4	L	
01/04/2005	Tue	02:17AM LST	4.9	H	08:31AM LST	0.7	L	02:27PM LST	4.7	H	08:40PM LST	0.2	L	
01/05/2005	Wed	03:20AM LST	5.3	H	09:39AM LST	0.6	L	03:29PM LST	4.6	H	09:41PM LST	0.0	L	
01/06/2005	Thu	04:23AM LST	5.6	H	10:44AM LST	0.3	L	04:32PM LST	4.6	H	10:42PM LST	-0.2	L	
01/07/2005	Fri	05:26AM LST	6.0	H	11:46AM LST	0.0	L	05:35PM LST	4.8	H	11:42PM LST	-0.5	L	
01/08/2005	Sat	06:27AM LST	6.3	H	12:43PM LST	-0.3	L	06:35PM LST	5.0	H				
01/09/2005	Sun	12:41AM LST	-0.8	L	07:25AM LST	6.6	H	01:38PM LST	-0.6	L	07:33PM LST	5.2	H	
01/10/2005	Mon	01:37AM LST	-1.1	L	08:21AM LST	6.8	H	02:30PM LST	-0.7	L	08:29PM LST	5.4	H	
01/11/2005	Tue	02:32AM LST	-1.2	L	09:15AM LST	6.8	H	03:21PM LST	-0.8	L	09:24PM LST	5.5	H	
01/12/2005	Wed	03:26AM LST	-1.2	L	10:07AM LST	6.7	H	04:11PM LST	-0.8	L	10:19PM LST	5.6	H	
01/13/2005	Thu	04:20AM LST	-1.0	L	10:58AM LST	6.4	H	05:00PM LST	-0.8	L	11:13PM LST	5.5	H	
01/14/2005	Fri	05:14AM LST	-0.6	L	11:49AM LST	6.1	H	05:50PM LST	-0.6	L				
01/15/2005	Sat	12:09AM LST	5.5	H	06:11AM LST	-0.3	L	12:39PM LST	5.6	H	06:40PM LST	-0.4	L	
01/16/2005	Sun	01:05AM LST	5.4	H	07:09AM LST	0.1	L	01:31PM LST	5.2	H	07:31PM LST	-0.2	L	
01/17/2005	Mon	02:01AM LST	5.3	H	08:11AM LST	0.4	L	02:24PM LST	4.7	H	08:23PM LST	0.0	L	
01/18/2005	Tue	02:58AM LST	5.3	H	09:13AM LST	0.6	L	03:19PM LST	4.5	H	09:17PM LST	0.1	L	
01/19/2005	Wed	03:55AM LST	5.3	H	10:14AM LST	0.7	L	04:14PM LST	4.3	H	10:10PM LST	0.2	L	
01/20/2005	Thu	04:49AM LST	5.3	H	11:10AM LST	0.6	L	05:08PM LST	4.3	H	11:03PM LST	0.2	L	
01/21/2005	Fri	05:41AM LST	5.4	H	12:01PM LST	0.6	L	05:59PM LST	4.3	H	11:52PM LST	0.1	L	
01/22/2005	Sat	06:29AM LST	5.4	H	12:47PM LST	0.4	L	06:47PM LST	4.4	H				
01/23/2005	Sun	12:38AM LST	0.0	L	07:14AM LST	5.5	H	01:29PM LST	0.3	L	07:31PM LST	4.5	H	
01/24/2005	Mon	01:21AM LST	-0.1	L	07:55AM LST	5.6	H	02:07PM LST	0.3	L	08:13PM LST	4.6	H	
01/25/2005	Tue	02:01AM LST	-0.1	L	08:34AM LST	5.6	H	02:44PM LST	0.2	L	08:52PM LST	4.6	H	
01/26/2005	Wed	02:40AM LST	-0.2	L	09:09AM LST	5.6	H	03:18PM LST	0.2	L	09:29PM LST	4.6	H	
01/27/2005	Thu	03:17AM LST	-0.1	L	09:43AM LST	5.5	H	03:50PM LST	0.2	L	10:03PM LST	4.7	H	
01/28/2005	Fri	03:55AM LST	0.0	L	10:14AM LST	5.4	H	04:23PM LST	0.1	L	10:36PM LST	4.7	H	
01/29/2005	Sat	04:34AM LST	0.1	L	10:46AM LST	5.3	H	04:57PM LST	0.1	L	11:11PM LST	4.8	H	
01/30/2005	Sun	05:17AM LST	0.2	L	11:22AM LST	5.0	H	05:34PM LST	0.1	L	11:52PM LST	4.9	H	
01/31/2005	Mon	06:05AM LST	0.3	L	12:03PM LST	4.8	H	06:16PM LST	0.1	L				

All times are listed in Local Standard Time(LST) or, Local Daylight Time (LDT) (when applicable). All heights are in feet referenced to Mean Lower Low Water (MLLW).

February

D	Day	Time	Height		Time	Height		Time	Height		Time	Height		Ti
02/01/2005	Tue	12:40AM LST	5.0	H	07:00AM LST	0.5	L	12:53PM LST	4.6	H	07:06PM LST	0.1	L	
02/02/2005	Wed	01:38AM LST	5.2	H	08:04AM LST	0.5	L	01:51PM LST	4.5	H	08:04PM LST	0.1	L	
02/03/2005	Thu	02:45AM LST	5.3	H	09:13AM LST	0.5	L	02:57PM LST	4.4	H	09:10PM LST	0.0	L	
02/04/2005	Fri	03:57AM LST	5.5	H	10:22AM LST	0.3	L	04:08PM LST	4.4	H	10:19PM LST	-0.2	L	
02/05/2005	Sat	05:08AM LST	5.8	H	11:26AM LST	0.0	L	05:17PM LST	4.6	H	11:26PM LST	-0.5	L	
02/06/2005	Sun	06:13AM LST	6.2	H	12:25PM LST	-0.3	L	06:21PM LST	4.9	H				
02/07/2005	Mon	12:28AM LST	-0.9	L	07:13AM LST	6.4	H	01:19PM LST	-0.6	L	07:21PM LST	5.3	H	
02/08/2005	Tue	01:25AM LST	-1.1	L	08:08AM LST	6.6	H	02:11PM LST	-0.9	L	08:16PM LST	5.6	H	
02/09/2005	Wed	02:20AM LST	-1.3	L	08:59AM LST	6.6	H	02:59PM LST	-1.0	L	09:09PM LST	5.8	H	
02/10/2005	Thu	03:12AM LST	-1.2	L	09:47AM LST	6.5	H	03:46PM LST	-1.0	L	10:00PM LST	5.9	H	
02/11/2005	Fri	04:04AM LST	-1.0	L	10:34AM LST	6.2	H	04:32PM LST	-0.9	L	10:50PM LST	5.9	H	
02/12/2005	Sat	04:55AM LST	-0.7	L	11:20AM LST	5.8	H	05:17PM LST	-0.7	L	11:39PM LST	5.8	H	
02/13/2005	Sun	05:47AM LST	-0.3	L	12:06PM LST	5.4	H	06:02PM LST	-0.4	L				
02/14/2005	Mon	12:29AM LST	5.6	H	06:41AM LST	0.2	L	12:54PM LST	4.8	H	06:49PM LST	-0.1	L	
02/15/2005	Tue	01:20AM LST	5.4	H	07:37AM LST	0.5	L	01:45PM LST	4.5	H	07:40PM LST	0.2	L	
02/16/2005	Wed	02:14AM LST	5.2	H	08:37AM LST	0.8	L	02:40PM LST	4.2	H	08:34PM LST	0.4	L	
02/17/2005	Thu	03:12AM LST	4.9	H	09:38AM LST	0.9	L	03:38PM LST	4.1	H	09:32PM LST	0.5	L	
02/18/2005	Fri	04:11AM LST	4.9	H	10:37AM LST	0.9	L	04:36PM LST	4.1	H	10:30PM LST	0.5	L	
02/19/2005	Sat	05:08AM LST	5.0	H	11:30AM LST	0.8	L	05:31PM LST	4.2	H	11:24PM LST	0.4	L	
02/20/2005	Sun	06:01AM LST	5.2	H	12:17PM LST	0.6	L	06:21PM LST	4.4	H				
02/21/2005	Mon	12:13AM LST	0.2	L	06:48AM LST	5.4	H	12:59PM LST	0.5	L	07:07PM LST	4.6	H	
02/22/2005	Tue	12:58AM LST	0.0	L	07:30AM LST	5.5	H	01:37PM LST	0.3	L	07:50PM LST	4.8	H	
02/23/2005	Wed	01:39AM LST	-0.1	L	08:08AM LST	5.6	H	02:12PM LST	0.1	L	08:29PM LST	5.0	H	
02/24/2005	Thu	02:19AM LST	-0.2	L	08:43AM LST	5.6	H	02:46PM LST	0.0	L	09:05PM LST	5.2	H	
02/25/2005	Fri	02:57AM LST	-0.2	L	09:16AM LST	5.5	H	03:18PM LST	0.0	L	09:38PM LST	5.3	H	
02/26/2005	Sat	03:36AM LST	-0.2	L	09:48AM LST	5.4	H	03:51PM LST	-0.1	L	10:11PM LST	5.4	H	
02/27/2005	Sun	04:17AM LST	-0.1	L	10:21AM LST	5.3	H	04:26PM LST	-0.1	L	10:45PM LST	5.5	H	
02/28/2005	Mon	05:00AM LST	0.1	L	10:57AM LST	5.0	H	05:04PM LST	-0.1	L	11:26PM LST	5.5	H	

3/1/05
3/2/05

All times are listed in Local Standard Time(LST) or, Local Daylight Time (LDT) (when applicable). All heights are in feet referenced to Mean Lower Low Water (MLLW).

March

Date	Day	Time	Height		Time	Height		Time	Height		Time	Height		Ti
03/01/2005	Tue	05:48AM LST	0.2	L	11:39AM LST	4.8	H	05:48PM LST	0.0	L				
03/02/2005	Wed	12:14AM LST	5.5	H	06:42AM LST	0.4	L	12:30PM LST	4.6	H	06:39PM LST	0.1	L	
03/03/2005	Thu	01:13AM LST	5.5	H	07:45AM LST	0.5	L	01:30PM LST	4.5	H	07:41PM LST	0.2	L	
03/04/2005	Fri	02:24AM LST	5.5	H	08:54AM LST	0.5	L	02:40PM LST	4.4	H	08:52PM LST	0.1	L	
03/05/2005	Sat	03:41AM LST	5.6	H	10:03AM LST	0.4	L	03:54PM LST	4.5	H	10:06PM LST	0.0	L	
03/06/2005	Sun	04:54AM LST	5.8	H	11:07AM LST	0.1	L	05:05PM LST	4.8	H	11:14PM LST	-0.3	L	
03/07/2005	Mon	05:59AM LST	6.1	H	12:05PM LST	-0.2	L	06:10PM LST	5.3	H				
03/08/2005	Tue	12:17AM LST	-0.6	L	06:57AM LST	6.3	H	12:58PM LST	-0.5	L	07:08PM LST	5.7	H	
03/09/2005	Wed	01:13AM LST	-0.9	L	07:49AM LST	6.4	H	01:47PM LST	-0.8	L	08:01PM LST	6.0	H	
03/10/2005	Thu	02:07AM LST	-1.0	L	08:37AM LST	6.4	H	02:33PM LST	-0.9	L	08:50PM LST	6.2	H	
03/11/2005	Fri	02:57AM LST	-0.9	L	09:22AM LST	6.2	H	03:17PM LST	-0.9	L	09:37PM LST	6.3	H	
03/12/2005	Sat	03:46AM LST	-0.7	L	10:06AM LST	5.9	H	04:00PM LST	-0.7	L	10:22PM LST	6.2	H	
03/13/2005	Sun	04:34AM LST	-0.4	L	10:49AM LST	5.5	H	04:42PM LST	-0.5	L	11:06PM LST	6.1	H	
03/14/2005	Mon	05:21AM LST	0.0	L	11:33AM LST	5.2	H	05:25PM LST	-0.1	L	11:51PM LST	5.8	H	
03/15/2005	Tue	06:10AM LST	0.4	L	12:18PM LST	4.7	H	06:09PM LST	0.2	L				
03/16/2005	Wed	12:37AM LST	5.5	H	07:01AM LST	0.7	L	01:07PM LST	4.4	H	06:56PM LST	0.6	L	
03/17/2005	Thu	01:29AM LST	5.2	H	07:57AM LST	1.0	L	02:01PM LST	4.2	H	07:51PM LST	0.8	L	
03/18/2005	Fri	02:26AM LST	4.9	H	08:56AM LST	1.2	L	03:00PM LST	4.1	H	08:51PM LST	0.9	L	
03/19/2005	Sat	03:28AM LST	4.8	H	09:55AM LST	1.2	L	04:01PM LST	4.2	H	09:53PM LST	0.9	L	
03/20/2005	Sun	04:28AM LST	4.9	H	10:49AM LST	1.1	L	04:58PM LST	4.4	H	10:50PM LST	0.7	L	
03/21/2005	Mon	05:22AM LST	5.0	H	11:37AM LST	0.8	L	05:50PM LST	4.6	H	11:42PM LST	0.5	L	
03/22/2005	Tue	06:11AM LST	5.3	H	12:20PM LST	0.6	L	06:37PM LST	4.9	H				
03/23/2005	Wed	12:29AM LST	0.3	L	06:54AM LST	5.4	H	12:58PM LST	0.4	L	07:20PM LST	5.3	H	
03/24/2005	Thu	01:13AM LST	0.1	L	07:34AM LST	5.5	H	01:35PM LST	0.1	L	07:59PM LST	5.5	H	
03/25/2005	Fri	01:55AM LST	-0.1	L	08:11AM LST	5.6	H	02:10PM LST	0.0	L	08:36PM LST	5.7	H	
03/26/2005	Sat	02:37AM LST	-0.1	L	08:46AM LST	5.5	H	02:44PM LST	-0.1	L	09:11PM LST	5.9	H	
03/27/2005	Sun	03:18AM LST	-0.2	L	09:22AM LST	5.4	H	03:20PM LST	-0.2	L	09:47PM LST	6.0	H	
03/28/2005	Mon	04:01AM LST	-0.1	L	09:59AM LST	5.3	H	03:59PM LST	-0.1	L	10:25PM LST	6.1	H	
03/29/2005	Tue	04:47AM LST	0.0	L	10:39AM LST	5.0	H	04:41PM LST	-0.1	L	11:09PM LST	6.0	H	
03/30/2005	Wed	05:36AM LST	0.2	L	11:25AM LST	4.8	H	05:29PM LST	0.1	L				
03/31/2005	Thu	12:02AM LST	5.9	H	06:31AM LST	0.3	L	12:19PM LST	4.7	H	06:25PM LST	0.2	L	

All times are listed in Local Standard Time(LST) or, Local Daylight Time (LDT) (when applicable). All heights are in feet referenced to Mean Lower Low Water (MLLW).

APPENDIX C-5
SOLUTIONS-IES PILOT SCALE TREATABILITY STUDY REPORTS

MEMORANDUM

TO: Dr. Andrea Leeson; Bryan Harre, ESTCP
Cliff Casey; Jeff Adams, SOUTHDIV

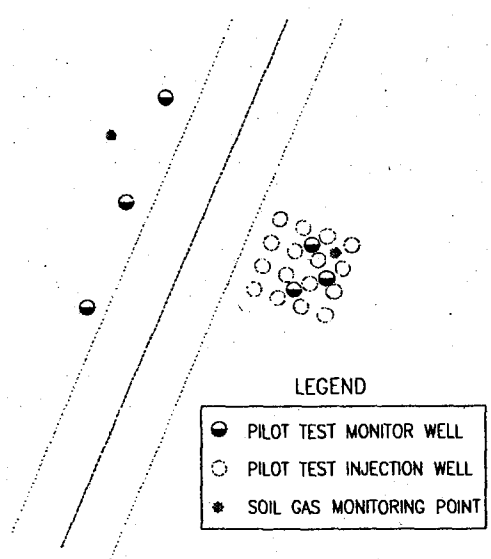
FROM: Dr. Robert C. Borden, P.E.; Christie Zawtocki, P.E., Solutions-IES

DATE: March 15, 2005

RE: ESTCP Project CU-0221
Project Status Update
Naval Weapons Station, Charleston, SC

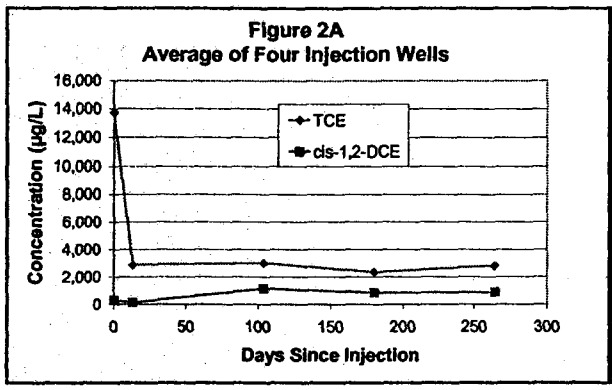
Solutions-IES has prepared this memo to update ESTCP on the status of the edible oil substrate pilot study at the Naval Weapons Station in Charleston, SC and to propose additional activities not included in the Technology Demonstration Plan for this site. The pilot test was initiated in May 2004 with the injection of emulsified edible oil in 16 temporary injection wells at SWMU 17. A temporary recirculation system was used to smear the emulsion throughout the 20-ft by 20-ft treatment area. Baseline monitoring activities were conducted before injection, and the first nine months of performance monitoring have been completed with sampling events immediately after injection and at approximately 3 months, 6 months, and 9 months post-injection. The monitoring activities consist of collecting groundwater samples from 3 upgradient monitor wells, 3 monitor wells located in the pilot test grid, and 4 injection wells. Figure 1 shows the layout of the pilot test area.

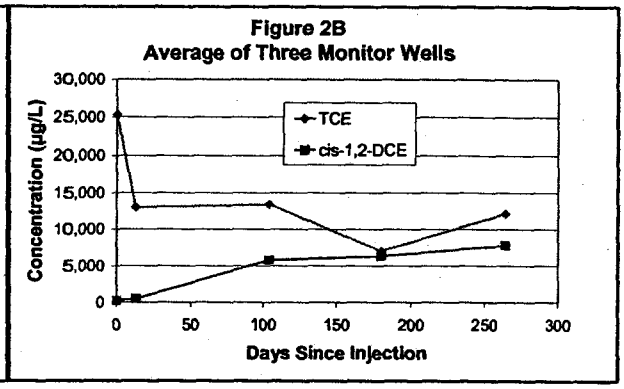
Figure 1 –
Pilot Test Layout



Solutions-IES has evaluated the first 9 months of monitoring data to assess the performance of the pilot test. Figure 2A and 2B, below, show the changes in TCE and *cis*-1,2-DCE in the injection wells and monitor wells located within the test grid. As shown in the figures, an initial drop in TCE was observed after injection with some production of *cis*-1,2-DCE. However, at nine months post-injection, the data

suggest that both degradation of TCE and formation of *cis*-1,2-DCE have slowed considerably or possibly stopped.



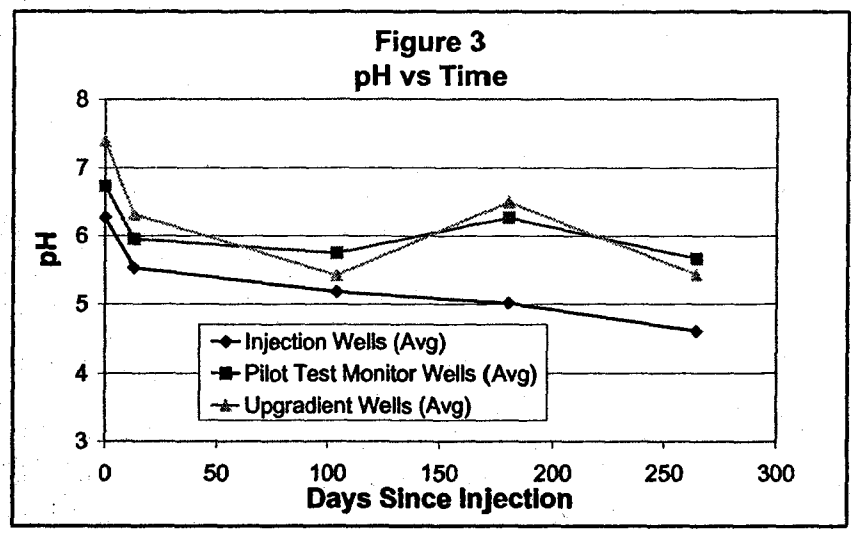


In an effort to understand the observed changes in TCE at the site, Solutions-IES reviewed the geochemistry and other data from the pilot test wells. Based on these data, we have developed three hypotheses to explain the apparent stall:

a. Low molecular weight fatty acids have accumulated in the aquifer leading to a drop in pH and a 'sour' aquifer. Table 1 below summarizes the results of the volatile fatty acid analyses that have been performed. As shown in the table, high levels of fatty acids are accumulating in the injection wells. Figure 3 shows the pH changes that have been observed at the site. In general, pH has decreased in all of the wells being monitored; however, a more dramatic reduction in pH has been observed in the injection wells with current pH values around 4.5. This is a concern, because pH levels below 4 or 5 may inhibit growth of dechlorinating microbes.

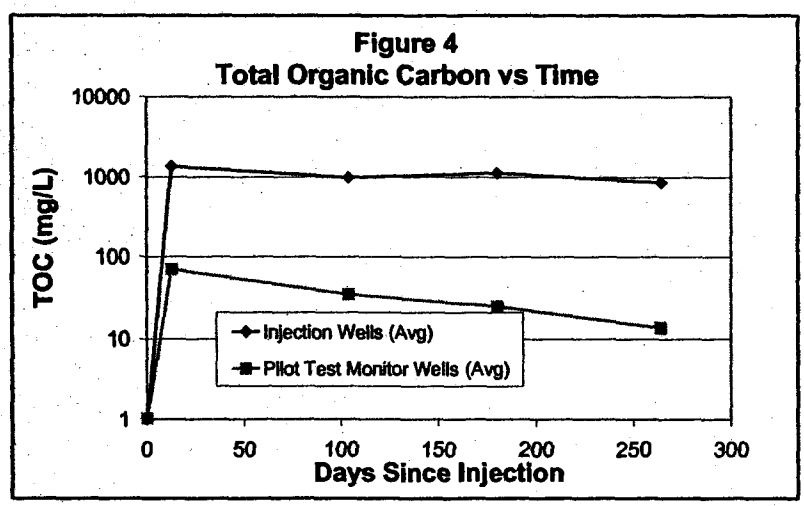
TABLE 1
Volatile Fatty Acids in Groundwater

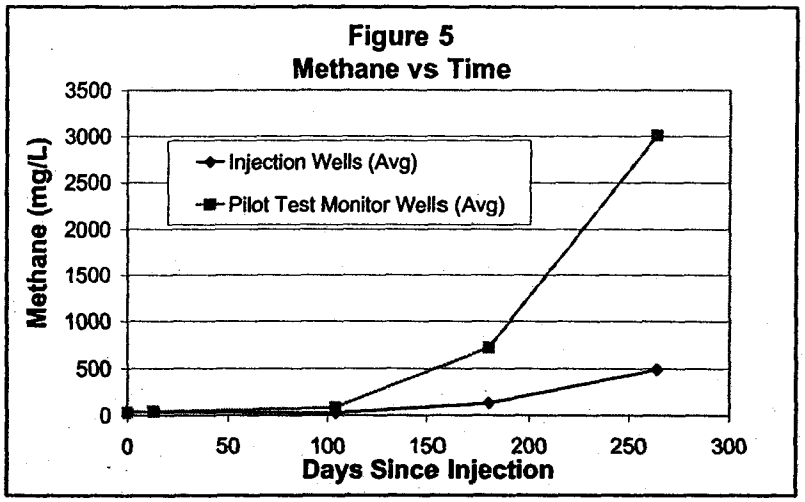
Well ID	Sample Date	Pyruvic Acid (mg/L)	Lacitc Acid (mg/L)	Formic Acid (mg/L)	Acetic Acid (mg/L)	Propionic Acid (mg/L)	Butyric Acid (mg/L)
Upgradient Monitoring Well							
17MW-6S	4/1/2004	<4	<1	<1	<1	<1	<1
	6/2/2004	<4	<1	<1	6.0	<1	<1
	9/1/2004	<40	<10	<1	<1	<1	<1
	11/16/2004	<4	<1	<1	<1	<1	<1
	2/9/2005	<4	<1	<1	<1	<1	<1
Injection Wells							
17-PSI-07	3/31/2004	<4	<1	<1	<1	<1	<1
	6/2/2004	<4	<1	<1	224.2	174.6	118.6
	9/1/2004	<40	<10	17.10	281.9	44.5	250.0
	11/17/2004	<80	<20	<20	663.8	31.7	520.1
	2/8/2005	<40	<1	<1	495.7	34.6	396.4
17-PSI-10	3/31/2004	<4	<1	<1	<1	<1	<1
	6/2/2004	<4	<1	<1	183.1	243.9	64.7
	9/1/2004	<40	<10	2.40	482.0	123.1	247.4
	11/17/2004	<80	<20	<20	676.7	90.9	270.5
	2/8/2005	<4	<1	<1	618.3	50.6	257.8
Pilot Test Monitoring Well							
17-PS-02	4/1/2004	<4	<1	<1	<1	<1	<1
	6/2/2004	<4	<1	<1	107.9	5.5	1.4
	9/1/2004	<40	<10	<1	<1	<1	<1
	11/16/2004	<4	<1	<1	24.5	2.1	<1
	2/8/2005	<4	<1	<1	5.4	<1	<1



b. Microorganisms capable of complete dechlorination are not present in the aquifer. Although the pH levels may be too low for reductive dechlorination in the injection wells, the pH levels in the pilot test monitor wells are around pH 5.7, which should not be inhibitory. Anaerobic, reducing conditions have been achieved in these wells as evidenced by reductions in DO, ORP and sulfate and increases in dissolved oxygen and methane. Despite the presence of favorable conditions, limited biotransformation of TCE and cis-DCE has been observed in the pilot test monitor wells. This could possibly indicate the absence of microorganisms capable of complete dechlorination.

c. Bioavailable carbon has been depleted in most of the treatment area due to active methanogenesis, and the low levels of dissolved organic carbon are now limiting TCE and cis-DCE biodegradation. Figure 4 below shows the average TOC levels in the pilot test wells. A substantial increase in TOC was observed in the injection wells immediately after EOS® injection and has been maintained for 9 months. In the pilot test monitor wells, an increase in TOC was observed immediately after injection, but levels have declined to near 10 mg/L. As shown in Figure 5, methane levels have increased substantially in the monitor wells indicating that methanogenesis may be consuming the organic carbon. Insufficient carbon may be present to sustain reductive dechlorination in these wells.





At this point, we believe there are three ways of proceeding with the emulsified oil project at the Charleston NWS site:

1. Continue to monitor the field pilot test "as is." Substantial further changes in chlorinated solvents will likely not occur and the usefulness of the additional data will be limited.
2. Attempt to modify the field pilot test by either adding a pH buffer, a dechlorinating inoculum, or additional EOS®. Since we are unsure which process is limiting reductive dechlorination, the potential effectiveness of these approaches is unknown.
3. Conduct a laboratory microcosm study to determine which of these processes or combination of processes may be limiting reductive dechlorination at the Charleston NWS pilot test site..

We feel confident that performing a microcosm study in a controlled laboratory environment provides the best opportunity to evaluate and understand the process(es) responsible for the field observations. Therefore, we propose to conduct a microcosm study using sediment and groundwater from the field pilot test area. The proposed microcosm plan is attached. We estimate the microcosm study will cost approximately $25,000 to $30,000 to implement. To fund the study, we propose to re-direct funds from other activities planned at the Charleston NWS. The remaining activities currently scheduled and budgeted for the NWS include the following:

- Performance monitoring at 12 months, 15 months, and 18 months post-injection;
- Mass flux monitoring at 15 to 18 months post-injection; and
- Soil sampling at 15 to 18 months post-injection to evaluate reductions in VOCs and changes in TOC.

We propose to proceed with the 12-month and 18-month post-injection monitoring events, eliminate the 15-month post-injection event, and delay the final mass flux monitoring and soil sampling events. The funds budgeted for these activities would be re-directed to the microcosm study. The microcosm study would be initiated in April 2005. After 6 months (Oct/Nov 2005), we would evaluate the microcosm results and develop a plan for proceeding with the field pilot study. At that time, we would discuss with ESTCP the plan to implement changes indicated by the lab studies or agree to complete the project at that point in order to remain on the original schedule. Should ESTCP wish to continue the project and test the laboratory results in the field, additional funding would be requested to proceed with the additional field activities and the project timeframe would need to be extended.

MICROCOSM PLAN – Charleston NWS EOS® Pilot Test Site
March 15, 2005

1.0 INTRODUCTION

In May 2004, unbuffered EOS® solution was injected into a 20 ft x 20 ft area in SWMU 17 at the Charleston NWS to stimulate reductive dechlorination of TCE. Monitoring data collected in winter 2005 suggest that anaerobic biodegradation has slowed or stopped. Three hypotheses have been proposed to explain the apparent stall:

a. Low molecular weight fatty acids have accumulated in the aquifer leading to a drop in pH and a 'sour' aquifer. This is supported by high levels of fatty acids and low pH in the injection wells.

b. Microorganisms capable of complete dechlorination are not present in the aquifer. This is supported by the limited biotransformation of TCE and cis-DCE in the monitor wells, even though pH is not too low in these wells.

c. Bioavailable carbon has been depleted in most of the treatment area due to active methanogenesis. The low levels of dissolved organic carbon are now limiting TCE and cis-DCE biodegradation. This is supported by the low levels of organic carbon and high levels of methane in several of the monitor wells.

The objective of the proposed microcosm study is to determine which of these processes or combination of processes are important at the Charleston NWS pilot test site and evaluate treatments that could be scaled up in the field to re-start and/or accelerate TCE and cis-DCE biodegradation.

2.0 PRELIMINARY WORK

1. Prepare stock solution of 10% NaOH.
2. Titrate 100 mL of groundwater with NaOH to pH=7 (two injection wells and two monitor wells).
3. Titrate 50 g of sediment in 100 mL of DI water with NaOH to pH=7 (two samples).

3.0 EXPERIMENTAL TREATMENTS

The microcosms will be constructed, incubated, and analyzed at the laboratory of Environmental Engineering at North Carolina State University under the direction of Dr. Robert Borden. Microcosms will be constructed using aquifer material and groundwater from two locations: (a) within the pilot test area; and (b) from a background area. Experimental treatments will include:

Pilot Test Area
1. Killed control - 1 bottle
2. Live control (no amendments) - 3 bottles
3. pH buffer - 3 bottles
4. pH buffer + bioaugmentation culture - 3 bottles
5. pH buffer + bioaugmentation culture + EOS® (neutralized) - 3 bottles

Background Area
1. Killed control - 1 bottle
2. Live control (no amendments) - 3 bottles
3. Unbuffered EOS® - 3 bottles
4. Buffered EOS® - 3 bottles
5. Buffered EOS® + bioaugmentation culture + EOS® (neutralized) - 3 bottles

4.0 MICROCOSM CONSTRUCTION

1. Prior to microcosm construction, prepare the following materials.

    a. One #4 sieve - clean and autoclaved

    b. Twenty-two 245 mL serum bottles with thick rubber stoppers - clean and autoclaved

    c. Two 250 mL graduated cylinders – clean and autoclaved

    d. Buffer stock solution (concentration will be determined based on preliminary work)

    e. Buffered EOS® stock solution. Dilute 10 mL concentrated EOS® with 80 mL DI water. Adjust pH to 7.0 with NaOH. Then, dilute to a final volume of 100 mL with DI water generating a 10% dilution.

    f. Bioaugmentation culture

    g. Large plastic tray covered with thick aluminum foil.

2. Microcosm construction (for each location)

    a. Transfer all materials to anaerobic hood. Leave stock solutions sitting out overnight with the tops off to allow oxygen exchange.

    b. Blend and sieve sediment

    c. Add 100 g damp sediment to each bottle using balance

    d. Add 150 mL groundwater to each bottle using graduated cylinder

    e. Seal with thick rubber stoppers.

    f. Add the following treatments to the bottles.

        i. Killed – autoclaved at 121°C for 30 minutes on two consecutive days (1 bottle)

        ii. Ambient conditions – don't add anything (3 bottles)

        iii. Add 1 mL buffer solution - 3 bottles

        iv. Add 1 mL buffer solution + bioaugmentation culture - 3 bottles

        v. Add 1 mL buffer solution + bioaug. culture + 1 mL EOS® (neutralized) - 3 bottles

3. Microcosm Sampling

a. Sample each microcosm at the following times after microcosm construction
   - 1 day
   - 2 weeks
   - 1 month
   - 2 months
   - 3 months
   - 6 months
   - 12 months

b. Monitor for the following parameters

   i. Gases (methane, ethane, ethene, vinyl chloride)

   ii. Chlorinated VOCs (PCE, TCE, cis-DCE, trans-DCE)

   iii. pH using standard pH test paper

   iv. TOC analysis (by a commercial lab)

MEMORANDUM

TO: Dr. Andrea Leeson; Bryan Harre, ESTCP
Cliff Casey; Jeff Adams, SOUTHDIV

FROM: Dr. Robert C. Borden, P.E.; Christie Zawtocki, P.E., Solutions-IES

DATE: January 18, 2005

RE: ESTCP Project CU-0221
Results of 6-Month Geoprobe Sampling Event and
Proposed Modifications to Technology Demonstration Plan
Naval Weapons Station, Charleston, SC

Solutions-IES has prepared this memo to update ESTCP on proposed changes to the edible oil substrate pilot study at the Naval Weapons Station in Charleston, SC. The Technology Demonstration Plan for this site included the installation of monitor wells downgradient of the injection wells. However, due to the flat gradient and uncertainty regarding the groundwater flow direction, we prepared a memo dated March 16, 2004, which proposed delaying installation of the downgradient wells. In the memo, we proposed to conduct a Geoprobe investigation 6 months after injection to assess groundwater conditions and evaluate the impact of the injection. Based on the results of the Geoprobe investigation, we proposed to either install downgradient wells or conduct a subsequent Geoprobe sampling event (e.g., 12 months or 18 months).

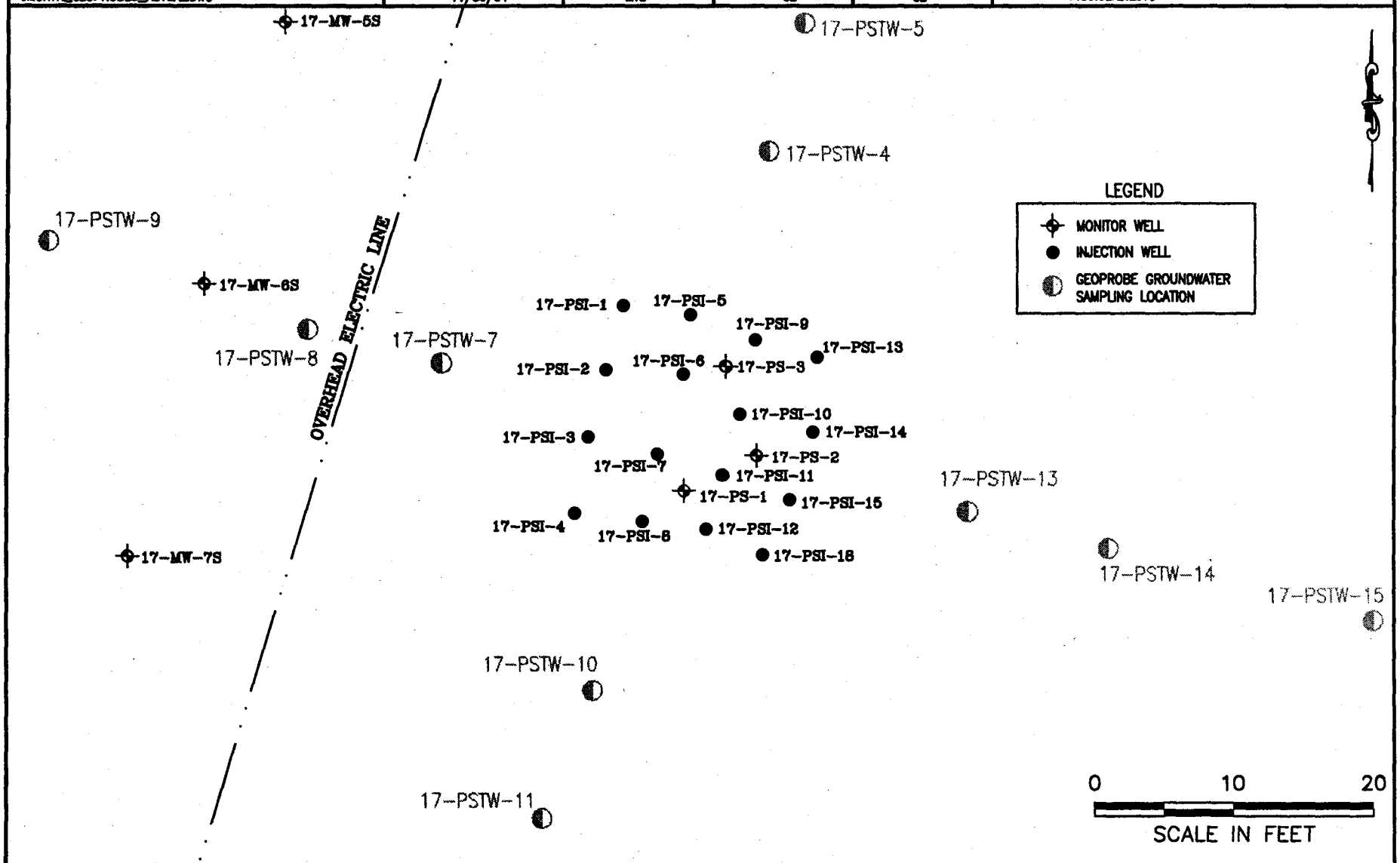
Injections activities were conducted at the Charleston NWS site between May 13 and 21, 2004, and the 6-month post-injection Geoprobe sampling event was conducted between November 8 and 11, 2004. The Geoprobe investigation consisted of collecting groundwater samples from the 12 locations shown on the attached figures (Figure 1A and 1B). The locations are approximately 20, 30, and 50 feet from the center of the pilot test area. At each location, a boring was advanced to a total depth of 16 feet below ground surface (bgs) and a temporary section of 5-foot screen was placed in the hole to allow collection of groundwater samples using a peristaltic pump. The temporary screen interval of 11 to 16 feet bgs correlates to approximately the middle portion of the pilot test injection and monitor well screen intervals of 8 to 18 feet bgs. The groundwater samples were analyzed for volatile contaminants (TCE, cis-DCE, trans-DCE, VC), gases (methane, ethene, ethane), total organic carbon (TOC), nitrate, nitrite, sulfate, phosphate, chloride, and field parameters (pH, DO, Eh, specific conductance and temperature).

Table 1 summarizes the results of the Geoprobe investigation. The data suggest that none of the Geoprobe sampling locations have been impacted by the pilot test injection activities, as evidenced by the non-detectable total organic carbon results, the positive ORP values, the high sulfate levels, and relatively low concentrations of TCE daughter products. Data from the pilot test injection and monitor wells are provided in Tables 2 and 3 for comparison.

Based on the results of the Geoprobe sampling, we propose to not install any additional monitor wells at this time. None of the locations sampled during the 6-month Geoprobe event were impacted by the injection. It does not appear that permanent monitor wells installed at any of these locations would yield useful data. Since the pilot test is designed as an areal treatment rather than a permeable reactive barrier, the performance of the pilot test will be adequately

evaluated with the existing monitor well network. As the pilot test progresses, Solutions-IES will re-evaluate conducting another Geoprobe groundwater sampling event 12 to 18 months post-injection.

FILE	DATE	PROJECT MANAGER	CHECKED BY	DRAFTER	PROJECT NUMBER
6MONTH_GEOPROBES_ACTUAL.DWG	11/30/04	MTL	CZ	CZ	1130.02A3.ESTC

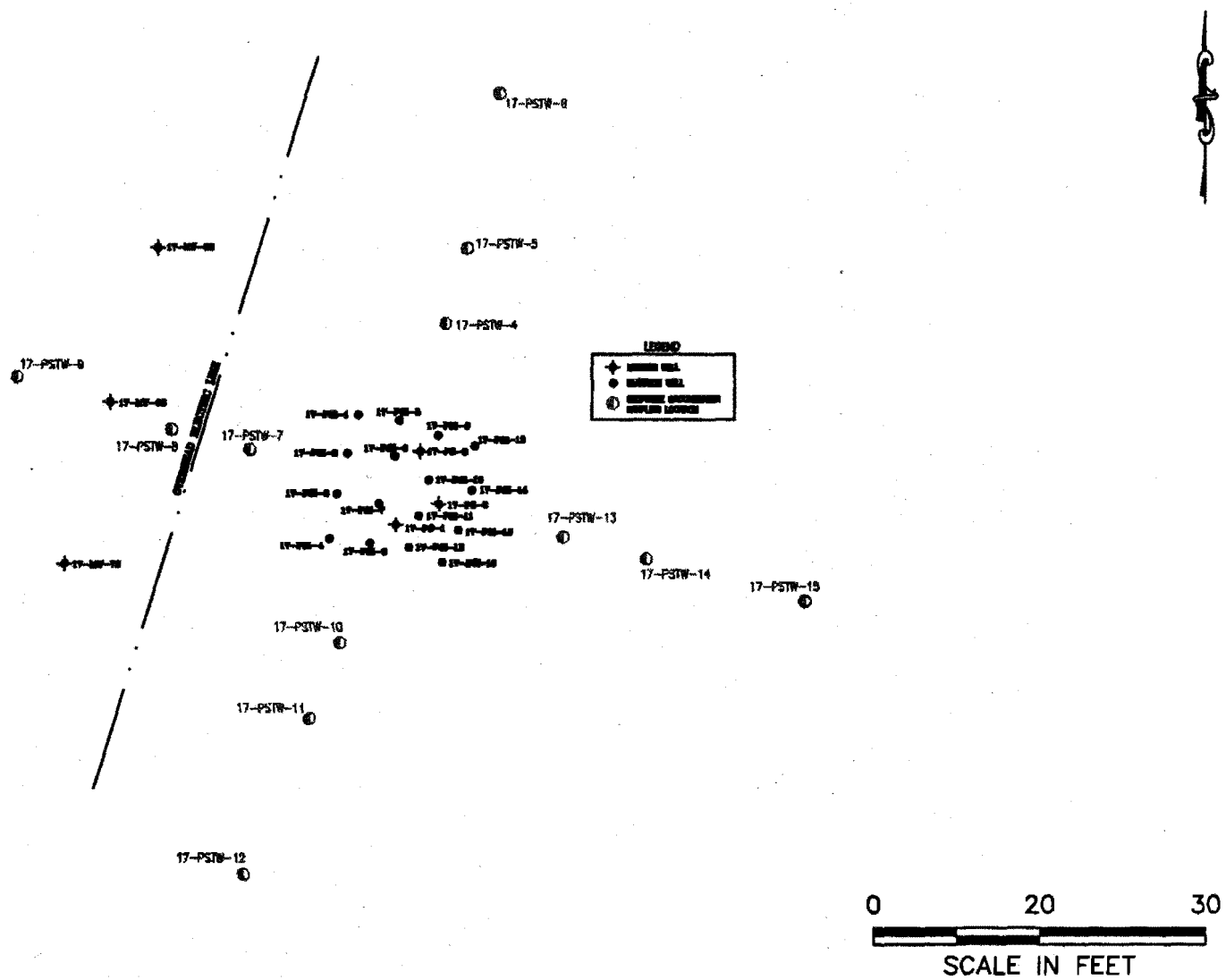


Solutions
Industrial & Environmental Services
3722 BENSON DRIVE
RALEIGH, NORTH CAROLINA 27609
TEL.: (919) 873-1060 FAX.: (919) 873-1074

GEOPROBE GROUNDWATER SAMPLING LOCATIONS
EDIBLE OIL PILOT TEST
SWMU 17
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA

FIGURE:
1A

FILE	DATE	PROJECT MANAGER	CHECKED BY	DRAFTER	PROJECT NUMBER
6MONTH_GEOPROBES_ACTUAL_B.DWG	11/30/04	MTL	CZ	CZ	1130.02A3.ESTC



Solutions
Industrial & Environmental Services
BENSON DRIVE
GH, NORTH CAROLINA 27609
(919) 873-1060 FAX.: (919) 873-1074

GEOPROBE GROUNDWATER SAMPLING LOCATIONS
EDIBLE OIL PILOT TEST
SWMU 17
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA

FIGURE:
1B

TABLE 1
Summary of Groundwater Results from 6-Month Post-Injection Geoprobe Sampling Event
Edible Oil Substrate Pilot Test
SWMU 17, Charleston Naval Weapons Station, South Carolina

Sample ID	Sample Date	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	Chloroform (µg/L)	Methane (µg/L)	Ethane (µg/L)	Ethene (µg/L)	TOC (mg/L)	Chloride (mg/L)	Nitrite (mg/L)	Bromide (mg/L)	Nitrate (mg/L)	Phosphate (mg/L)	Sulfate (mg/L)	pH	Conductivity (µS)	ORP (mV)	Temperature (°C)	DO (mg/L)
17-PSTW-4	11/9/2004	35,000	490	<50	<50	32.3	0.20	1.09	<1.0	710	<2.5	1.6	<0.5	<0.5	79	5.51	1916	99.3	19.1	1.06
17-PSTW-5	11/9/2004	49,000	700	<50	<50	49.5	0.12	1.77	<1.0	490/490	<2.5/<2.5	1.2/1.2	<0.5/<0.5	<0.5/<0.5	78/76	5.70	1138	71.2	20.8	0.45
17-PSTW-6	11/9/2004	49,000	590	<50	<50	38.6	0.06	1.66	<1.0	230	<2.5	0.7	<0.5	<0.5	81	5.84	911	66.8	18.8	0.36
17-PSTW-7	11/10/2004	30,000	300	<50	<50	47.1	0.06	0.55	<1.0	520	<2.5	1.7	<0.5	<0.5	39	5.46	1662	51.2	19.7	0.34
17-PSTW-8	11/10/2004	39,000	260	<50	<50	89.3	0.06	0.82	<1.0	480	<2.5	1.7	<0.5	<0.5	35	5.3	1538	65.5	19.7	0.38
17-PSTW-9	11/10/2004	31,000	170	<50	230	113.9	0.08	0.69	<1.0	51	<0.5	0.5	<0.5	<0.5	34	5.04	396	168.1	18.9	0.41
17-PSTW-10	11/10/2004	11,000	190	16	48	53.2	0.02	0.59	<1.0	860/850	<5/<5	2.3/2.1	<0.5/<0.5	<0.5/<0.5	97/91	5.55	1932	57.8	19.7	0.46
17-PSTW-11	11/10/2004	6,800	71	<5.0	77	69.2	0.04	0.41	<1.0	1900	<10	4.0	<0.5	<0.5	130	5.56	5050	56.4	20.4	0.68
17-PSTW-12	11/10/2004	710	<5.0	<5.0	<5.0	56.6	0.01	0.05	<1.0	510	<5	1.6	<0.5	<0.5	97	5.98	1512	37.8	19.4	0.99
17-PSTW-13	11/10/2004	3,900	100	25	<5.0	18.0	0.01	0.14	<1.0	1400	<10	3.7	<0.5	<0.5	130	5.37	5350	52.4	19.2	0.21
17-PSTW-14	11/10/2004	380	36	11	<0.5	13.1	0.01	0.03	<1.0	1420	<10	4.0	<0.5	<0.5	180	5.76	5040	33.4	21.4	0.41
17-PSTW-15	11/10/2004	1.5	<0.5	<0.5	<0.5	10.2	0.01	0.02	<1.0	2800/2800	<5/<5	7.9/7.7	<0.5/<0.5	<0.5/<0.5	320/310	5.79	7800	52.5	20.4	0.37
Rinse Blank	11/10/2004	<0.5	<0.5	<0.5	<0.5	NA	NA	NA	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA

TABLE 2
Summary of CAHs and Dissolved Hydrocarbon Gases in Groundwater (µg/L)
Edible Oil Substrate Pilot Test
SWMU 17, Charleston Naval Weapons Station, South Carolina

Well ID (Distance from barrier)	Sample Date	Toluene (µg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	Naphthalene (µg/L)	Dichloro-difluoro-methane (µg/L)	Methylene chloride (µg/L)	1,1,2,2-TCA (µg/L)	1,1,2-TCA (µg/L)	PCE (µg/L)	TCE (µg/L)	*cis*-1,2-DCE (µg/L)	*trans*-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	Chloro-form (µg/L)	Total Chlorinated Ethenes (µg/L)	Methane (µg/L)	Ethane (µg/L)	Ethene (µg/L)
UPGRADIENT MONITORING WELLS																				
17MW-5S	4/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	32,000	230	<50.0	<50.0	<50.0	300	32,230	102.1	0.05	0.45
	6/2/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	16,000	1,600	<50.0	<50.0	<50.0	160	17,600	147.1	0.08	0.78
	9/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	9,300	260	<50.0	<50.0	<50.0	<50.0	9,560	20.0	0.02	0.12
	11/16/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	31,000	930	<50.0	<50.0	<50.0	210	31,930	62.7	0.02	0.03
17MW-6S	4/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	46,000	330	<50.0	<50.0	<50.0	570	46,330	101.6	0.11	0.73
	6/2/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	16,000	6,600	<50.0	<50.0	<50.0	260	22,600	125.6	0.19	2.81
	9/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	31,000	3,900	<50.0	<50.0	<50.0	390	34,900	75.8	0.08	1.96
	11/16/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	34,000	2,500	<50.0	<50.0	<50.0	440	36,500	71.15	0.05	1.12
17MW-7S	4/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	210	<50.0	150,000	610	<50.0	<50.0	<50.0	1,300	150,610	67.7	0.07	0.80
	6/2/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	38,000	2,000	<50.0	<50.0	<50.0	290	40,000	100.0	0.14	1.56
	9/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	110,000	2,100	<50.0	<50.0	<50.0	1,100	112,100	73.7	0.11	0.97
	11/16/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	91	<50.0	88,000	2,700	<50.0	<50.0	<50.0	770	90,700	56.6	0.06	0.69
INJECTION WELLS																				
17PSI-02	3/31/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	18,000	360	<50.0	<50.0	<50.0	210	18,360	53.2	0.11	1.36
	6/2/04	<5.0	28	<5.0	<5.0	<5.0	<20.0	<5.0	<5.0	<5.0	3,000	150	<5.0	<5.0	<5.0	88	3,150	47.4	3.63	1.74
	9/1/04	<5.0	<5.0	<5.0	<5.0	<5.0	<20.0	<5.0	<5.0	<5.0	3,600	210	<5.0	<5.0	<5.0	80	3,810	42.6	1.67	3.55
	11/17/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50	<50	<50	3,300	340	<50	<50	<50	83	3,640	256.3	0.91	3.17
17PSI-04	3/31/04	130	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	12,000	240	<50.0	<50.0	<50.0	260	12,240	43.2	0.11	1.02
17PSI-05	3/31/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	22,000	330	<50.0	<50.0	<50.0	210	22,330	38.0	0.09	1.28
17PSI-07	3/31/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	14,000	410	<50.0	<50.0	<50.0	200	14,410	40.7	0.09	1.26
	6/2/04	<0.5	1.6	<0.5	<0.5	<0.5	<2.0	<0.5	4.5	<0.5	2,300	120	7.2	<.05	7.5	49	2,435	53.7	2.61	2.66
	9/1/04	1.7	<0.5	2.5	0.59	2.8	7.3	1.9	6.4	<0.5	2,500	170	7.8	3.8	12	65	2,694	26.6	2.13	9.91
	11/17/04	<.50	1.6	7.5	<.50	1.1	9.7	1.7	5.1	<.50	1,900	270	8.9	6.8	8.3	36	2,194	156.3	0.58	3.39
17PSI-10	3/31/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	13,000	280	<50.0	<50.0	<50.0	150	13,280	35.5	0.27	1.05
	6/2/04	<5.0	41	<5.0	<5.0	<5.0	<20.0	<5.0	<5.0	<5.0	3,600	110	<5.0	<5.0	<5.0	30	3,710	16.9	2.85	2.11
	9/1/04	<5.0	<5.0	<5.0	<5.0	<5.0	<20.0	<5.0	<5.0	<5.0	670	4,100	17	10	<5.0	45	4,797	20.1	0.28	0.54
	11/17/04	<5.0	17	<5.0	<5.0	<5.0	<20.0	<5.0	5.2	<5.0	690	2,600	18	10	41	59	3,359	27.2	0.15	0.37
17PSI-12	3/31/04	<5.0	<5.0	<5.0	<5.0	<5.0	<20.0	<5.0	<5.0	<5.0	9,900	210	23	<5.0	<5.0	80	10,133	32.0	0.08	0.78
(Dup-1)	3/31/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	10,000	260	<50.0	<50.0	<50.0	180	10,260	NA	NA	NA
17PSI-13	3/31/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	9,800	170	<50.0	<50.0	<50.0	110	9,970	13.4	0.07	0.50
	6/2/04	<5.0	49	<5.0	<5.0	<5.0	<20.0	<5.0	<5.0	<5.0	2,700	160	<5.0	<5.0	<5.0	28	2,860	17.5	3.77	2.35
	9/1/04	<5.0	<5.0	<5.0	<5.0	<5.0	<20.0	<5.0	<5.0	<5.0	5,300	120	<5.0	<5.0	<5.0	46	5,420	14.3	1.13	5.76
	11/16/04	<5.0	24	<5.0	<5.0	<5.0	<20.0	<5.0	<5.0	<5.0	3,500	210	<5.0	<5.0	<5.0	21	3,710	78.7	0.39	1.56
17PSI-15	3/31/04	130	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	11,000	190	<0.5	<0.5	<0.5	120	11,190	18.3	0.03	0.56

TABLE 2
Summary of CAHs and Dissolved Hydrocarbon Gases in Groundwater (µg/L)
Edible Oil Substrate Pilot Test
SWMU 17, Charleston Naval Weapons Station, South Carolina

Well ID (Distance from barrier)	Sample Date	Toluene (µg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	Naphthalene (µg/L)	Dichloro-difluoro-methane (µg/L)	Methylene chloride (µg/L)	1,1,2,2-TCA (µg/L)	1,1,2-TCA (µg/L)	PCE (µg/L)	TCE (µg/L)	*cis*-1,2-DCE (µg/L)	*trans*-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	Chloro-form (µg/L)	Total Chlorinated Ethenes (µg/L)	Methane (µg/L)	Ethane (µg/L)	Ethene (µg/L)
PILOT TEST MONITORING WELLS																				
17PS-01	4/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	22,000	190	<50.0	<50.0	<50.0	400	22,190	27.2	0.08	0.43
	6/2/04	23	13	<5.0	<5.0	<5.0	<20.0	8	<5.0	<5.0	12,000	390	<5.0	<5.0	<5.0	110	12,390	25.8	0.45	0.56
	9/1/04	6.5	14	<5.0	<5.0	<5.0	<20.0	7.2	8.3	<5.0	17,000	750	17	<5.0	<5.0	170	17,767	37.7	0.92	0.87
	11/16/04	6.7	<5.0	<5.0	<5.0	<5.0	<20.0	<5.0	16	<5.0	11,000	2,200	27	15	<5.0	130	13,242	33.1	0.32	0.57
17PS-02	4/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	28,000	260	<50.0	<50.0	<50.0	440	28,260	30.8	0.05	0.40
	6/2/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	15,000	320	<50.0	<50.0	<50.0	72	15,320	30.6	0.56	0.68
(duplicate)	6/2/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	13,000	330	<50.0	<50.0	<50.0	56	13,330	NA	NA	NA
	9/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	16,000	2,600	<50.0	<50.0	<50.0	190	18,600	36.7	0.56	0.73
(duplicate)	9/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	15,000	2,700	<50.0	<50.0	<50.0	190	17,700	NA	NA	NA
	11/16/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	13,000	5,100	<50.0	<50.0	<50.0	310	18,100	66.0	0.19	0.34
(duplicate)	11/16/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	10,000	5,800	<50.0	<50.0	<50.0	290	15,800	NA	NA	NA
17PS-03	4/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	26,000	230	<50.0	<50.0	<50.0	330	26,230	36.0	0.09	0.48
	6/2/04	<5.0	25	<5.0	<5.0	<5.0	<20.0	6.4	<5.0	<5.0	12,000	730	<5.0	<5.0	<5.0	54	12,730	50.7	1.26	0.81
	9/1/04	<5.0	<5.0	<5.0	<5.0	<5.0	<20.0	11	12	<5.0	7,200	14,000	130	30	57	310	21,417	173.3	0.86	1.23
	11/16/04	<5.0	<5.0	<5.0	<5.0	<5.0	<20.0	<5.0	6	<5.0	160	11,000	73	29	25	150	11,287	2062.5	0.56	0.84
QA/QC																				
Trip Blanks	3/31/04	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	NA	NA	NA
	6/2/04	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	NA	NA	NA
	11/16/04	<0.5	<0.5	<1.0	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	NA	NA	NA
Rinse Blanks	3/31/04	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	NA	NA	NA
	6/2/04	<0.5	<0.5	<0.5	<0.5	<0.5	2.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.1	NA	NA	NA
	9/1/04	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	NA	NA	NA
	11/16/04	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.8	2.80	NA	NA	NA

NA denotes not analyzed.
Total chlorinated ethenes are the sum of PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, and vinyl chloride.

TABLE 3
Summary of Measured Groundwater Paramenters
Edible Oil Substrate Pilot Test
SWMU 17, Charleston Naval Weapons Station, South Carolina

Well ID (Distance from Barrier)	Sample Date	Total Inorganic Carbon (mg/L)	Total Organic Carbon (mg/L)	Chloride (mg/L)	Nitrite (mg/L)	Bromide (mg/L)	Nitrate (mg/L)	Phosphate (mg/L)	Sulfate (mg/L)	Dissolved Iron (mg/L)	Arsenic (mg/L)	Manganese (mg/L)	Sulfide (ppm)	Alkalinity (ppm)	Carbon Dioxide (ppm)	Dissolved Oxygen (mg/L)	ORP (mV)	pH	Temperature (°C)	Conductivity (µS/cm)
UPGRADIENT MONITORING WELLS																				
17MW-5S	4/1/04	19.9	1.29	317.6	<0.5	0.8	<0.5	<0.5	19	3.0	NA	0.083	NA	NA	NA	3.01	154.2	7.3	16.8	1,143
	6/2/04	44.7	8.09	200.8	<0.5	0.6	<0.5	<0.5	4.4	14.0	NA	0.19	0.1	15	40	0.76	-81.7	6.07	20.6	1,535
	9/1/04	21.3	4.74	126.9/138.5	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	<1.0/<1.0	7.4/11	1.4	NA	<0.05	0	10	70	0.19	-42.9	5.21	23.3	405
	11/16/04	26.6	<1.0	241.6/242.7	<1.0/<1.0	0.9/0.8	<0.5/<0.5	<0.5/<0.5	23/21	15.0	NA	0.2	0	12	30	0.20	63.5	6.04	20.8	924
17MW-6S	4/1/04	22.0	<1.0	240.5	<0.5	0.9	<0.5	<0.5	25	0.41	<0.010	0.069	NA	NA	NA	2.77	170.3	7.2	16.4	980
	6/2/04	61.3	15.1	154.0	<0.5	0.6	<0.5	<0.5	1.3	8.7	0.038	0.34	0	18	100	0.27	-109.6	6.33	20.1	1,418
	9/1/04	42.2	3.75	195.7	<0.5	0.7	<0.5	<1.0	18	7.7	0.015	0.21	0	25	100	0.14	-34.6	5.42	24.8	659
	11/16/04	43.0	3.63	220.7	<1.0	1.0	<0.5	<0.5	33	10.0	0.016	0.27	0	35	20	0.44	38.9	6.59	21.1	874
17MW-7S	4/1/04	26.9	1.64	121.8/120.7	<0.5/<0.5	0.9/0.9	<0.5/<0.5	<0.5/<0.5	32/32	2.7	NA	0.059	NA	NA	NA	NM	169.7	7.7	15.7	700
	6/2/04	62.2	17.8	90.1/90.5	<0.5/<0.5	0.5/0.6	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	<0.5	NA	0.530	0	<10	25	0.43	-110.1	6.54	20.3	1,270
	9/1/04	34.8	3.38	103.5	<0.5	<0.5	<0.5	<1.0	16	10	NA	0.094	0	15	50	0.15	-23.9	5.62	24.7	600
	11/16/04	32.3	3.20	123.2	<0.5	0.8	<0.5	<0.5	27	0	NA	0.160	0	40	25	1.03	35.9	6.85	20.9	705
INJECTION WELLS																				
17PSI-02	3/31/04	17.3	<1.0	654.2/661.2	**	1.6/1.6	<0.5/<0.5	<0.5/<0.5	91/92	33	NA	0.39	NA	NA	NA	1.48	96.9	5.60	16.0	2,400
	6/2/04	55.6	46.2	655.7	<5	1.2	<0.5	<0.5	18	150	NA	0.57	1.0	<10	300	0.39	-81.6	5.44	20.3	6,630
	9/1/04	77.4	1180	782.9	<5.0	<0.5	<0.5	<1.0	<0.5	160	NA	0.51	2.5	<10	1000	0.42	-45.1	4.85	22.9	1,209
	11/16/04	74.6	1190	522.5	<5.0	1.2	<0.5	1.3	<0.5	210	NA	0.53	0.1	120	NA	0.14	42.2	4.92	19.6	3,020
17PSI-04	3/31/04	18.0	<1.0	795.1	**	1.7	<0.5	<0.5	99	33	NA	0.47	NA	NA	NA	2.12	120.7	5.40	16.0	3,540
17PSI-05	3/31/04	19.3	<1.0	931.1	**	1.9	<0.5	<0.5	81	44	NA	0.46	NA	NA	NA	4.00	114.9	6.50	17.4	3,690
17PSI-07	3/31/04	18.5	<1.0	542.4	**	1.4	<0.5	<0.5	100	24	0.018	0.37	NA	NA	NA	3.93	73.8	6.10	17.9	2,490
	6/2/04	60.0	4560	1,124.0	<5	2.3	<0.5	<0.5	1.8	180	<0.010	0.71	1.5	20	350	0.60	-101.7	5.51	20.2	5,050
	9/1/04	112	1240	597.0	<5.0	<0.5	<0.5	<1.0	0.5	300	0.05	0.82	0.0	<10	1000	0.13	-4.9	4.55	23.2	1,315
	11/16/04	79.2	1610	543.1	<10	1.6	<0.5	9.6	<0.5	240	0.03	0.74	0.1	70	NA	0.09	44.1	4.88	19.2	3,400
17PSI-10	3/31/04	22.2	<1.0	677.1/681.2	**	1.5/1.3	<0.5/<0.5	<0.5/<0.5	59/59	29	<0.010	0.40	NA	NA	NA	4.05	78.6	6.50	17.1	2,660
	6/2/04	61.9	482	1033.3/1013.4	<5/<5	1.6/1.9	<0.5/<0.5	<0.5/<0.5	54/53	150	<0.010	0.92	2.0	<10	325	0.47	-60.2	5.46	20.1	6,600
	9/1/04	87.2	1110	960/950	<5.0/<5.0	<0.5/1.8	<0.5/<0.5	<1.0/<1.0	0.5/0.8	130	<0.010	0.70	2.5	<10	16	0.26	-19.9	6.45	25	294
	11/16/04	98.9	864	690	<10	1.8	<0.5	1.5	<0.5	190	0.05	0.94	0.0	100	700	0.14	33.3	5.23	18.7	3,470
17PSI-12	3/31/04	16.3/16.5	<1.0/<1.0	660/580	**	1.4/1.2	<0.5/<0.5	<0.5/<0.5	73/79	38	NA	0.49	NA	NA	NA	3.91	124.0	6.90	16.9	2,940
17PSI-13	3/31/04	13.9	<1.0	680	**	1.4	<0.5	<0.5	100	53	NA	0.61	NA	NA	NA	4.66	99.0	6.90	16.8	3,990
	6/2/04	37.7	368	1,100	<5	2.2	<0.5	<0.5	83	120	NA	0.92	1.0	<10	375	0.74	-106.5	5.69	20.2	5,700
	9/1/04	27.5	400	1,200	<5.0	2.1	<0.5	<1.0	<0.5	200	NA	0.84	1.5	<10	1000	0.19	-46.5	4.87	23.3	1,344
	11/16/04	92.2	863	560/570	<10/<10	1.6/1.6	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	210	NA	0.92	0.0	150	300	0.10	49.8	5.04	19.7	3,070
17PSI-15	3/31/04	15.0	<1.0	670	**	1.4	<0.5	<0.5	86	48	NA	0.54	NA	NA	NA	3.59	153.6	6.90	16.0	3,860

TABLE 3
Summary of Measured Groundwater Paramenters
Edible Oil Substrate Pilot Test
SWMU 17, Charleston Naval Weapons Station, South Carolina

Well ID (Distance from Barrier)	Sample Date	Total Inorganic Carbon (mg/L)	Total Organic Carbon (mg/L)	Chloride (mg/L)	Nitrite (mg/L)	Bromide (mg/L)	Nitrate (mg/L)	Phosphate (mg/L)	Sulfate (mg/L)	Dissolved Iron (mg/L)	Arsenic (mg/L)	Manganese (mg/L)	Sulfide (ppm)	Alkalinity (ppm)	Carbon Dioxide (ppm)	Dissolved Oxygen (mg/L)	ORP (mV)	pH	Temperature (°C)	Conductivity (µS/cm)
PILOT TEST MONITORING WELLS																				
17PS-01	4/1/04	19.5	1.02	1,300	**	2.8	<0.5	<0.5	66	78	NA	0.63	NA	NA	NA	0.67	176.2	6.7	15.9	5,190
	6/2/04	50.7	62.7	1100/1100	<5/<5	2.1/2.2	<0.5/<0.5	<0.5/<0.5	44/45	120	NA	0.72	0.4	<10	300	1.14	-113	5.94	20.5	9,280
	9/1/04	60.8	39.7	1,100	<5.0	2.1	<0.5	<1.0	15	110	NA	0.54	2	30	400	0.15	-94.2	5.45	24.4	1,774
	11/16/04	77.3	4.92	1,100	<10	2.9	<0.5	<0.5	23	130	NA	0.78	0	150	350	0.17	16.3	6.27	20.8	3,980
17PS-02	4/1/04	20.6	1.03	850/850	**	1.6/1.5	<0.5/<0.5	<0.5/<0.5	58/58	50	<0.010	0.56	NA	NA	NA	1.50	158.3	6.6	15.6	3,970
	6/2/04	49.2	62.9	1,100	<5/<5	2.1/1.9	<0.5/<0.5	<0.5/<0.5	5.4/2.7	81	0.038	0.74	0.2	<10	150	3.36	-95.8	5.98	20.1	8,140
	9/1/04	38.1/59.7	13.3/13.2	960	<5.0	1.6	<0.5	<1.0	15	170	<0.010	0.6	2.0	12.0	250	0.14	-76.3	5.86	24.8	1,445
	11/16/04	75.7/68.4	17.2/19.1	770/830	<10/<10	2.0/22	<0.5/<0.5	<0.5/<0.5	2.8/3.8	150	<0.010	0.6	0.6	55	350	0.16	-4.7	6.12	20.7	OR
17PS-03	4/1/04	<1.0	<1.0	1,040	**	2.2	0.5	<0.5	78	69	NA	0.68	NA	NA	NA	0.40	178.1	6.9	15.6	4,650
	6/2/04	62.6	84.5	990	<5	2.1	<0.5	<0.5	10	110	NA	0.81	0.0	40	325	1.22	-111.4	5.93	20.4	7,660
	9/1/04	60.8	51.4	560	<5.0	<0.5	<0.5	<1.0	<0.5	130	NA	0.46	0.4	40	350	0.14	-78.9	5.92	23.6	140.7
	11/16/04	98.0	51.2	990/1030	<10/<10	2.4/2.3	<0.5/<0.5	<0.5/<0.5	0.5/<0.5	200	NA	0.8	0.0	175	300	0.18	-15.2	6.41	20.7	3,710
QA/QC																				
RB-1	3/31/04	4.50	<1.0	9.1	<0.5	<0.5	<0.5	<0.5	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/2/04	16.9	17.4	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	9/1/04	2.96	<1.0	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/16/04	<1.0	<1.0	3.6	<0.5	<0.5	<0.5	<0.5	2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

**Nitrite not quantifiable due to interference from high chloride.
NA denotes not analyzed.
OR denotes over range of meter.

Solutions
Industrial & Environmental Services

3722 Benson Drive ▪ Raleigh, NC 27609
(919) 873-1060 ▪ Fax (919) 873-1074
www.solutions-ies.com

January 10, 2005

Mr. Jeff Adams
Southern Division
Naval Facilities Engineering Command
2155 Eagle Dr., P.O. Box 190010
N. Charleston, SC 29419-9010

Re.: Data Submittal for Edible Oil Substrate (EOS®) Pilot Test at SWMU 17
Naval Weapons Station, Charleston, South Carolina
Solutions-IES Project No. 1130.02A3.ESTC

Dear Mr. Adams:

Solutions Industrial & Environmental Services, Inc. (Solutions-IES) is conducting a pilot study at SWMU 17 at the Charleston Naval Weapons Station to demonstrate the use of edible oil substrate (EOS®) for enhancing anaerobic biodegradation of chlorinated solvents. Solutions-IES' project is funded by the Environmental Security Technology Certification Program (ESTCP) of the Department of Defense. Pilot test injection and monitoring wells were installed at the site in March 2004, and the injection activities were conducted between May 13 and 21, 2004. In November 2004, a Geoprobe® groundwater sampling event was conducted in the vicinity of the pilot test to assess potential impacts from the EOS® injection.

The South Carolina Department of Health and Environmental Control (DHEC) has requested that we provide existing figures, data tables, and boring logs for the EOS® pilot test. Attachment A contains a site map showing the layout of the pilot test monitoring and injection wells (Figure 1) and two maps showing the locations of the temporary Geoprobe® groundwater sampling locations (Figures 2a and 2b). Data tables are provided in Attachment B and include well completion data (Table 1), groundwater elevation data (Table 2), groundwater data from pre- and post-injection performance monitoring activities (Tables 3, 4, and 5), and data from the 6-month post-injection Geoprobe® groundwater sampling event (Table 6). Boring logs and water well records are provided in Attachment C.

Thanks for your continuing cooperation and strong support for this project. If you have any questions or need any additional information, please feel free to contact me at your convenience.

Yours truly,
Solutions-IES

Christie Zawtocki, P.E.
Project Manager

M. Tony Lieberman, RSM
Co-Principal Investigator

Attachments: Attachment A – Figures
Attachment B – Tables
Attachment C – Boring Logs and Water Well Records

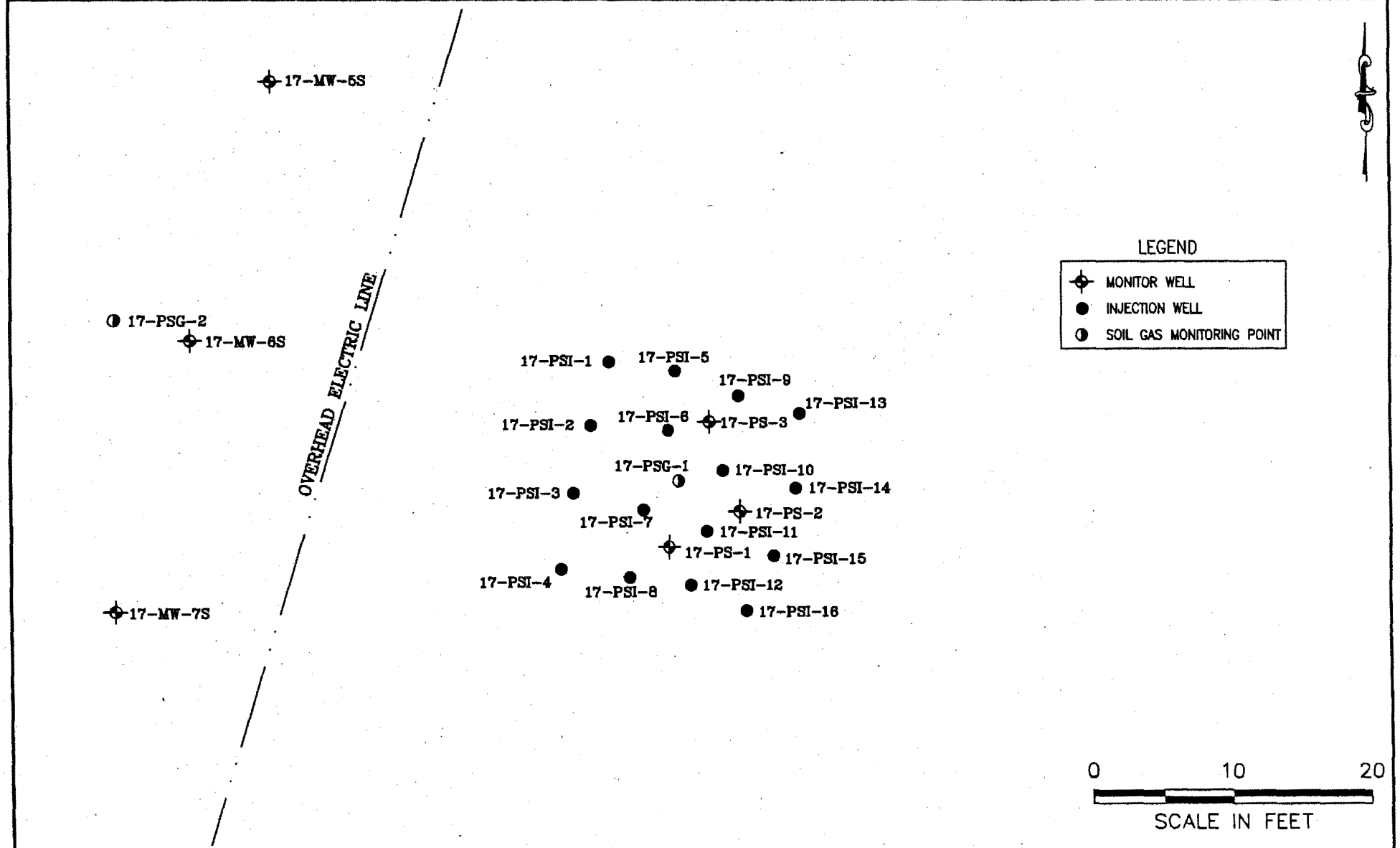
cc: Cliff Casey, NAVFAC EFD SOUTH

T:\Project Files\ESTCP\1130 - Edible Oil\NWS Charleston, SC\Correspondence\SOUTHDIV-ltr-1-7-2005.doc

ATTACHMENT A

FIGURES

FILE	DATE	PROJECT MANAGER	CHECKED BY	DRAFTER	PROJECT NUMBER
SITE_LAYOUT.DWG	4/27/04	MTL	CZ	CZ	1130.02A3.ESTC



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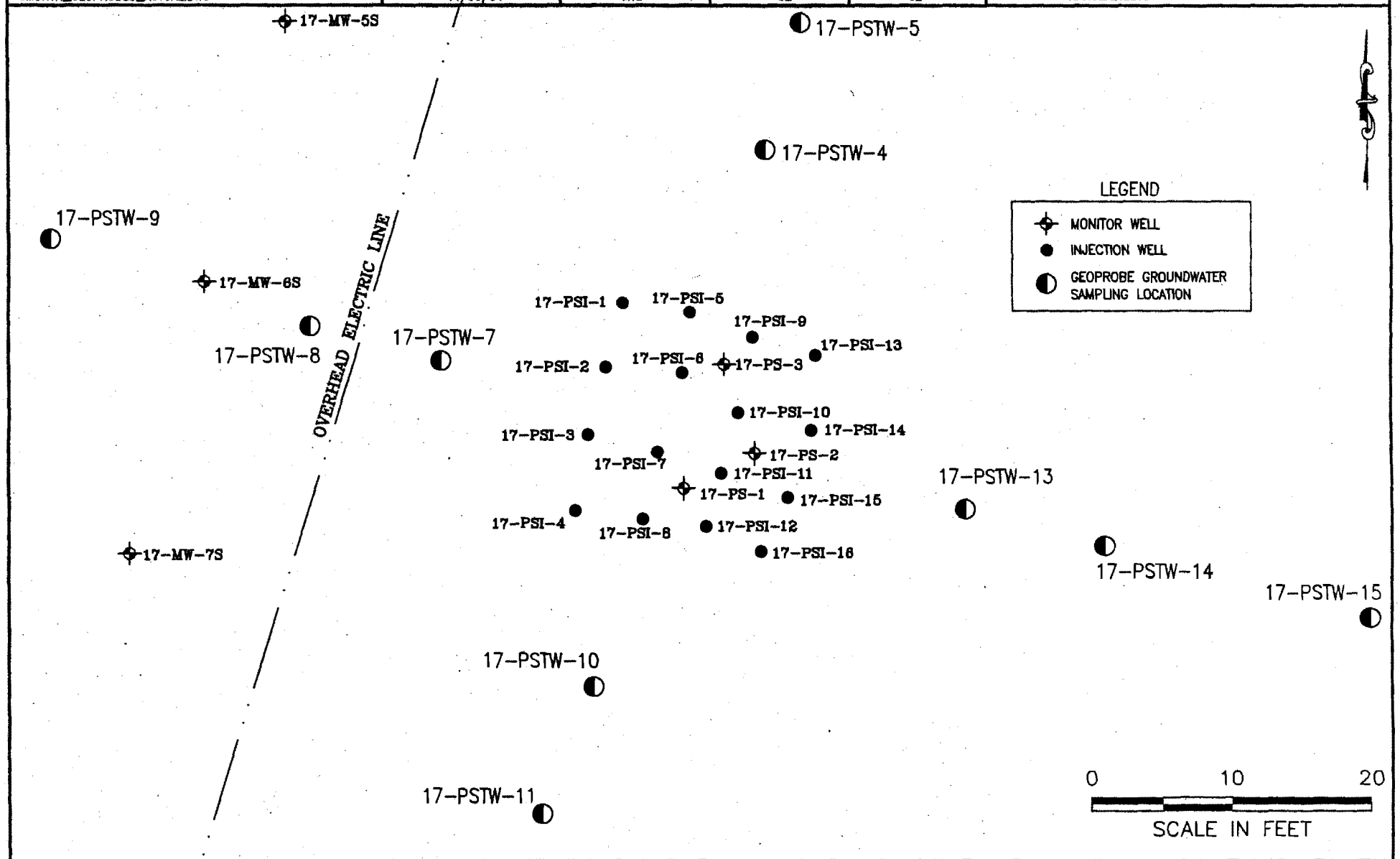
3722 BENSON DRIVE
RALEIGH, NORTH CAROLINA 27609
TEL.: (919) 873-1060 FAX.: (919) 873-1074

PILOT TEST LAYOUT

SWMU 17
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA

FIGURE: 1

FILE	DATE	PROJECT MANAGER	CHECKED BY	DRAFTER	PROJECT NUMBER
6MONTH_GEOPROBES_ACTUAL.DWG	11/30/04	MTL	CZ	CZ	1130.02A3.ESTC



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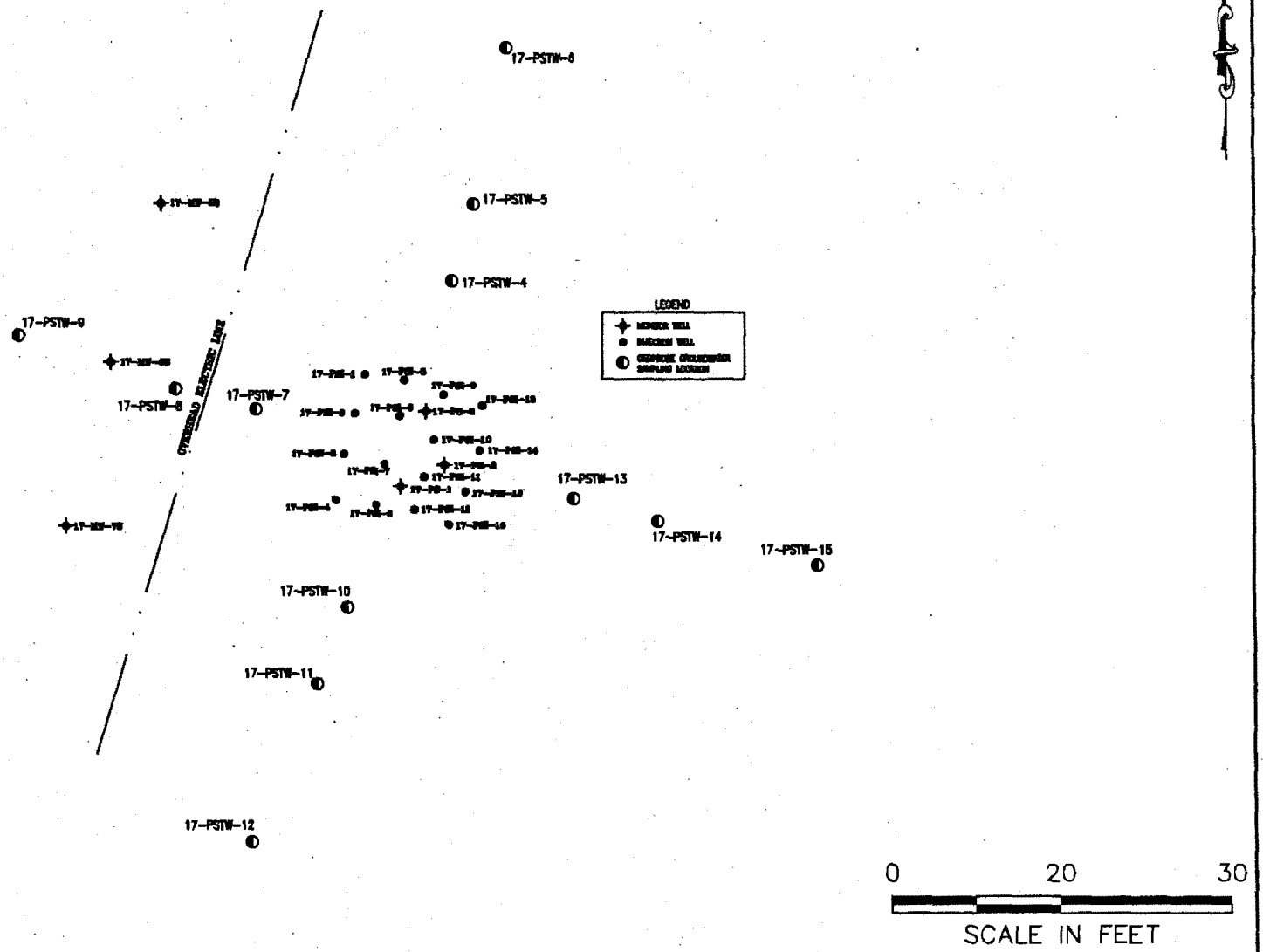
GEOPROBE GROUNDWATER SAMPLING LOCATIONS
EDIBLE OIL PILOT TEST
SWMU 17
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA

FIGURE:
2A

FILE	DATE	PROJECT MANAGER	CHECKED BY	DRAFTER	PROJECT NUMBER
6MONTH_GEOPROBES_ACTUAL_B.DWG	11/30/04	MTL	CZ	CZ	1130.02A3.ESTC



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Industrial & Environmental Services
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TEL.: (919) 873-1060 FAX.: (919) 873-1074

GEOPROBE GROUNDWATER SAMPLING LOCATIONS
EDIBLE OIL PILOT TEST
SWMU 17
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA

FIGURE:
2B

ATTACHMENT B

TABLES

TABLE 1
Well Completion Data
Naval Weapons Station
Charleston, South Carolina

Well ID	Screen Length (feet)	Screened Interval (feet bgs)	Northing	Easting	TOC Elevation (feet MSL)
UPGRADIENT MONITORING WELLS					
17MW-5S	10	8 to 18	397272.7335	2321215.2923	7.83
17MW-6S	10	8 to 18	397253.9191	2321209.3376	7.95
17MW-7S	10	8 to 18	397234.3073	2321204.1680	7.99
PERMANENT INJECTION WELLS					
PSI-02	10	8 to 18	397247.7234	2321238.5416	4.81
PSI-04	10	8 to 18	397237.4929	2321236.3123	4.90
PSI-05	10	8 to 18	397251.7239	2321244.7139	4.86
PSI-07	10	8 to 18	397241.6646	2321242.2807	5.10
PSI-10	10	8 to 18	397244.5788	2321248.1410	4.88
PSI-12	10	8 to 18	397236.2990	2321245.9211	6.868
PSI-13	10	8 to 18	397248.6895	2321253.8489	4.74
PSI-15	10	8 to 18	397238.4301	2321251.8711	5.01
TEMPORARY INJECTION WELLS					
PSI-01	10	8 to 18	397252.4063	2321239.7960	8.19
PSI-03	10	8 to 18	397242.9505	2321237.2320	6.86
PSI-06	10	8 to 18	397247.4348	2321244.1720	7.149
PSI-08	10	8 to 18	397236.8438	2321241.2370	6.89
PSI-09	10	8 to 18	397249.9361	2321249.3224	8.066
PSI-11	10	8 to 18	397240.1693	2321247.0062	6.865
PSI-14	10	8 to 18	397243.2775	2321253.5560	7.18
PSI-16	10	8 to 18	397234.4705	2321249.8904	6.788
PILOT TEST MONITORING WELLS					
17PS-01	10	8 to 18	397239.2635	2321244.2819	8.04
17PS-02	10	8 to 18	397241.5563	2321249.5524	7.97
17PS-03	10	8 to 18	397248.1645	2321247.2720	7.89
SOIL GAS MONITORING POINTS					
17PSG-1	1	1 to 2	397243.802	2321244.993	9.247
17PSG-2	1	1 to 2	397255.4217	2321203.9	7.818
TEMPORARY GEOPROBE GROUNDWATER SAMPLING POINTS					
17-PSTW-4	5	11 to 16	397263.5123	2321250.2773	NS
17-PSTW-5	5	11 to 16	397272.6894	2321252.9023	NS
17-PSTW-6	5	11 to 16	397291.4150	2321256.8260	NS
17-PSTW-7	5	11 to 16	397248.2661	2321226.5505	NS
17-PSTW-8	5	11 to 16	397250.7106	2321216.9624	NS
17-PSTW-9	5	11 to 16	397257.0743	2321198.2484	NS
17-PSTW-10	5	11 to 16	397224.6968	2321237.5799	NS
17-PSTW-11	5	11 to 16	397215.4853	2321233.9060	NS
17-PSTW-12	5	11 to 16	397196.6083	2321225.878	NS
17-PSTW-13	5	11 to 16	397237.5473	2321264.718	NS
17-PSTW-14	5	11 to 16	397234.8894	2321274.783	NS
17-PSTW-15	5	11 to 16	397229.6844	2321293.756	NS

NS denotes not surveyed.

TABLE 2
Groundwater Elevation Data
Naval Weapons Station
Charleston, South Carolina

Well ID	Date	Depth to Water (ft)	Top of Casing Elevation (ft MSL)	Groundwater Elevation (ft MSL)
UPGRADIENT MONITORING WELLS				
17MW-5S	3/30/2004	5.73	7.83	2.10
	5/11/2004	4.98		2.85
	6/1/2004	7.49		0.34
	8/31/2004	3.38		4.45
	11/15/2004	6.46		1.37
17MW-6S	3/30/2004	5.87	7.95	2.08
	5/11/2004	5.09		2.86
	6/1/2004	7.61		0.34
	8/31/2004	3.50		4.45
	11/15/2004	6.50		1.45
17MW-7S	3/30/2004	5.94	7.99	2.05
	5/11/2004	5.12		2.87
	6/1/2004	7.65		0.34
	8/31/2004	3.61		4.38
	11/15/2004	6.59		1.40
INJECTION WELLS				
PSI-01	3/30/2004	4.74	8.19	3.45
	5/11/2004	3.98		4.21
	6/1/2004	6.50		1.69
	Abandoned after injection			
PSI-02	3/30/2004	4.76	6.83	2.07
	5/11/2004	3.99		2.84
	6/1/2004	6.55		0.28
	8/31/2004	0.00	4.81	4.81
	11/15/2004	3.42		1.39
PSI-03	3/30/2004	4.80	6.86	2.06
	5/11/2004	4.04		2.82
	6/1/2004	6.57		0.29
	Abandoned after injection			
PSI-04	3/30/2004	4.70	6.77	2.07
	5/11/2004	3.93		2.84
	6/1/2004	6.47		0.30
	8/31/2004	NM	4.90	NM
	11/15/2004	3.51		1.39
PSI-05	3/30/2004	4.65	8.12	3.47
	5/11/2004	3.91		4.21
	6/1/2004	6.76		1.36
	8/31/2004	NM	4.86	NM
	11/15/2004	3.48		1.38
PSI-06	3/30/2004	5.04	7.15	2.11
	5/11/2004	4.35		2.80
	6/1/2004	6.87		0.28
	Abandoned after injection			

TABLE 2
Groundwater Elevation Data
Naval Weapons Station
Charleston, South Carolina

Well ID	Date	Depth to Water (ft)	Top of Casing Elevation (ft MSL)	Groundwater Elevation (ft MSL)
PSI-07	3/30/2004	4.69	6.74	2.05
	5/11/2004	3.92		2.82
	6/1/2004	7.38		-0.64
	8/31/2004	0.00	5.10	5.10
	11/15/2004	3.67		1.43
PSI-08	3/30/2004	4.85	6.89	2.04
	5/11/2004	4.05		2.84
	6/1/2004	6.60		0.29
	Abandoned after injection			
PSI-09	3/30/2004	4.62	8.07	3.45
	5/11/2004	3.89		4.18
	6/1/2004	6.39		1.68
	Abandoned after injection			
PSI-10	3/30/2004	4.59	6.66	2.07
	5/11/2004	3.86		2.80
	6/1/2004	6.36		0.30
	8/31/2004	0.00	4.88	4.88
	11/15/2004	3.48		1.40
PSI-11	3/30/2004	4.78	6.87	2.09
	5/11/2004	4.06		2.81
	6/1/2004	6.54		0.33
	Abandoned after injection			
PSI-12	3/30/2004	4.79	6.87	2.08
	5/11/2004	4.07		2.80
	6/1/2004	6.55		0.32
	8/31/2004	NM	4.88	NM
	11/15/2004	3.53		1.35
PSI-13	3/30/2004	4.61	6.70	2.09
	5/11/2004	3.86		2.84
	6/1/2004	6.39		0.31
	8/31/2004	0.00	4.74	4.74
	11/15/2004	3.37		1.37
PSI-14	3/30/2004	5.10	7.18	2.08
	5/11/2004	4.37		2.81
	6/1/2004	7.04		0.14
	Abandoned after injection			
PSI-15	3/30/2004	4.84	6.94	2.10
	5/11/2004	4.13		2.81
	6/1/2004	6.65		0.29
	8/31/2004	NM	5.01	NM
	11/15/2004	3.56		1.45
PSI-16	3/30/2004	4.70	6.79	2.09
	5/11/2004	3.98		2.81
	6/1/2004	6.58		0.21
	Abandoned after injection			

TABLE 3
Summary of CAHs and Dissolved Hydrocarbon Gases in Groundwater (µg/L)
Naval Weapons Station
Charleston, South Carolina

Well ID (Distance from barrier)	Sample Date	Toluene (µg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	Naphthalene (µg/L)	Dichloro-difluoro-methane (µg/L)	Methylene chloride (µg/L)	1,1,2,2-TCA (µg/L)	1,1,2-TCA (µg/L)	PCE (µg/L)	TCE (µg/L)	*cis*-1,2-DCE (µg/L)	*trans*-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	Chloro-form (µg/L)	Total Chlorinated Ethenes (µg/L)	Methane (µg/L)	Ethane (µg/L)	Ethene (µg/L)
UPGRADIENT MONITORING WELLS																				
17MW-5S	4/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	32,000	230	<50.0	<50.0	<50.0	300	32,230	102.1	0.05	0.45
	6/2/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	16,000	1,600	<50.0	<50.0	<50.0	160	17,600	147.1	0.08	0.78
	9/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	9,300	260	<50.0	<50.0	<50.0	<50.0	9,560	20.0	0.02	0.12
	11/16/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	31,000	930	<50.0	<50.0	<50.0	210	31,930	62.7	0.02	0.03
17MW-6S	4/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	46,000	330	<50.0	<50.0	<50.0	570	46,330	101.6	0.11	0.73
	6/2/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	16,000	6,600	<50.0	<50.0	<50.0	260	22,600	125.6	0.19	2.81
	9/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	31,000	3,900	<50.0	<50.0	<50.0	390	34,900	75.8	0.08	1.96
	11/16/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	34,000	2,500	<50.0	<50.0	<50.0	440	36,500	71.15	0.05	1.12
17MW-7S	4/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	210	<50.0	150,000	610	<50.0	<50.0	<50.0	1,300	150,610	67.7	0.07	0.80
	6/2/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	38,000	2,000	<50.0	<50.0	<50.0	290	40,000	100.0	0.14	1.56
	9/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	110,000	2,100	<50.0	<50.0	<50.0	1,100	112,100	73.7	0.11	0.97
	11/16/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	91	<50.0	88,000	2,700	<50.0	<50.0	<50.0	770	90,700	56.6	0.06	0.69
INJECTION WELLS																				
17PSI-02	3/31/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	18,000	360	<50.0	<50.0	<50.0	210	18,360	53.2	0.11	1.36
	6/2/04	<5.0	28	<5.0	<5.0	<5.0	<20.0	<5.0	<5.0	<5.0	3,000	150	<5.0	<5.0	<5.0	88	3,150	47.4	3.63	1.74
	9/1/04	<5.0	<5.0	<5.0	<5.0	<5.0	<20.0	<5.0	<5.0	<5.0	3,600	210	<5.0	<5.0	<5.0	80	3,810	42.6	1.67	3.55
	11/17/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50	<50	<50	3,300	340	<50	<50	<50	83	3,640	256.3	0.91	3.17
17PSI-04	3/31/04	130	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	12,000	240	<50.0	<50.0	<50.0	260	12,240	43.2	0.11	1.02
17PSI-05	3/31/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	22,000	330	<50.0	<50.0	<50.0	210	22,330	38.0	0.09	1.28
17PSI-07	3/31/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	14,000	410	<50.0	<50.0	<50.0	200	14,410	40.7	0.09	1.26
	6/2/04	<0.5	1.6	<0.5	<0.5	<0.5	<2.0	<0.5	4.5	<0.5	2,300	120	7.2	<.05	7.5	49	2,435	53.7	2.61	2.66
	9/1/04	1.7	<0.5	2.5	0.59	2.8	7.3	1.9	6.4	<0.5	2,500	170	7.8	3.8	12	65	2,694	26.6	2.13	9.91
	11/17/04	<.50	1.6	7.5	<.50	1.1	9.7	1.7	5.1	<.50	1,900	270	8.9	6.8	8.3	36	2,194	156.3	0.58	3.39
17PSI-10	3/31/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	13,000	280	<50.0	<50.0	<50.0	150	13,280	35.5	0.27	1.05
	6/2/04	<5.0	41	<5.0	<5.0	<5.0	<20.0	<5.0	<5.0	<5.0	3,600	110	<5.0	<5.0	<5.0	30	3,710	16.9	2.85	2.11
	9/1/04	<5.0	<5.0	<5.0	<5.0	<5.0	<20.0	<5.0	<5.0	<5.0	670	4,100	17	10	<5.0	45	4,797	20.1	0.28	0.54
	11/17/04	<5.0	17	<5.0	<5.0	<5.0	<20.0	<5.0	5.2	<5.0	690	2,600	18	10	41	59	3,359	27.2	0.15	0.37
17PSI-12	3/31/04	<5.0	<5.0	<5.0	<5.0	<5.0	<20.0	<5.0	<5.0	<5.0	9,900	210	23	<5.0	<5.0	80	10,133	32.0	0.08	0.78
(Dup-1)	3/31/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	10,000	260	<50.0	<50.0	<50.0	180	10,260	NA	NA	NA
17PSI-13	3/31/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	9,800	170	<50.0	<50.0	<50.0	110	9,970	13.4	0.07	0.50
	6/2/04	<5.0	49	<5.0	<5.0	<5.0	<20.0	<5.0	<5.0	<5.0	2,700	160	<5.0	<5.0	<5.0	28	2,860	17.5	3.77	2.35
	9/1/04	<5.0	<5.0	<5.0	<5.0	<5.0	<20.0	<5.0	<5.0	<5.0	5,300	120	<5.0	<5.0	<5.0	46	5,420	14.3	1.13	5.76
	11/16/04	<5.0	24	<5.0	<5.0	<5.0	<20.0	<5.0	<5.0	<5.0	3,500	210	<5.0	<5.0	<5.0	21	3,710	78.7	0.39	1.56
17PSI-15	3/31/04	130	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	11,000	190	<0.5	<0.5	<0.5	120	11,190	18.3	0.03	0.56

TABLE 3
Summary of CAHs and Dissolved Hydrocarbon Gases in Groundwater (µg/L)
Naval Weapons Station
Charleston, South Carolina

Well ID (Distance from barrier)	Sample Date	Toluene (µg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	Naphthalene (µg/L)	Dichloro-difluoro-methane (µg/L)	Methylene chloride (µg/L)	1,1,2,2-TCA (µg/L)	1,1,2-TCA (µg/L)	PCE (µg/L)	TCE (µg/L)	*cis*-1,2-DCE (µg/L)	*trans*-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	Chloro-form (µg/L)	Total Chlorinated Ethenes (µg/L)	Methane (µg/L)	Ethane (µg/L)	Ethene (µg/L)
MONITORING WELLS																				
17PS-01	4/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	22,000	190	<50.0	<50.0	<50.0	400	22,190	27.2	0.08	0.43
	6/2/04	23	13	<5.0	<5.0	<5.0	<20.0	8	<5.0	<5.0	12,000	390	<5.0	<5.0	<5.0	110	12,390	25.8	0.45	0.56
	9/1/04	6.5	14	<5.0	<5.0	<5.0	<20.0	7.2	8.3	<5.0	17,000	750	17	<5.0	<5.0	170	17,767	37.7	0.92	0.87
	11/16/04	6.7	<5.0	<5.0	<5.0	<5.0	<20.0	<5.0	16	<5.0	11,000	2,200	27	15	<5.0	130	13,242	33.1	0.32	0.57
17PS-02	4/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	28,000	260	<50.0	<50.0	<50.0	440	28,260	30.8	0.05	0.40
	6/2/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	15,000	320	<50.0	<50.0	<50.0	72	15,320	30.6	0.56	0.68
(duplicate)	6/2/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	13,000	330	<50.0	<50.0	<50.0	56	13,330	NA	NA	NA
	9/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	16,000	2,600	<50.0	<50.0	<50.0	190	18,600	36.7	0.56	0.73
(duplicate)	9/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	15,000	2,700	<50.0	<50.0	<50.0	190	17,700	NA	NA	NA
	11/16/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	13,000	5,100	<50.0	<50.0	<50.0	310	18,100	66.0	0.19	0.34
(duplicate)	11/16/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	10,000	5,800	<50.0	<50.0	<50.0	290	15,800	NA	NA	NA
17PS-03	4/1/04	<50.0	<50.0	<50.0	<50.0	<50.0	<200	<50.0	<50.0	<50.0	26,000	230	<50.0	<50.0	<50.0	330	26,230	36.0	0.09	0.48
	6/2/04	<5.0	25	<5.0	<5.0	<5.0	<20.0	6.4	<5.0	<5.0	12,000	730	<5.0	<5.0	<5.0	54	12,730	50.7	1.26	0.81
	9/1/04	<5.0	<5.0	<5.0	<5.0	<5.0	<20.0	11	12	<5.0	7,200	14,000	130	30	57	310	21,417	173.3	0.86	1.23
	11/16/04	<5.0	<5.0	<5.0	<5.0	<5.0	<20.0	<5.0	6	<5.0	160	11,000	73	29	25	150	11,287	2062.5	0.56	0.84
QA/QC																				
Trip Blanks	3/31/04	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	NA	NA	NA
	6/2/04	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	NA	NA	NA
	11/16/04	<0.5	<0.5	<1.0	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	NA	NA	NA
Rinse Blanks	3/31/04	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	NA	NA	NA
	6/2/04	<0.5	<0.5	<0.5	<0.5	<0.5	2.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.1	NA	NA	NA
	9/1/04	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	NA	NA	NA
	11/16/04	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.8	2.80	NA	NA	NA

NA denotes not analyzed.
Total chlorinated ethenes are the sum of PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, and vinyl chloride.

TABLE 4
Summary of Measured Groundwater Paramenters
Naval Weapons Station
Charleston, South Carolina

Well ID (Distance from Barrier)	Sample Date	Total Inorganic Carbon (mg/L)	Total Organic Carbon (mg/L)	Chloride (mg/L)	Nitrite (mg/L)	Bromide (mg/L)	Nitrate (mg/L)	Phosphate (mg/L)	Sulfate (mg/L)	Dissolved Iron (mg/L)	Arsenic (mg/L)	Manganese (mg/L)	Sulfide (ppm)	Alkalinity (ppm)	Carbon Dioxide (ppm)	Dissolved Oxygen (mg/L)	ORP (mV)	pH	Temperature (°C)	Conductivity (µS/cm)
UPGRADIENT MONITORING WELLS																				
17MW-5S	4/1/04	19.9	1.29	317.6	<0.5	0.8	<0.5	<0.5	19.1	3.0	NA	0.083	NA	NA	NA	3.01	154.2	7.3	16.8	1,143
	6/2/04	44.7	8.09	200.8	<0.5	0.6	<0.5	<0.5	4.4	14.0	NA	0.19	0.1	15	40	0.76	-81.7	6.07	20.6	1,535
	9/1/04	21.3	4.74	126.9/138.5	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	<1.0/<1.0	7.4/10.8	1.4	NA	<0.05	0	10	70	0.19	-42.9	5.21	23.3	405
	11/16/04	26.6	<1.0	241.6/242.7	<1.0/<1.0	0.9/0.8	<0.5/<0.5	<0.5/<0.5	23.1/21.0	15.0	NA	0.2	0	12	30	0.20	63.5	6.04	20.8	924
17MW-6S	4/1/04	22.0	<1.0	240.5	<0.5	0.9	<0.5	<0.5	25.0	0.41	<0.010	0.069	NA	NA	NA	2.77	170.3	7.2	16.4	980
	6/2/04	61.3	15.1	154.0	<0.5	0.6	<0.5	<0.5	1.3	8.7	0.038	0.34	0	18	100	0.27	-109.6	6.33	20.1	1,418
	9/1/04	42.2	3.75	195.7	<0.5	0.7	<0.5	<1.0	17.7	7.7	0.015	0.21	0	25	100	0.14	-34.6	5.42	24.8	659
	11/16/04	43.0	3.63	220.7	<1.0	1.0	<0.5	<0.5	32.9	10.0	0.016	0.27	0	35	20	0.44	38.9	6.59	21.1	874
17MW-7S	4/1/04	26.9	1.64	121.8/120.7	<0.5/<0.5	0.9/0.9	<0.5/<0.5	<0.5/<0.5	31.6/31.6	2.7	NA	0.059	NA	NA	NA	NM	169.7	7.7	15.7	700
	6/2/04	62.2	17.8	90.1/90.5	<0.5/<0.5	0.5/0.6	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	<0.5	NA	0.530	0	<10	25	0.43	-110.1	6.54	20.3	1,270
	9/1/04	34.8	3.38	103.5	<0.5	<0.5	<0.5	<1.0	15.9	10	NA	0.094	0	15	50	0.15	-23.9	5.62	24.7	600
	11/16/04	32.3	3.20	123.2	<0.5	0.8	<0.5	<0.5	26.6	0	NA	0.160	0	40	25	1.03	35.9	6.85	20.9	705
INJECTION WELLS																				
17PSI-02	3/31/04	17.3	<1.0	654.2/661.2	**	1.6/1.6	<0.5/<0.5	<0.5/<0.5	90.8/92.1	33	NA	0.39	NA	NA	NA	1.48	96.9	5.60	16.0	2,400
	6/2/04	55.6	46.2	655.7	<5	1.2	<0.5	<0.5	18.0	150	NA	0.57	1.0	<10	300	0.39	-81.6	5.44	20.3	6,630
	9/1/04	77.4	1180	782.9	<5.0	<0.5	<0.5	<1.0	<0.5	160	NA	0.51	2.5	<10	1000	0.42	-45.1	4.85	22.9	1,209
	11/16/04	74.6	1190	522.5	<5.0	1.2	<0.5	1.3	<0.5	210	NA	0.53	0.1	120	NA	0.14	42.2	4.92	19.6	3,020
17PSI-04	3/31/04	18.0	<1.0	795.1	**	1.7	<0.5	<0.5	99.2	33	NA	0.47	NA	NA	NA	2.12	120.7	5.40	16.0	3,540
17PSI-05	3/31/04	19.3	<1.0	931.1	**	1.9	<0.5	<0.5	80.9	44	NA	0.46	NA	NA	NA	4.00	114.9	6.50	17.4	3,690
17PSI-07	3/31/04	18.5	<1.0	542.4	**	1.4	<0.5	<0.5	102.5	24	0.018	0.37	NA	NA	NA	3.93	73.8	6.10	17.9	2,490
	6/2/04	60.0	4560	1,124.0	<5	2.3	<0.5	<0.5	1.8	180	<0.010	0.71	1.5	20	350	0.60	-101.7	5.51	20.2	5,050
	9/1/04	112	1240	597.0	<5.0	<0.5	<0.5	<1.0	0.5	300	0.05	0.82	0.0	<10	1000	0.13	-4.9	4.55	23.2	1,315
	11/16/04	79.2	1610	543.1	<10	1.6	<0.5	9.6	<0.5	240	0.03	0.74	0.1	70	NA	0.09	44.1	4.88	19.2	3,400
17PSI-10	3/31/04	22.2	<1.0	677.1/681.2	**	1.5/1.3	<0.5/<0.5	<0.5/<0.5	58.8/58.5	29	<0.010	0.40	NA	NA	NA	4.05	78.6	6.50	17.1	2,660
	6/2/04	61.9	482	1033.3/1013.4	<5/<5	1.6/1.9	<0.5/<0.5	<0.5/<0.5	53.5/52.6	150	<0.010	0.92	2.0	<10	325	0.47	-60.2	5.46	20.1	6,600
	9/1/04	87.2	1110	959.6/954.5	<5.0/<5.0	<0.5/1.8	<0.5/<0.5	<1.0/<1.0	0.5/0.8	130	<0.010	0.70	2.5	<10	16	0.26	-19.9	6.45	25	294
	11/16/04	98.9	864	693.2	<10	1.8	<0.5	1.5	<0.5	190	0.05	0.94	0.0	100	700	0.14	33.3	5.23	18.7	3,470
17PSI-12	3/31/04	16.3/16.5	<1.0/<1.0	664.7/581.5	**	1.4/1.2	<0.5/<0.5	<0.5/<0.5	72.9/78.6	38	NA	0.49	NA	NA	NA	3.91	124.0	6.90	16.9	2,940
17PSI-13	3/31/04	13.9	<1.0	677.1	**	1.4	<0.5	<0.5	102.6	53	NA	0.61	NA	NA	NA	4.66	99.0	6.90	16.8	3,990
	6/2/04	37.7	368	1,123.5	<5	2.2	<0.5	<0.5	82.6	120	NA	0.92	1.0	<10	375	0.74	-106.5	5.69	20.2	5,700
	9/1/04	27.5	400	1,219.8	<5.0	2.1	<0.5	<1.0	<0.5	200	NA	0.84	1.5	<10	1000	0.19	-46.5	4.87	23.3	1,344
	11/16/04	92.2	863	557.2/565.9	<10/<10	1.6/1.6	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	210	NA	0.92	0.0	150	300	0.10	49.8	5.04	19.7	3,070
17PSI-15	3/31/04	15.0	<1.0	667.2	**	1.4	<0.5	<0.5	86.2	48	NA	0.54	NA	NA	NA	3.59	153.6	6.90	16.0	3,860

TABLE 4
Summary of Measured Groundwater Paramenters
Naval Weapons Station
Charleston, South Carolina

Well ID (Distance from Barrier)	Sample Date	Total Inorganic Carbon (mg/L)	Total Organic Carbon (mg/L)	Chloride (mg/L)	Nitrite (mg/L)	Bromide (mg/L)	Nitrate (mg/L)	Phosphate (mg/L)	Sulfate (mg/L)	Dissolved Iron (mg/L)	Arsenic (mg/L)	Manganese (mg/L)	Sulfide (ppm)	Alkalinity (ppm)	Carbon Dioxide (ppm)	Dissolved Oxygen (mg/L)	ORP (mV)	pH	Temperature (°C)	Conductivity (µS/cm)
MONITORING WELLS																				
17PS-01	4/1/04	19.5	1.02	1,281.0	**	2.8	<0.5	<0.5	65.5	78	NA	0.63	NA	NA	NA	0.67	176.2	6.7	15.9	5,190
	6/2/04	50.7	62.7	1133.6/1102.8	<5/<5	2.1/2.2	<0.5/<0.5	<0.5/<0.5	44.1/44.6	120	NA	0.72	0.4	<10	300	1.14	-113	5.94	20.5	9,280
	9/1/04	60.8	39.7	1,093.2	<5.0	2.1	<0.5	<1.0	15.3	110	NA	0.54	2	30	400	0.15	-94.2	5.45	24.4	1,774
	11/16/04	77.3	4.92	1,147.2	<10	2.9	<0.5	<0.5	23.4	130	NA	0.78	0	150	350	0.17	16.3	6.27	20.8	3,980
17PS-02	4/1/04	20.6	1.03	848.4/852.8	**	1.6/1.5	<0.5/<0.5	<0.5/<0.5	57.7/58.1	50	<0.010	0.56	NA	NA	NA	1.50	158.3	6.6	15.6	3,970
	6/2/04	49.2	62.9	1,111.3	<5/<5	2.1/1.9	<0.5/<0.5	<0.5/<0.5	5.4/2.7	81	0.038	0.74	0.2	<10	150	3.36	-95.8	5.98	20.1	8,140
	9/1/04	38.1/59.7	13.3/13.2	955.3	<5.0	1.6	<0.5	<1.0	15.0	170	<0.010	0.6	2.0	12.0	250	0.14	-76.3	5.86	24.8	1,445
	11/16/04	75.7/68.4	17.2/19.1	771.7/833.1	<10/<10	2.0/22	<0.5/<0.5	<0.5/<0.5	2.8/3.8	150	<0.010	0.6	0.6	55	350	0.16	-4.7	6.12	20.7	OR
17PS-03	4/1/04	<1.0	<1.0	1,038.5	**	2.2	0.5	<0.5	77.5	69	NA	0.68	NA	NA	NA	0.40	178.1	6.9	15.6	4,650
	6/2/04	62.6	84.5	987.3	<5	2.1	<0.5	<0.5	10.0	110	NA	0.81	0.0	40	325	1.22	-111.4	5.93	20.4	7,660
	9/1/04	60.8	51.4	561.4	<5.0	<0.5	<0.5	<1.0	<0.5	130	NA	0.46	0.4	40	350	0.14	-78.9	5.92	23.6	140.7
	11/16/04	98.0	51.2	990.3/1027.9	<10/<10	2.4/2.3	<0.5/<0.5	<0.5/<0.5	0.5/<0.5	200	NA	0.8	0.0	175	300	0.18	-15.2	6.41	20.7	3,710
QA/QC																				
RB-1	3/31/04	4.50	<1.0	9.1	<0.5	<0.5	<0.5	<0.5	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/2/04	16.9	17.4	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	9/1/04	2.96	<1.0	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/16/04	<1.0	<1.0	3.6	<0.5	<0.5	<0.5	<0.5	2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

**Nitrite not quantifiable due to interference from high chloride.
NA denotes not analyzed.
OR denotes over range of meter.

TABLE 5
Volatile Fatty Acids in Groundwater
Naval Weapons Station
Charleston, South Carolina

Well ID	Sample Date	Pyruvic Acid (mg/L)	Lacitc Acid (mg/L)	Formic Acid (mg/L)	Acetic Acid (mg/L)	Proprionic Acid (mg/L)	Butyric Acid (mg/L)
Upgradient Monitoring Wells							
17MW-6S	4/1/2004	<4	<1	<1	<1	<1	<1
	6/2/2004	<4	<1	<1	6.0	<1	<1
	9/1/2004	<40	<10	<1	<1	<1	<1
	11/16/2004	<4	<1	<1	<1	<1	<1
Injection Wells							
17-PSI-07	3/31/2004	<4	<1	<1	<1	<1	<1
	6/2/2004	<4	<1	<1	224.2	174.6	118.6
	9/1/2004	<40	<10	17.10	281.9	44.5	250.0
	11/17/2004	<80	<20	<20	663.8	31.7	520.1
17-PSI-10	3/31/2004	<4	<1	<1	<1	<1	<1
	6/2/2004	<4	<1	<1	183.1	243.9	64.7
	9/1/2004	<40	<10	2.40	482.0	123.1	247.4
	11/17/2004	<80	<20	<20	676.7	90.9	270.5
Monitoring Wells							
17-PS-02	4/1/2004	<4	<1	<1	<1	<1	<1
	6/2/2004	<4	<1	<1	107.9	5.5	1.4
	9/1/2004	<40	<10	<1	<1	<1	<1
	11/16/2004	<4	<1	<1	24.5	2.1	<1

TABLE 6
Summary of Groundwater Results from 6-Month Post-Injection Geoprobe Sampling Event
Naval Weapons Station
Charleston, South Carolina

Sample ID	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	Chloroform (µg/L)	TOC (mg/L)	Chloride (mg/L)	Nitrite (mg/L)	Bromide (mg/L)	Nitrate (mg/L)	Phosphate (mg/L)	Sulfate (mg/L)	pH	Conductivity (µS)	ORP (mV)	Temperature (°C)	DO (mg/L)
17-PSTW-4	35,000	490	<50	<50	<1.0	708.0	<2.5	1.6	<0.5	<0.5	78.8	5.51	1916	99.3	19.1	1.06
17-PSTW-5	49,000	700	<50	<50	<1.0	490.6/488.2	<2.5/<2.5	1.2/1.2	<0.5/<0.5	<0.5/<0.5	78.2/76.6	5.70	1138	71.2	20.8	0.45
17-PSTW-6	49,000	590	<50	<50	<1.0	225.6	<2.5	0.7	<0.5	<0.5	81.1	5.84	911	66.8	18.8	0.36
17-PSTW-7	30,000	300	<50	<50	<1.0	518.8	<2.5	1.7	<0.5	<0.5	39.4	5.46	1662	51.2	19.7	0.34
17-PSTW-8	39,000	260	<50	<50	<1.0	479.3	<2.5	1.7	<0.5	<0.5	35.0	5.3	1538	65.5	19.7	0.38
17-PSTW-9	31,000	170	<50	230	<1.0	51.2	<0.5	0.5	<0.5	<0.5	33.9	5.04	396	168.1	18.9	0.41
17-PSTW-10	11,000	190	16	48	<1.0	861.9/853.5	<5/<5	2.3/2.1	<0.5/<0.5	<0.5/<0.5	96.6/91.2	5.55	1932	57.8	19.7	0.46
17-PSTW-11	6,800	71	<5.0	77	<1.0	1878.0	<10	4.0	<0.5	<0.5	132.5	5.56	5050	56.4	20.4	0.68
17-PSTW-12	710	<5.0	<5.0	<5.0	<1.0	514.4	<5	1.6	<0.5	<0.5	96.8	5.98	1512	37.8	19.4	0.99
17-PSTW-13	3,900	100	25	<5.0	<1.0	1356.5	<10	3.7	<0.5	<0.5	125.9	5.37	5350	52.4	19.2	0.21
17-PSTW-14	380	36	11	<0.5	<1.0	1418.9	<10	4.0	<0.5	<0.5	177.1	5.76	5040	33.4	21.4	0.41
17-PSTW-15	1.5	<0.5	<0.5	<0.5	<1.0	2797.3/2797.2	<5/<5	7.9/7.7	<0.5/<0.5	<0.5/<0.5	316/310.6	5.79	7800	52.5	20.4	0.37
Rinse Blank	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA

ATTACHMENT C

BORING LOGS AND WATER WELL RECORDS

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137 / 0528
DRILLING COMPANY: GREGG
DRILLING RIG: RHINO ATV

BORING No.: 17MW05S
DATE: 3-23-04
GEOLOGIST: WUDKWYCH
DRILLER: P. McKAY # 1607

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
						BROWN	FINE GRAIN SAND + SILT	SM					
	2			1.5					DRY				
						ORANGE	SILTY CLAY MOTTLED	CL					
S-1	4		4/4			GREY			DRY	0	0	0	0
	6												
									DAMP				
S-2	8		3/4	7		GREY	FINESAND + SILT	ML	MOIST	17	0	0	0
				V					WET				
	10												
							NO RECOVERY						
S-3	12												
						BROWN	SAND + SILT	SM	WET	20	0	0	0
	14									28	0	0	0
										-			
S-4	16		3/4			BROWN GREY				58	0	0	0
	18												
S-5	20		0.6/4			DARK GREY	SILT W/CLAY	ML/CL		0	0	0	0
				TD 20'			AUGER TO 19' SCREEN 8-18'						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: 4' MACRO CORE 4¼" HSA
Screen interval as per direction of Solutions Inc. to intercept max. concentration

Converted to Well: Yes X No ____ Well I.D. #: 17MW05S

17-MW-5 S

DHEC
PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

TT

1. WELL OWNER INFORMATION:
Name: Naval Weapons Station Charleston
(last) (first)
Address: 2311 Red Bank Rd
City: Goose Creek State: SC Zip: 29445
Telephone: Work: Home:

2. LOCATION OF WELL: **COUNTY:**
Name:
Street Address: Same as above
City: Zip:
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☐ Yes ☐ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Top Soil	0	6"
Brown to Tan Silty Sand	6"	18'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:

6. TYPE: ☐ Mud Rotary ☐ Jetted ☒ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☒ Other Augered

7. PERMIT NUMBER:

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☒ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 3/22/04
18' ft. Date Completed: 3/22/04

10. CASING: ☒ Threaded ☐ Welded
Diam.: 2"
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
11 in. to +2.5 ft. depth
_____ in. to _____ ft. depth
Height: Above ☒ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 2"
Slot/Gauge: .010 Length: 10'
Set Between: 8 ft. and 18 ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☒ Yes ☐ No
Installed from 11 ft. to 18 ft.
Effective size #2 Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0 ft. to 11 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P. _____ Volts _____ Length of drop pipe ____ ft. Capacity ____ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: Philip McKay CERT. NO.: 01607
Address: (Print) 106 Butternut Rd
Summerville, SC 29483
Level: A B C D (circle one) ☐ ☒ ☐ ☐
Telephone No.: (843) 832-4918 Fax No.: (843) 832-4919

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: _____ Date: 3/26/04
Well Driller

If D Level Driller, provide supervising driller's name:

DHEC 1903 (07/2003) COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137 / 0528
DRILLING COMPANY: GREGG
DRILLING RIG: RHINO ATV

BORING No.: 17MW06S
DATE: 3-22-04
GEOLOGIST: WUDKWYCH
DRILLER: McKAY #1607

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
						BROWN	FINE SAND + SILT	SM	DRY				
	2			1.5			↓	↓					
						ORG	SILTY CLAY	CL					
S-1	4		4/4			GREY	MOTTLED			0	0	0	0
									DRY				
	6												
S-2	8		3/4				SILT SAND + CLAY	ML	DAMP	0	0	0	0
				V		BROWN	SILT + SAND	SM	WET				
	10									21			
										28			
S-3	12		3/4							29			
	14						NO RECOVERY						
S-4	16		0/4										
	18						NO RECOVERY						
							GREY SILT ON TIP						
S5	20		0/4										
				TD 20'			AUGER TO 19'						
							SCREEN 8-18						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: 4' MACRO CORE 4 1/4" HSA
Screen interval as per direction of Solutions Inc. to intercept max. concentration

Converted to Well: Yes x No ____ Well I.D. #: 17MW06S

17 MW-685

D H E C
PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

JT

1. WELL OWNER INFORMATION:
Name: Naval Weapons Station (Charleston) (last) (first)
Address: 2311 Red Bank Rd
City: Goose Creek State: SC Zip: 29445
Telephone: Work: Home:

2. LOCATION OF WELL: **COUNTY:**
Name:
Street Address:
City: Same as above Zip:
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☐ Yes ☐ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Top Soil	0	6"
Brown to Tan Silty Sand	6"	18'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:

6. TYPE: ☐ Mud Rotary ☐ Jetted ☒ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☒ Other Hand-dug

7. PERMIT NUMBER:

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☒ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 3/22/04
18' ft. Date Completed: 3/22/04

10. CASING: ☒ Threaded ☐ Welded
Diam.: 2"
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
11 in. to +2.5 ft. depth
_____ in. to _____ ft. depth
Height: Above ☒ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 2"
Slot/Gauge: .010 Length: 10'
Set Between: 8 ft. and 18 ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☒ Yes ☐ No
Installed from 11 ft. to 18 ft.
Effective size #2 Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0 ft. to 11 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not Installed ☐
Mfr. Name: _____ Model No.: _____
H.P. _____ Volts _____ Length of drop pipe ___ ft. Capacity ___ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: Philip McKay CERT. NO.: 01607
Address: (Print) 106 Bitternut Rd Summerville, SC 29483
Level: A B C D (circle one) ☐ ☒ ☐ ☐
Telephone No.: (843) 832-4918 Fax No.: (843) 832-4919

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: _____ Date: 3/26/04
Well Driller

If D Level Driller, provide supervising driller's name:

DHEC 1903 (07/2003) COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWS CHARLESTON
PROJECT NUMBER: CTO 137 / 0528
DRILLING COMPANY: GREGG
DRILLING RIG: RHINO ATV

BORING No.: 17MW07S
DATE: 3-22-04
GEOLOGIST: WUDKWYCH
DRILLER: P. McKAY #1607

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
						BROWN	FINE SAND + SILT	SM					
	2			1.5		ORANGE	SILTY CLAY	CL	DRY				
						GREY	MOTTLED						
S-1	4		4/4						DAMP	0	0	0	0
	6												
S-2	8		4/4	7.5	▽		SAND + CLAY	SC	WET	0	0	0	0
				8		BROWN	FINE SAND S-SILT	SM					
	10					GREY			WET	160			
										170			
S-3	12		3/4							0	0	0	0
							POOR RECOVERY						
	14						ORANGE FINE SAND + SILT						
										0	0	0	0
S-4	16		0/4	16									
					V. SOFT	DARK GREY	S SAND + SILT S-CLAY	ML					
	18			18					WET				
							SILTY SANDY CLAY	CL					
S-5	20		4/4				S-SHELLS		MORE @ BASE	0	0	0	0
				TD 20'									
							AUGER TO 19'						
							SCREEN 8'-18'						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: 4' MACRO CORE 4¼" HSA
Screen interval as per direction of Solutions Inc to intercept max. concentration

Converted to Well: Yes X No _____ Well I.D. #: 17MW07S

17MW705

DHEC
PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

TT

1. WELL OWNER INFORMATION:
Name: Naval Weapons Station Charleston (last) (first)
Address: 2311 Red Bank Rd
City: Goose Creek State: SC Zip: 29445
Telephone Work: Home:

2. LOCATION OF WELL: **COUNTY:**
Name:
Street Address:
City: Summerville Zip:
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☐ Yes ☐ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Top Soil	0	6"
Brown to Tan Silty Sand	6"	18'

Log of Soil Boring

Project: SWMU 17 Injection Pilot Test *Solutions-IES Project No.:* 1090.02A3.ESTC *Boring Number:* 17PS-01
Client: ESTCP *Page:* 1 of 1
Project Location: Naval Weapons Station *City:* North Charleston, SC
Ft. ☑
Date Started: March 24,2004 *Date Finished:* March 24,2004
Drilling Method: Hollow Stem Auger *Initial Water Level:* *Final Water Level:* 2.9
Logged By: D. Hirth *Checked By:* *Total Depth of Boring:* 20 *Total Depth of Well:* 18

SUBSURFACE PROFILE				SAMPLE					PID Field Screen • ppm • 250 500 750 / OVA Field Screen ■ ppm ■ 250 500 750	Lab Sample	TCE in Soil (mg/kg)
Elevation	Depth in Feet	Symbol	Description	Number	Sample Interval	Type	Blows per Foot (N)	Recovery			
0	0		Ground Surface								
-2	1		*(OL)* Organic						1		
-4	2–4		*(SC)* Tan Sandy CLAY with Orange Streaks	1		MC			25		
-8	4–8		*(SC)* Tan Sandy CLAY with Orange and Green Streaks	2		MC			78, 94		
-12	8–12		No Recovery	3		MC					
-20	12–20		*(SM)* Wet Tan Silty SAND	4		MC			25, 17		
				5		MC			94, 67		
	20–22		20 ft								

Solutions Industrial & Environmental Services, Inc.
3722 Benson Drive
Raleigh, NC 27609
(919) 873-1060

Solutions Industrial & Environmental Services

17-PS-01

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name: Naval Weapons Station/Charleston (last) (first)
Address: 2316 Red Bluff Rd
City: Goose Creek State: SC Zip: 29445
Telephone: Work: Home:

2. LOCATION OF WELL: **COUNTY:**
Name:
Street Address:
City: Summerville Zip:
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☐ Yes ☐ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Top Soil	0	6"
Brown/Tan Silty Sand	6"	18'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:

6. TYPE: ☐ Mud Rotary ☐ Jetted ☒ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☒ Other Augered

7. PERMIT NUMBER:

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☒ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 3/25/04
18' ft. Date Completed: 3/25/04

10. CASING: ☒ Threaded ☐ Welded
Diam.: 2"
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
+2@5 in. to 13 ft. depth
_____ in. to _____ ft. depth
Height: Above ☒ Below ☐
Surface 2'
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 2"
Slot/Gauge: .010 Length: 5' 10'
Set Between: 8' 13' ft. and 18' ft.
_____ ft. and _____ ft.
Sieve Analysis ☐ Yes (please enclose) ☐ No
NOTE: MULTIPLE SCREENS USE SECOND SHEET

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☒ Yes ☐ No
Installed from 11 ft. to 18 ft.
Effective size #2 Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0 ft. to 11 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P. _____ Volts _____ Length of drop pipe ___ ft. Capacity ___ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: Philip McKay CERT. NO.: 01607
Address: (Print) 108 Bethwood Rd Summerville, SC 29485
Level: A B C D (circle one) ☐ ☒ ☐ ☐
Telephone No.: (843) 832-4518 Fax No.: (843) 832-4515

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.
Signed: _____ Date: 3/28/04
Well Driller

If D Level Driller, provide supervising driller's name:

DHEC 1903 (07/2003) COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

(7)

Log of Soil Boring

Project: SWMU 17 Injection Pilot Test *Solutions-IES Project No.:* 1090.02A3.ESTC *Boring Number:* 17PS-2
Client: ESTCP *Page:* 1 of 1
Project Location: Naval Weapons Station *City:* North Charleston, SC
Ft. ☑
Date Started: March 24,2004 *Date Finished:* March 24,2004
Drilling Method: Hollow Stem Auger *Initial Water Level:* *Final Water Level:* 2.9
Logged By: D. Hirth *Checked By:* *Total Depth of Boring:* 20 *Total Depth of Well:* 18

SUBSURFACE PROFILE				SAMPLE					PID Field Screen • ppm • 250 500 750 / OVA Field Screen ■ ppm ■ 250 500 750	Lab Sample	TCE in Soil (mg/kg)
Elevation	Depth in Feet	Symbol	Description	Number	Sample Interval	Type	Blows per Foot (N)	Recovery			
0	0		Ground Surface								
-1	1		*(OL)* Organic								
	2		*(SC)* Tan Orange Clayey SAND	1		MC			16		
	3										
	4								21		
	5										
	6			2		MC			115		
-7	7										
-9	8		*(SC)* Tan Orange Green Clayey SAND						156		
	9		*(SM)* Wet Silty SAND								
	10			3		MC			162		
	11										
	12								91		
	13										
	14			4		MC			82		
	15										
-16	16								50		
	17		Cave In								
	18			5		MC			40		
	19										
-20	20								104		
	21		20 ft								
	22										

Solutions Industrial & Environmental Services, Inc.
3722 Benson Drive
Raleigh, NC 27609
(919) 873-1060

Solutions Industrial & Environmental Services

17-PS-02

DHEC

PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name Naval Weapons Station/Charleston (last) (first)
Address 2316 Red Bank Rd
City Goose Creek State: SC Zip: 29445
Telephone Work Home

2. LOCATION OF WELL: **COUNTY:**
Name:
Street Address
City: Sand Island Zip
Latitude Longitude

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☐ Yes ☐ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Top Soil	0	6"
Brown/Tan Silty Sand	6"	18'

*Indicate Water Bearing Zones
(Use a 2nd sheet if needed)

5. REMARKS:

6. TYPE: ☐ Mud Rotary ☐ Jetted ☒ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☒ Other Augered

7. PERMIT NUMBER:

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☒ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 3/25/04
18' ft. Date Completed: 3/25/04

10. CASING: ☒ Threaded ☐ Welded
Diam.: 2"
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
+2.5 in. to 13 ft. depth
_____ in. to _____ ft. depth
Height: Above ☒ Below ☐
Surface 2" ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 2"
Slot/Gauge: .010 Length: ~~5~~ 10'
Set Between: 8 ft. and 18 ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☒ Yes ☐ No
Installed from 11 ft. to 18 ft.
Effective size #2 Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0 ft. to 11 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: _____ ft. _____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P. _____ Volts _____ Length of drop pipe ___ ft. Capacity ___ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: Philip McKay CERT. NO.: 01607
Address: (Print) 106 Dorchester Rd Summerville, SC 29483
Level: A B C D (circle one) ☐ ☒ ☐ ☐
Telephone No.: (843) 832-4518 Fax No.: (843) 832-4515

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: _____ Date: 3/28/04
Well Driller

If D Level Driller, provide supervising driller's name:

DHEC 1901 (07/2003) COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

Log of Soil Boring

Project: SWMU 17 Injection Pilot Test *Solutions-IES Project No.:* 1090.02A3.ESTC *Boring Number:* 17PS-3
Client: ESTCP *Page:* 1 of 1
Project Location: Naval Weapons Station *City:* North Charleston, SC
Ft. ☑
Date Started: March 25,2004 *Date Finished:* March 25,2004
Drilling Method: Hollow Stem Auger *Initial Water Level:* *Final Water Level:* 2.2
Logged By: D. Hirth *Checked By:* *Total Depth of Boring:* 20 *Total Depth of Well:* 18

SUBSURFACE PROFILE				SAMPLE					PID Field Screen • ppm • 250 500 750 / OVA Field Screen ■ ppm ■ 250 500 750	Lab Sample	TCE in Soil (mg/kg)
Elevation	Depth in Feet	Symbol	Description	Number	Sample Interval	Type	Blows per Foot (N)	Recovery			
0	0		Ground Surface								
-1	1		*(OL)* Organic								
	2		*(CL)* Tan Orange CLAY	1		MC					
	3										
	4										
	5										
	6			2		MC					
-8	7										
	8		*(CL)* Gray Green CLAY								
	9		*(GW)* tan Orange Wet SAND								
	10			3		MC					
	11										
	12										
	13										
	14			4		MC					
	15										
	16										
	17										
	18			5		MC					
-19	19										
-20	20		*(CL)* Dark Gray Clayey SAND								
	21		20 ft								
	22										

Solutions Industrial & Environmental Services, Inc.
3722 Benson Drive
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(919) 873-1060

Solutions Industrial & Environmental Services

17 PS-03

DHEC

PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name Naval Weapons Station/Charleston
(last) (first)
Address 2316 Red Bank Rd
City Goose Creek State SC Zip 29445
Telephone Work Home

2. LOCATION OF WELL: **COUNTY:**
Name:
Street Address:
City: Summerville Zip:
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☐ Yes ☐ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Top Soil	0	6"
Brown/Tan Silty Sand	6"	18'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:

6. TYPE: ☐ Mud Rotary ☐ Jetted ☒ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☒ Other Augered

7. PERMIT NUMBER:

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☒ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 3/25/04
18' ft. Date Completed: 3/25/04

10. CASING: ☒ Threaded ☐ Welded
Diam.: 2"
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
+2.05 in. to 13 ft. depth
_____ in. to _____ ft. depth
Height: Above ☒ Below ☐
Surface 2.4 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 2"
Slot/Gauge: .010 Length: 5' 10'
Set Between: 8.2 ft. and 18 ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☒ Yes ☐ No
Installed from 11 ft. to 18 ft.
Effective size #2 Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0 ft. to 11 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P. _____ Volts _____ Length of drop pipe ___ ft. Capacity ___ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: Philip McKay CERT. NO.: 01607
Address (Print) 106 Dorchester Rd Summerville, SC 29485
Level: A B C D (circle one) ☐ ☒ ☐ ☐
Telephone No.: (843) 836-4518 Fax No.: (843) 836-4615

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: _____ Date: 3/28/04
Well Driller

If D Level Driller, provide supervising driller's name:

DHEC 1901 (07/2003) COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

Log of Soil Boring

Project: SWMU 17 Injection Pilot Test *Solutions-IES Project No.:* 1090.02A3.ESTC *Boring Number:* 17PSI-1

Client: ESTCP *Page:* 1 of 1

Project Location: Naval Weapons Station *City:* North Charleston, SC

Ft. ☑

Date Started: March 25,2004 *Date Finished:* March 25,2004

Drilling Method: Hollow Stem Auger *Initial Water Level:* *Final Water Level:* 2.4

Logged By: D. Hirth *Checked By:* *Total Depth of Boring:* 20 *Total Depth of Well:* 18

SUBSURFACE PROFILE				SAMPLE					PID Field Screen • ppm • 250 500 750 / OVA Field Screen ■ ppm ■ 250 500 750	Lab Sample	TCE in Soil (mg/kg)
Elevation	Depth in Feet	Symbol	Description	Number	Sample Interval	Type	Blows per Foot (N)	Recovery			
0	0		Ground Surface								
-1	1		*(OL)* Organic								
	2		*(CL)* Tan Orange CLAY								
	3										
	4										
	5										
-6	6		*(CL)* Tan Orange Green CLAY								
-8	7										
	8		*(SM)* wet Tan Silty SAND								
	9										
	10										
	11										
	12										
	13										
	14										
	15										
	16										
	17										
-19	18										
-20	19		*(SM)* Light Gray Silty SAND with Some Clay								
	20		20 ft								
	21										
	22										

Solutions Industrial & Environmental Services, Inc.
722 Benson Drive
Raleigh, NC 27609
(919) 873-1060

Solutions Industrial & Environmental Services

17 FEB 01

DHEC

PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name: Naval Weapons Station / Charleston
(last) (first)
Address: 2316 Red Bank Rd
City: Goose Creek State: SC Zip: 29445
Telephone: Work: Home:

2. LOCATION OF WELL: **COUNTY:**
Name:
Street Address:
City: Same as above Zip:
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☐ Yes ☐ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Brown Fine Silty Sand	0	18'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☒ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER:

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☐ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 3/28/04
_____ ft. Date Completed: 3/28/04

10. CASING: ☒ Threaded ☐ Welded
Diam.: 1"
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
0 in. to 13 ft. depth
_____ in. to _____ ft. depth
Height: Above ☒ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 1"
Slot/Gauge: .010 Length: 10'
Set Between: 8.5 ft. and 18 ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☐ Yes ☒ No
Installed from _____ ft. to _____ ft.
Effective size _____ Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0 ft. to 13 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not Installed ☐
Mfr. Name: _____ Model No.: _____
H.P. _____ Volts _____ Length of drop pipe ____ ft. Capacity ____ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: Philip Mobley **CERT. NO.:** 01607
Address: (Print) 1K Bishop Way Rd
Summerville, SC 29483
Level: A ☐ B ☒ C ☐ D ☐ (circle one)
Telephone No.: (843) 832-4518 Fax No.: (843) 832-4519

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: _____ Date: 3/28/04
Well Driller

If D Level Driller, provide supervising driller's name:

DHEC 1903 (07/2003) COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

(16)

Log of Soil Boring

Project: SWMU 17 Injection Pilot Test *Solutions-IES Project No.:* 1090.02A3.ESTC *Boring Number:* 17PSI-2
Client: ESTCP *Page:* 1 of 1
Project Location: Naval Weapons Station *City:* North Charleston, SC
Ft. ☑
Date Started: March 25,2004 *Date Finished:* March 25,2004
Drilling Method: Hollow Stem Auger *Initial Water Level:* *Final Water Level:* 2.2
Logged By: D. Hirth *Checked By:* *Total Depth of Boring:* 20 *Total Depth of Well:* 18

SUBSURFACE PROFILE				SAMPLE					PID Field Screen • ppm • 250 500 750 / OVA Field Screen ■ ppm ■ 250 500 750	Lab Sample	TCE in Soil (mg/kg)
Elevation	Depth in Feet	Symbol	Description	Number	Sample Interval	Type	Blows per Foot (N)	Recovery			
0	0		Ground Surface								
-1	1		*(OL)* Organic								
	2		*(CL)* Tan Orange CLAY								
	3										
	4			1		MC					
	5										
	6										
-7	7										
-8	8		*(CL)* Tan Orange Green CLAY								
	9		*(SM)* Tan Silty SAND	3		MC					TCE = 9.9
	10										
	11										
	12										
	13			4		MC					
	14										
	15										
	16										
	17										
-19	18										
	19		*(SC)* Gray Clayey SAND								
-20	20		20 ft								
	21										
	22										

Solutions Industrial & Environmental Services, Inc.
3722 Benson Drive
Raleigh, NC 27609
(919) 873-1060

Solutions
Industrial & Environmental Services

17 PJE 02

D H E C

PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name Naval Weapons Station / Charleston
(last) (first)
Address 2316 Red Bank Rd
City Goose Creek State SC Zip: 29445
Telephone Work Home:

2. LOCATION OF WELL: **COUNTY:**
Name:
Street Address:
City: Same as above Zip
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☐ Yes ☐ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Brownish Silty sand	0	15'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☒ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER:

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☐ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 3/29/04
_____ ft. Date Completed: 3/29/04

10. CASING: ☒ Threaded ☐ Welded
Diam.: 1"
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
12.5 in. to 15 ft depth
_____ in. to _____ ft. depth
Height: Above ☒ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 1"
Slot/Gauge: .010 Length: 10'
Set Between: 5.5 ft. and 15 ft. **NOTE: MULTIPLE SCREENS**
_____ ft. and _____ ft. **USE SECOND SHEET**
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☐ Yes ☒ No
Installed from _____ ft. to _____ ft.
Effective size _____ Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0 ft. to 15 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not Installed ☐
Mfr. Name: _____ Model No.: _____
H.P. _____ Volts _____ Length of drop pipe ___ ft. Capacity ___ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: Philip Moten CERT. NO.: 01607
Address: (Print) 105 Sawmill Way Rd
Summerville, SC 29483
Level: A ☐ B ☒ C ☐ D ☐ (circle one)
Telephone No.: (843) 832-4918 Fax No.: (843) 832-4919

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: _____ Date: 3/29/04
Well Driller

If D Level Driller, provide supervising driller's name:

DHEC [illegible] COPY MAIL TO S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

Log of Soil Boring

Project: SWMU 17 Injection Pilot Test *Solutions-IES Project No.:* 1090.02A3.ESTC *Boring Number:* 17PSI-3
Client: ESTCP *Page:* 1 of 1
Project Location: Naval Weapons Station *City:* North Charleston, SC
Ft. ☑
Date Started: March 25,2004 *Date Finished:* March 25,2004
Drilling Method: Hollow Stem Auger *Initial Water Level:* *Final Water Level:* 2.4
Logged By: D. Hirth *Checked By:* *Total Depth of Boring:* 20 *Total Depth of Well:* 18

SUBSURFACE PROFILE				SAMPLE					PID Field Screen • ppm • 250 500 750 / OVA Field Screen ■ ppm ■ 250 500 750	Lab Sample	TCE in Soil (mg/kg)
Elevation	Depth in Feet	Symbol	Description	Number	Sample Interval	Type	Blows per Foot (N)	Recovery			
0	0		Ground Surface								
-1	1		*(OL)* Organic								
	2		*(CL)* Tan Orange CLAY								
	3										
	4										
	5					SS					
	6										
	7										
-8	8		*(SM)* Wet Tan silty SAND								
	9										
	10										
	11					SS					TCE = 10
	12										
	13										
	14										
-15	15		*(SM)* Wet Gray Silty SAND								
	16					SS					
	17										
-18	18		*(SC)* Gray Clayey SAND								
	19										
-20	20		20 ft								
	21										
	22										

Solutions Industrial & Environmental Services, Inc.
3722 Benson Drive
Raleigh, NC 27609
(919) 873-1060

Solutions Industrial & Environmental Services

17 PSI 03

DHEC

PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name Naval Weapons Station / Charleston
(last) (first)
Address 2316 Red Bank Rd
City Goose Creek State SC Zip: 29445
Telephone Work Home

2. LOCATION OF WELL: **COUNTY:**
Name:
Street Address:
City: Same as above Zip:
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☐ Yes ☐ No
Grouted Depth: from _____ ft to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Brownish Silty Sand	0	15'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☒ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER:

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☐ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 3/25/04
_____ ft. Date Completed: 3/25/04

10. CASING: ☒ Threaded ☐ Welded
Diam.: 1"
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
42.5 in. to 13 ft. depth
_____ in. to _____ ft. depth
Height: Above ☒ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 1"
Slot/Gauge: .010 Length: 10'
Set Between: 8 ft and 18 ft. **NOTE: MULTIPLE SCREENS**
_____ ft and _____ ft. **USE SECOND SHEET**
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☐ Yes ☒ No
Installed from _____ ft. to _____ ft.
Effective size _____ Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0 ft. to 13 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not Installed ☐
Mfr. Name: _____ Model No.: _____
H.P. _____ Volts _____ Length of drop pipe ___ ft. Capacity ___ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: Philip Moore CERT. NO.: 01607
Address: (Print) 107 Sutherland Rd Summerville, SC 29483
Level: A ☐ B ☒ C ☐ D ☐ (circle one)
Telephone No.: (843) 832-4918 Fax No.: (843) 832-4919

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: _____ Date: 3/25/04
Well Driller

If D Level Driller, provide supervising driller's name:

DHEC 1903 (07/2003) COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

Log of Soil Boring

Project: SWMU 17 Injection Pilot Test *Solutions-IES Project No.:* 1090.02A3.ESTC *Boring Number:* 17PSI-4
Client: ESTCP *Page:* 1 of 1
Project Location: Naval Weapons Station *City:* North Charleston, SC
Ft. ☑
Date Started: March 25,2004 *Date Finished:* March 25,2004
Drilling Method: Hollow Stem Auger *Initial Water Level:* *Final Water Level:* 2.4
Logged By: D. Hirth *Checked By:* *Total Depth of Boring:* 20 *Total Depth of Well:* 18

SUBSURFACE PROFILE				SAMPLE					PID Field Screen • ppm • 250 500 750 / OVA Field Screen ■ ppm ■ 250 500 750	Lab Sample	TCE in Soil (mg/kg)
Elevation	Depth in Feet	Symbol	Description	Number	Sample Interval	Type	Blows per Foot (N)	Recovery			
0	0		Ground Surface								
-1	1		*(OL)* Organic						1		
	2		*(CL)* Tan Orange CLAY						1		
	3										
	4								3		
	5										
	6								10		
-7	7										
	8		*(CL)* Gray-Green Clay.						35		
	9		*(SM)* Tan Silty SAND.								
	10								46		
	11										
	12								38		
	13										
-15	14										
	15		*(SM)* Gray Silty SAND. Wet.						8		
-16	16		*(SC)* Medium Gray Clayey SAND. 75% recovery.						6		
	17										
	18								7		
	19										
-20	20		20 ft						1		
	21										
	22										

Solutions Industrial & Environmental Services, Inc.
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11 PJZ 07

DHEC

PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name Naval Weapons Station / Charleston
(last) (first)
Address 2316 Red Bank Rd
City Goose Creek State SC Zip 29445
Telephone Work. Home

2. LOCATION OF WELL: COUNTY:
Name:
Street Address:
City: Sam's Club Zip:
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☐ Yes ☐ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Brownish Silty Sand	0	15'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☒ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER:

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☐ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 3/25/04
_____ ft. Date Completed: 3/25/04

10. CASING: ☒ Threaded ☐ Welded
Diam.: 1"
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
12.5 in. to 13 ft. depth
_____ in. to _____ ft. depth
Height: Above ☒ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 1"
Slot/Gauge: .010 Length: 10'
Set Between: 8.5 ft. and 18 ft. NOTE: MULTIPLE SCREENS
_____ ft. and _____ ft. USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☐ Yes ☒ No
Installed from _____ ft. to _____ ft.
Effective size _____ Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0 ft. to 13 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P. _____ Volts _____ Length of drop pipe ___ ft. Capacity ____ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: Philip Mosley CERT. NO.: 01807
Address: (Print) [illegible] Summerville, SC 29483
Level: A ☐ B ☒ C ☐ D ☐ (circle one)
Telephone No.: (843) 832-4518 Fax No.: (843) 832-4519

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: _____ Date: 3/25/04
Well Driller

If D Level Driller, provide supervising driller's name:

DHEC 1903 (07/2003) COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

Log of Soil Boring

Project: SWMU 17 Injection Pilot Test *Solutions-IES Project No.:* 1090.02A3.ESTC *Boring Number:* 17PSI-5

Client: ESTCP *Page:* 1 of 1

Project Location: Naval Weapons Station *City:* North Charleston, SC

Ft. ☑

Date Started: March 25,2004 *Date Finished:* March 25,2004

Drilling Method: Hollow Stem Auger *Initial Water Level:* *Final Water Level:* 2.5

Logged By: D. Hirth *Checked By:* *Total Depth of Boring:* 20 *Total Depth of Well:* 18

SUBSURFACE PROFILE				SAMPLE					PID Field Screen • ppm • 250 500 750 / OVA Field Screen ■ ppm ■ 250 500 750	Lab Sample	TCE in Soil (mg/kg)
Elevation	Depth in Feet	Symbol	Description	Number	Sample Interval	Type	Blows per Foot (N)	Recovery			
0	0		Ground Surface								
-1	1		*(OL)* Organic								
	2		*(CL)* Tan Orange CLAY								
	3										
	4			1		MC					
-6	5										
	6		*(CL)* Tan Orange Green CLAY								
-8	7										
	8		*(SM)* Wet Silty SAND								
	9					SS					TCE = NA
	10										
	11										
	12										
	13										
	14										
	15					SS					
	16										
	17										
	18										
-20	19										
-20	20		*(CL)* Gray Clayey SAND								
	21		20 ft								
	22										

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Solutions Industrial & Environmental Services

11 PSZ 03

DHEC

PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name Naval Weapons Station / Charleston
(last) (first)
Address: 2316 Red Bank Rd
City Goose Creek State SC Zip: 29445
Telephone Work Home:

2. LOCATION OF WELL: **COUNTY:**
Name:
Street Address:
City: Sand Island Zip:
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☐ Yes ☐ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Brownish Silty Sand	0	15'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☒ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER:

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☐ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 3/25/04
_____ ft. Date Completed: 3/25/04

10. CASING: ☒ Threaded ☐ Welded
Diam.: 1"
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
42.5 in. to 13 ft. depth
_____ in. to _____ ft. depth
Height: Above ☒ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 1"
Slot/Gauge: .010 Length: 10'
Set Between: 8.5 ft. and 18 ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☐ Yes ☒ No
Installed from _____ ft. to _____ ft.
Effective size _____ Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0 ft. to 13 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P. _____ Volts _____ Length of drop pipe ___ ft. Capacity ___ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: Philip Mabry CERT. NO.: 01607
Address: (Print) 102 Sunnyway Rd Summerville, SC 29483
Level: A ☒ B C D (circle one)
Telephone No.: (843) 832-4918 Fax No.: (843) 832-4919

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: _____ Date: 3/25/04
Well Driller

If D Level Driller, provide supervising driller's name:

DHEC 1903 (07/2003) COPY: MAIL TO S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

Log of Soil Boring

Project: SWMU 17 Injection Pilot Test *Solutions-IES Project No.:* 1090.02A3.ESTC *Boring Number:* 17PSI-6
Client: ESTCP *Page:* 1 of 1
Project Location: Naval Weapons Station *City:* North Charleston, SC
Ft. ☑
Date Started: March 25,2004 *Date Finished:* March 25,2004
Drilling Method: Hollow Stem Auger *Initial Water Level:* *Final Water Level:* 2.6
Logged By: D. Hirth *Checked By:* *Total Depth of Boring:* 20 *Total Depth of Well:* 18

SUBSURFACE PROFILE				SAMPLE					PID Field Screen • ppm • 250 500 750 / OVA Field Screen ■ ppm ■ 250 500 750	Lab Sample	TCE in Soil (mg/kg)
Elevation	Depth in Feet	Symbol	Description	Number	Sample Interval	Type	Blows per Foot (N)	Recovery			
0	0		Ground Surface								
-1	1		*(OL)* Organic								
	2		*(SC)* Tan Orange Sandy CLAY								
	3										
-4	4			1		MC					
			Cave In								
	5		*(SC)* Tan Orange Green Sandy CLAY								
	6										
	7										
-8	8		*(SM)* Tan Gray Wet Silty SAND			MC					TCE = 9.0
	9					MC					TCE = 9.1
	10					MC					TCE = 5.3
	11					MC					TCE = 9.8
	12					MC					TCE = 9.0
	13					MC					TCE = 7.2
	14					MC					TCE = 5.8
	15					MC					TCE = 5.9
	16					MC					TCE = 8.7
-17	17					MC					TCE = 5.9
-18	18		*(SC)* Gray Wet Clayey SAND								
	19		*(SC)* Gray Clayey SAND			MC					
-20	20		20 ft								
	21										
	22										

Solutions Industrial & Environmental Services, Inc.
3722 Benson Drive
Raleigh, NC 27609
(919) 873-1060

Solutions Industrial & Environmental Services

DHEC

PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name: Naval Weapons Station / Charleston
(last) (first)
Address: 2316 Red Bank Rd
City: Goose Creek State: SC Zip: 29445
Telephone: Work Home

2. LOCATION OF WELL: **COUNTY:**
Name:
Street Address:
City: Same as above Zip:
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☐ Yes ☐ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Brown fine silty sand	0	18'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☒ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER:

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☐ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 3/25/04
_____ ft. Date Completed: 3/25/04

10. CASING: ☒ Threaded ☐ Welded
Diam.: 1"
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
42.5 in. to 18 ft. depth
_____ in. to _____ ft. depth
Height: Above ☒ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 1"
Slot/Gauge: .010 Length: 10'
Set Between: 8 ft. and 18 ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☐ Yes ☒ No
Installed from _____ ft. to _____ ft.
Effective size _____ Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0 ft. to 18 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not Installed ☐
Mfr. Name: _____ Model No.: _____
H.P. _____ Volts _____ Length of drop pipe ___ ft. Capacity ___ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: Philip Mobley CERT. NO.: 01607
Address (Print) 107 Bishop Way Rd
Summerville, SC 29483
Level: A ☐ B ☒ C ☐ D ☐ (circle one)
Telephone No.: (843) 832-4918 Fax No.: (843) 832-4919

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: _____ Date: 3/25/04
Well Driller

If D Level Driller, provide supervising driller's name:

DHEC 1903 (07/2003) COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

Log of Soil Boring

Project: SWMU 17 Injection Pilot Test *Solutions-IES Project No.:* 1090.02A3.ESTC *Boring Number:* 17PSI-7
Client: ESTCP *Page:* 1 of 1
Project Location: Naval Weapons Station *City:* North Charleston, SC
Ft. ☑
Date Started: March 25,2004 *Date Finished:* March 25,2004
Drilling Method: Hollow Stem Auger *Initial Water Level:* *Final Water Level:* 2.6
Logged By: D. Hirth *Checked By:* *Total Depth of Boring:* 20 *Total Depth of Well:* 18

SUBSURFACE PROFILE				SAMPLE					PID Field Screen • ppm • 250 500 750 / OVA Field Screen ■ ppm ■ 250 500 750	Lab Sample	TCE in Soil (mg/kg)
Elevation	Depth in Feet	Symbol	Description	Number	Sample Interval	Type	Blows per Foot (N)	Recovery			
0	0		Ground Surface								
-1	1		*(OL)* Organic						4		
	2		*(SM)* Tan Orange Silty SAND								
	3								1		
	4										
	5								36		
	6										
	7								73		
-9	8								2		
	9		*(GW)* Tan wet SAND								
	10								58		
	11										
-12	12		*(SM)* Silty SAND						113		
	13										
	14								12		
-15	15		*(SM)* Dark Gray Silty SAND								
	16								61		
-18	17								35		
	18		*(SC)* Dark Gray Clayey SAND						32		
	19										
-20	20								1		
			20 ft								
	21										
	22										

Solutions Industrial & Environmental Services, Inc.
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Solutions Industrial & Environmental Services

DHEC

PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name Naval Weapons Station / Charleston
(last) (first)
Address 2316 Red Bank Rd
City Goose Creek State SC Zip 29445
Telephone Work Home

2. LOCATION OF WELL: **COUNTY:**
Name:
Street Address:
City: Same as above Zip:
Latitude Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☐ Yes ☐ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Brownish Silty Sand	0	18'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☒ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER:

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☐ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 3/23/04
_____ ft. Date Completed: 3/23/04

10. CASING: ☒ Threaded ☐ Welded
Diam.: 1"
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
+2.5 in. to 13 ft. depth
_____ in. to _____ ft. depth
Height: Above ☒ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 1"
Slot/Gauge: .010 Length: 8' 10'
Set Between: 8.5 ft. and 18 ft. **NOTE: MULTIPLE SCREENS**
_____ ft. and _____ ft. **USE SECOND SHEET**
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☐ Yes ☒ No
Installed from _____ ft. to _____ ft.
Effective size _____ Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0 ft. to 13 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not Installed ☐
Mfr. Name: _____ Model No.: _____
H.P. _____ Volts _____ Length of drop pipe ___ ft. Capacity ___ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: Philip Mobley **CERT. NO.:** 01607
Address: (Print) PO Box [illegible] Summerville, SC 29483
Level: A ☐ B ☒ C ☐ D ☐ (circle one)
Telephone No.: (843) 832-4518 Fax No.: (843) 832-4519

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: _____ Date: 3/25/04
Well Driller

If D Level Driller, provide supervising driller's name:

DHEC 1502 (07/2003) COPY + MAIL TO S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

Log of Soil Boring

Project: SWMU 17 Injection Pilot Test *Solutions-IES Project No.:* 1090.02A3.ESTC *Boring Number:* 17PSI-8
Client: ESTCP *Page:* 1 of 1
Project Location: Naval Weapons Station *City:* North Charleston, SC
Ft. ☑
Date Started: March 24,2004 *Date Finished:* March 24,2004
Drilling Method: Hollow Stem Auger *Initial Water Level:* *Final Water Level:* 3.1
Logged By: D. Hirth *Checked By:* *Total Depth of Boring:* 20 *Total Depth of Well:* 18

SUBSURFACE PROFILE				SAMPLE					PID Field Screen • ppm • 250 500 750 / OVA Field Screen ■ ppm ■ 250 500 750	Lab Sample	TCE in Soil (mg/kg)
Elevation	Depth in Feet	Symbol	Description	Number	Sample Interval	Type	Blows per Foot (N)	Recovery			
0	0		Ground Surface								
-1	1		(OL) Organic								
-2	2		(GW) Organic Fine SAND						16		
	3		(SC) Tan Orange Sandy CLAY						10		
	4										
	5			1		MC			52		
	6										
-7	7										
-8	8		(SC) Tan Orange Green Sandy Clay						202		
	9		(SM) Wet Tan Silty SAND						118		
	10										
	11					MC					TCE = 5.0
-12	12								231		
	13		No Recovery								
	14										
	15										
-16	16					MC					
	17		(GW) Tan SAND with Black Streaks						91		
-19	18										
	19		(SC) Dark Gray Clayey SAND								
-20	20								31		
	21		20 ft								
	22										

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Raleigh, NC 27609
(919) 873-1060

Solutions Industrial & Environmental Services

17 PJE 08

DHEC

PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name Naval Weapons Station / Charleston
(last) (first)
Address 2316 Red Bank Rd
City Goose Creek State SC Zip 29445
Telephone Work Home

2. LOCATION OF WELL: **COUNTY:**
Name:
Street Address:
City Same as above Zip
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☐ Yes ☐ No
Grouted Depth: from _____ ft to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Brown fine silty sand	0	18'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☒ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER:

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☐ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 3/25/04
_____ ft. Date Completed: 3/25/04

10. CASING: ☒ Threaded ☐ Welded
Diam.: 1"
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
2.5 in to 13 ft. depth
_____ in. to _____ ft. depth
Height: Above ☒ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 1"
Slot/Gauge: .010 Length: 10'
Set Between: 8 ft. and 18 ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☐ Yes ☒ No
Installed from _____ ft. to _____ ft.
Effective size _____ Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0 ft. to 13 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P. _____ Volts _____ Length of drop pipe ___ ft. Capacity ___ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: Philip Mosley CERT. NO.: 01607
Address (Print) 102 Sunset Way Rd
Summerville, SC 29483
Level: A B C D (circle one)
Telephone No.: (843) 832-4518 Fax No.: (843) 832-4519

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: _____ Date: 3/26/04
Well Driller

If D Level Driller, provide supervising driller's name:

Log of Soil Boring

Project: SWMU 17 Injection Pilot Test *Solutions-IES Project No.:* 1090.02A3.ESTC *Boring Number:* 17PSI-9
Client: ESTCP *Page:* 1 of 1
Project Location: Naval Weapons Station *City:* North Charleston, SC
Ft. ☑
Date Started: March 25,2004 *Date Finished:* March 25,2004
Drilling Method: Hollow Stem Auger *Initial Water Level:* *Final Water Level:* 2.6
Logged By: D. Hirth *Checked By:* *Total Depth of Boring:* 20 *Total Depth of Well:* 18

SUBSURFACE PROFILE				SAMPLE					PID Field Screen • ppm • 250 500 750 / OVA Field Screen ■ ppm ■ 250 500 750	Lab Sample	TCE in Soil (mg/kg)
Elevation	Depth in Feet	Symbol	Description	Number	Sample Interval	Type	Blows per Foot (N)	Recovery			
0	0		Ground Surface								
-1	1		*(OL)* Organic								
	2		*(CL)* Tan Orange CLAY								
	3										
	4										
	5										
	6										
-7	7										
-8	8		*(SC)* Tan Orange Green CLAY	1		MC					
	9		*(SC)* Wet Tan Clayey SAND								
	10		*(SM)* Gray Clayey SAND								
	11										
	12										
	13										
	14										
	15										
	16										
	17					MC					TCE = 3.2
	18										
	19					MC					
-20	20		20 ft								
	21										
	22										

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Raleigh, NC 27609
(919) 873-1060

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Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name: Naval Weapons Station / Charleston
(last) (first)
Address: 2316 Red Bank Rd
City: Goose Creek State: SC Zip: 29445
Telephone Work: Home:

2. LOCATION OF WELL: **COUNTY:**
Name:
Street Address:
City: Summerville Zip
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☐ Yes ☐ No
Grouted Depth: from _____ ft to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Brown Silty Sand	0	15'

Log of Soil Boring

Project: SWMU 17 Injection Pilot Test *Solutions-IES Project No.:* 1090.02A3.ESTC *Boring Number:* 17PSI-10
Client: ESTCP *Page:* 1 of 1
Project Location: Naval Weapons Station *City:* North Charleston, SC
Ft. ☑
Date Started: March 25,2004 *Date Finished:* March 25,2004
Drilling Method: Hollow Stem Auger *Initial Water Level:* *Final Water Level:* 2.4
Logged By: D. Hirth *Checked By:* *Total Depth of Boring:* 20 *Total Depth of Well:* 18

SUBSURFACE PROFILE				SAMPLE					PID Field Screen • ppm • 250 500 750 / OVA Field Screen ■ ppm ■ 250 500 750	Lab Sample	TCE in Soil (mg/kg)
Elevation	Depth in Feet	Symbol	Description	Number	Sample Interval	Type	Blows per Foot (N)	Recovery			
0	0		Ground Surface								
-1	1		(OL) Organic						6, 1		
	2		(CL) Tan Orange CLAY	1		MC			7		
	3										
	4										
	5								243		
-6	6		(CL) Tan Orange Green CLAY	2		MC			197		
-8	7										
	8		(GW) Gray SAND						134		
	9		(SM) Tan Silty SAND								
	10			3		MC					
	11										
	12										
	13										
	14			4		MC					
-15	15										
-16	16		(SC) Medium Gray Clayey SAND								
	17		Cave In								
-18	18		(SC) Medium Gray Clayey SAND	5		MC					
	19										
-20	20		20 ft								
	21										
	22										

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Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name: Naval Weapons Station / Charleston (last) (first)
Address: 2316 Red Bank Rd
City: Goose Creek State: SC Zip: 29445
Telephone Work: Home:

2. LOCATION OF WELL: COUNTY:
Name:
Street Address:
City: Sand Island Zip:
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: PUBLIC SYSTEM NUMBER:

4. ABANDONMENT: ☐ Yes ☐ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Brownish Silty Sand	0	15'

Log of Soil Boring

Project: SWMU 17 Injection Pilot Test *Solutions-IES Project No.:* 1090.02A3.ESTC *Boring Number:* 17PSI-11

Client: ESTCP *Page:* 1 of 1

Project Location: Naval Weapons Station *City:* North Charleston, SC

Ft. ☑

Date Started: March 24,2004 *Date Finished:* March 24,2004

Drilling Method: Hollow Stem Auger *Initial Water Level:* *Final Water Level:* 2.8

Logged By: D. Hirth *Checked By:* *Total Depth of Boring:* 20 *Total Depth of Well:* 18

SUBSURFACE PROFILE				SAMPLE					PID Field Screen • ppm • 250 500 750 / OVA Field Screen ■ ppm ■ 250 500 750	Lab Sample	TCE in Soil (mg/kg)
Elevation	Depth in Feet	Symbol	Description	Number	Sample Interval	Type	Blows per Foot (N)	Recovery			
0	0		Ground Surface								
-1	1		*(OL)* Organic								
	2		*(SC)* Tan Orange Clayey SAND						18		
	3										
	4								18		
	5										
	6								83		
-7	7										
-8	8		*(SC)* Tan Orange Green Clayey SAND						105		
	9		Cave In								
-10	10								121		
	11		*(SM)* Wet Silty SAND								
-12	12								86		
	13		Cave In								
	14								81		
	15										
-16	16								93		
	17		Cave In								
	18										
	19										
-20	20										
	21		20 ft								
	22										

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Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name Naval Weapons Station / Charleston
(last) (first)
Address 2316 Red Bank Rd
City Goose Creek State SC Zip 29445
Telephone Work Home

2. LOCATION OF WELL: **COUNTY:**
Name
Street Address
City Summerville Zip
Latitude Longitude

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☐ Yes ☐ No
Grouted Depth from _____ ft to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Brown Fine Silty Sand	0	18'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☒ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER:

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☐ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 3/24/04
_____ ft. Date Completed: 3/24/04

10. CASING: ☒ Threaded ☐ Welded
Diam.: 1"
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
0.5 in. to 18 ft. depth
_____ in. to _____ ft. depth
Height: Above ☒ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 1"
Slot/Gauge: .010 Length: 10'
Set Between: 8 ft. and 18 ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☐ Yes ☒ No
Installed from _____ ft. to _____ ft.
Effective size _____ Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0 ft. to 18 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not Installed ☐
Mfr. Name: _____ Model No.: _____
H.P. _____ Volts _____ Length of drop pipe ____ ft. Capacity ____ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: [illegible] CERT. NO.: 01607
Address: (Print) [illegible] Level: A ☐ B ☒ C ☐ D ☐ (circle one)
Summerville, SC 29483
Telephone No.: (843) 832-4918 Fax No.: (843) 832-4919

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: _____ Date: 3/28/04
Well Driller

If D Level Driller, provide supervising driller's name:

Log of Soil Boring

Project: SWMU 17 Injection Pilot Test *Solutions-IES Project No.:* 1090.02A3.ESTC *Boring Number:* 17PSI-12

Client: ESTCP *Page:* 1 of 1

Project Location: Naval Weapons Station *City:* North Charleston, SC

Ft. ☑

Date Started: March 24,2004 *Date Finished:* March 24,2004

Drilling Method: Hollow Stem Auger *Initial Water Level:* *Final Water Level:* 2.8

Logged By: D. Hirth *Checked By:* *Total Depth of Boring:* 20 *Total Depth of Well:* 18

SUBSURFACE PROFILE				SAMPLE					PID Field Screen ● ppm ● 250 500 750 / OVA Field Screen ■ ppm ■ 250 500 750	Lab Sample	TCE in Soil (mg/kg)
Elevation	Depth in Feet	Symbol	Description	Number	Sample Interval	Type	Blows per Foot (N)	Recovery			
0	0		Ground Surface								
-1	1		*(OL)* Organic						23		
-2	2		*(SC)* Tan Clayey SAND								
	3		*(SC)* Tan Sandy CLAY with Orange Streaks						28		
	4										
	5								201		
	6										
-7	7										
-8	8		*(SC)* Tan Sandy CLAY with Orange and Green Streak						245		
	9		*(SM)* Wet Tan Silty SAND						107		
	10										
	11								196		
	12										
	13								57		
	14										
	15								104		
	16										
	17								46		
	18										
	19								64		
-20	20		20 ft								
	21										
	22										

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Solutions Industrial & Environmental Services

17 PSI 12

DHEC

PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name Naval Weapons Station / Charleston
(last) (first)
Address 2316 Red Bank Rd
City Goose Creek State SC Zip 29445
Telephone Work Home

2. LOCATION OF WELL: **COUNTY:**
Name:
Street Address
City: Summerville Zip
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☐ Yes ☐ No
Grouted Depth from _____ ft to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Brown fine silty sand	0	15'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☒ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER:

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☐ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 3/24/04
_____ ft. Date Completed: 3/24/04

10. CASING: ☒ Threaded ☐ Welded
Diam.: 1"
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
12.5" in. to 13 ft. depth
_____ in. to _____ ft. depth
Height: Above ☒ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 1"
Slot/Gauge: .010 Length: 10'
Set Between: 8.5 ft. and 18 ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☐ No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☐ Yes ☒ No
Installed from _____ ft. to _____ ft.
Effective size _____ Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 0 ft. to 13 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type _____
Well Disinfected ☐ Yes ☐ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☐
Mfr. Name: _____ Model No.: _____
H.P. _____ Volts _____ Length of drop pipe ____ ft. Capacity ____ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: Philip Mobley CERT. NO.: 01607
Address: (Print) 107 Sunnyway Rd
Summerville, SC 29483
Level: A ☐ B ☒ C ☐ D ☐ (circle one)
Telephone No.: (843) 832-4918 Fax No.: (843) 832-4919

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: _____ Date: 3/28/04
Well Driller

If D Level Driller, provide supervising driller's name:

Log of Soil Boring

Project: SWMU 17 Injection Pilot Test *Solutions-IES Project No.:* 1090.02A3.ESTC *Boring Number:* 17PSI-13
Client: ESTCP *Page:* 1 of 1
Project Location: Naval Weapons Station *City:* North Charleston, SC
Ft. ☑
Date Started: March 25,2004 *Date Finished:* March 25,2004
Drilling Method: Hollow Stem Auger *Initial Water Level:* *Final Water Level:* 2.4
Logged By: D. Hirth *Checked By:* *Total Depth of Boring:* 20 *Total Depth of Well:* 18

SUBSURFACE PROFILE				SAMPLE					PID Field Screen (• ppm 250 500 750) / OVA Field Screen (■ ppm 250 500 750)	Lab Sample	TCE in Soil (mg/kg)
Elevation	Depth in Feet	Symbol	Description	Number	Sample Interval	Type	Blows per Foot (N)	Recovery			
0	0		Ground Surface								
-1	1		(OL) Organic								
	2		(CL) Tan Orange CLAY	1		MC			6, 1, 7		
	3										
	4										
	5								243		
-6	6			2		MC					
-8	7		(CL) Tan Orange Green CLAY						197		
	8		(GW) Gray SAND								
	9		(SM) Tan Silty SAND						134		
	10			3		MC					
	11										
	12										
	13										
	14			4		MC					
-15	15										
-16	16		(SC) Medium Gray Clayey SAND								
	17		Cave In								
-18	18		(SC) Medium Gray Clayey SAND	5		MC					
	19										
-20	20		20 ft								
	21										
	22										

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Log of Soil Boring

Project: SWMU 17 Injection Pilot Test *Solutions-IES Project No.:* 1090.02A3.ESTC *Boring Number:* 17PSI-14
Client: ESTCP *Page:* 1 of 1
Project Location: Naval Weapons Station *City:* North Charleston, SC
Ft. ☑
Date Started: March 24,2004 *Date Finished:* March 24,2004
Drilling Method: Hollow Stem Auger *Initial Water Level:* *Final Water Level:* 3.0
Logged By: D. Hirth *Checked By:* *Total Depth of Boring:* 20 *Total Depth of Well:* 18

SUBSURFACE PROFILE				SAMPLE					PID Field Screen ● ppm ● 250 500 750 / OVA Field Screen ■ ppm ■ 250 500 750	Lab Sample	TCE in Soil (mg/kg)
Elevation	Depth in Feet	Symbol	Description	Number	Sample Interval	Type	Blows per Foot (N)	Recovery			
0			Ground Surface								
	0										
-2	1		*(OL)* Organic						11		
	2		*(GW)* Tan Orange Silty SAND								
	3										
	4								23		
	5										
	6					MC			89		
-8	7										
	8		*(SC)* Gray Green Silty CLAY						136		
	9		No Recovery								
	10										
	11										
-12	12										
	13		*(SM)* Silty SAND			MC					TCE = 7.2
	14								153		
-15	15										
	16		*(SM)* Dark Gray Silty SAND						84		
	17					MC					
	18										
	19										
-20	20								35		
			20 ft								
	21										
	22										

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Log of Soil Boring

Project: SWMU 17 Injection Pilot Test *Solutions-IES Project No.:* 1090.02A3.ESTC *Boring Number:* 17PSI-15
Client: ESTCP *Page:* 1 of 1
Project Location: Naval Weapons Station *City:* North Charleston, SC
Ft. ☑
Date Started: March 24,2004 *Date Finished:* March 24,2004
Drilling Method: Hollow Stem Auger *Initial Water Level:* *Final Water Level:* 2.6
Logged By: D. Hirth *Checked By:* *Total Depth of Boring:* 20 *Total Depth of Well:* 18

SUBSURFACE PROFILE				SAMPLE					PID Field Screen • ppm • 250 500 750 / OVA Field Screen ■ ppm ■ 250 500 750	Lab Sample	TCE in Soil (mg/kg)
Elevation	Depth in Feet	Symbol	Description	Number	Sample Interval	Type	Blows per Foot (N)	Recovery			
0	0		Ground Surface								
-2	1		*(OL)* Organic						23		
-4	2–4		*(SC)* Tan Sandy CLAY						11		
-8	4–8		*(SC)* Gray Sandy CLAY with Orange and Green Streaks			MC			98; 0		
-12	8–12		*(SM)* Wet Tan Silty SAND with Some Clay			MC			62; 26; 75		TCE = 6.5
-16	12–16		No Sample Recovered; *(SM)* Tan Silty SAND with Some Clay Slightly Dryer at Bottom			MC			75; 85; 152; 84; 50		
-19	16–19		*(SM)* Tan Silty SAND with Some Clay						17; 27		
-20	19–20		*(SC)* Dark Medium Gray Sandy CLAY						15; 5		
	20		20 ft								
	21										
	22										

Solutions Industrial & Environmental Services, Inc.
3722 Benson Drive
Raleigh, NC 27609
(919) 873-1060

Solutions Industrial & Environmental Services

Log of Soil Boring

Project: SWMU 17 Injection Pilot Test *Solutions-IES Project No.:* 1090.02A3.ESTC *Boring Number:* 17PSI-16
Client: ESTCP *Page:* 1 of 1
Project Location: Naval Weapons Station *City:* North Charleston, SC
Ft. ☑
Date Started: March 24, 2004 *Date Finished:* March 24, 2004
Drilling Method: Geoprobe *Initial Water Level:* *Final Water Level:* 7.1
Logged By: D. Hirth *Checked By:* *Total Depth of Boring:* 20 *Total Depth of Well:* 18

SUBSURFACE PROFILE				SAMPLE					PID Field Screen • ppm • 250 500 750 / OVA Field Screen ■ ppm ■ 250 500 750	Lab Sample	TCE in Soil (mg/kg)
Elevation	Depth in Feet	Symbol	Description	Number	Sample Interval	Type	Blows per Foot (N)	Recovery			
0	0		Ground Surface								
-2	1		*(SM)* Black Silty Fine SAND, with Organic Matter (Topsoil)						40		
	2		*(SC)* Gray Clayey SAND.			MC			46		
-4	3		*(SC)* Gray Sandy CLAY. Orange streaks. Hard								
	4		*(SC)* Gray Sandy CLAY. Orange streaks.						123		
	5										
	6								107		
-8	7					MC					TCE = 11.0
	8		*(SM)* Tan Silty Fine SAND.								
	9		*(SM)* Tan Silty Fine SAND. Wet. 20% recovery.						141		
-12	10					MC					TCE = 13
	11										
	12		No Sample Recovered								
	13										
	14										
	15										
-16	16		16 ft			MC					
	17										
	18										
	19										
	20										
	21										
	22										

Solutions Industrial & Environmental Services, Inc.
3722 Benson Drive
Raleigh, NC 27609
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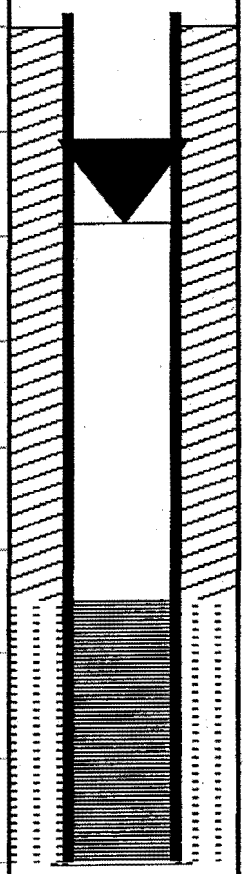
Log of Soil Boring 17PSTW-4 through 15

Project: ESTCP Charleston NWS
Solutions-IES Project No.: 1090.02A3.ESTC
Boring Number: 17PSTW-
Page: 1 of 1
Client: ESTCP
Project Location: Naval Weapons Station
City: North Charleston, SC
Ft. ☑
Date Started: November 9, 2004
Date Finished: November 11, 2004
Drilling Method: Direct Push
Initial Water Level: 3.8 bls
Final Water Level:
Logged By: Dan Hirth
Checked By: WB
Total Depth of Boring: 16
Total Depth of Well: 16

SUBSURFACE PROFILE				SAMPLE					PID Field Screen • ppm • 250 500 750 / OVA Field Screen ■ ppm ■ 250 500 750	Well Diagram
Elevation	Depth in Feet	Symbol	Description	Number	Sample Interval	Type	Blows per Foot (N)	Recovery		
5	0		Ground Surface							
	1		The boring was advanced with a direct push rig, advancing a 2.25 inch OD flush joint casing and expendable tip.							
	2									
	3		A temporary well was installed through the casing. The screen was constructed from 11 to 16 feet below land surface. No samples were collected for lithology. The well was abandoned on November 1, 2004 by Gregg Drilling.							
	4									
	5									
	6									
	7									
	8									
	9									
	10									
	11									
	12									
	13									
	14									
	15									
-11	16		16 ft							
	17									
	18									
	19									
	20									
	21									
	22									



Solutions Industrial & Environmental Services, Inc.
3722 Benson Drive
Raleigh, NC 27609
(919) 873-1060

Solutions Industrial & Environmental Services

17-PSTW-4 thru 17-PSTW-15

DHEC
PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name: Solutions IES (last) (first)
Address: 3722 Benson Road
City: Raleigh State: NC Zip: 27609
Telephone: Work: 919-878 Home: 1060

2. LOCATION OF WELL: COUNTY:
Name: NWS - Test Pad
Street Address:
City: N. Charleston Zip: S.C.
Latitude: Longitude:
Charleston County

3. PUBLIC SYSTEM NAME: PUBLIC SYSTEM NUMBER:

4. ABANDONMENT: ☒ Yes ☐ No (after sampling)
Grouted Depth: from 18 ft. to G.S. ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Silty Clay	8'	8'
Sand (Very wet)	10'+	~~18~~ 16'
TD @ ~~18.0~~ 16	Feet	
* 13 location for water		
sampling event @ test		
pad. Installation, sampling		
abandonment → 24 hours.		
*Indicate Water Bearing Zones		
(Use a 2nd sheet if needed)		

5. REMARKS: Water sampling only.

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☒ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER: HW-04-074

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☒ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) 18.0 ft. Date Started: 11/9/04 Date Completed: 11/10/04

10. CASING: ☒ Threaded ☐ Welded
Diam.: 3/4 inch
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
___ in. to ___ ft. depth
___ in. to ___ ft. depth
Height: Above ☐ Below ☐
Surface ___ ft.
Weight ___ lb./ft.
Drive Shoe? ☒ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 3/4"
Slot/Gauge: 0.010 in Length: 5.0
Set Between: ~~13.0~~ ft. and ~~18.0~~ ft.
11 ft. and 16 ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☒ No

12. STATIC WATER LEVEL ≈ 8.0 ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
___ ft. after ___ hrs. Pumping ___ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: N/A

14. WATER QUALITY
Chemical Analysis ☐ Yes ☐ No Bacterial Analysis ☐ Yes ☐ No
Please enclose lab results. - N/A

15. ARTIFICIAL FILTER (filter pack) ☐ Yes ☒ No
Installed from ___ ft. to ___ ft.
Effective size ___ Uniformity Coefficient ___

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other ___
Depth: From 16.0 ~~18.0~~ ft. to G.S. ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ___ ft. ___ direction
Type ___
Well Disinfected ☐ Yes ☐ No Type: ___ Amount: ___

18. PUMP: Date Installed: NA Not Installed ☐
Mfr. Name: ___ Model No.: ___
H.P. ___ Volts ___ Length of drop pipe ___ ft. Capacity ___ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: Francis Cooper CERT. NO.: 00965
Address: (Print) Level: A B C D (circle one) ☒
106 W. Butternut Road
Summerville SC. 29485
Telephone No.: 843 832 4918 Fax No.: 843 832 4919

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: [signature] Well Driller Date: 12/28/04

If D Level Driller, provide supervising driller's name:

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-94-D-0888

Rev. 1
09/08

RFI Report
for
SWMU 16 - Old Southside Landfill and
SWMU 17 - Old Southside Missile and Waste Oil Disposal Area

VOLUME III OF III - APPENDICES D THROUGH G

Naval Weapons Station Charleston
Charleston, South Carolina

Contract Task Order 0137

September 2008

USEPA ID No. SC8 170 022 620

NAVFAC
Naval Facilities Engineering Command
NAVFAC SOUTHEAST

NAS Jacksonville
Jacksonville, Florida 32212-0030

TETRA TECH NUS, Inc.

APPENDIX D
HYDROGEOLOGY DATA AND CALCULATIONS

APPENDIX D-1
SLUG TEST RESULTS AND CALCULATIONS

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT NWS CHARLESTON		JOB NUMBER 0528	
SUBJECT 16MW01S RISING HEAD SLUG TEST			
BASED ON HVORSLEV		DRAWING NUMBER	
BY FCW	CHECKED BY SWR 11-19-01	APPROVED BY	DATE 11-15-01

$$K = \frac{r^2 \ln(L/R)}{2L\,T_0}$$

K = HYDRAULIC CONDUCTIVITY
r = RADIUS OF WELL CASING — r = 0.083 Feet
R = RADIUS OF WELL SCREEN — R = 0.083 Feet
L = LENGTH OF WELL SCREEN — L = 8.65 Feet ✓
T_0 = TIME FOR WATER LEVEL TO RISE OR FALL 37% OF INTIAL CHANGE — T_0 = 2.3 min ✓

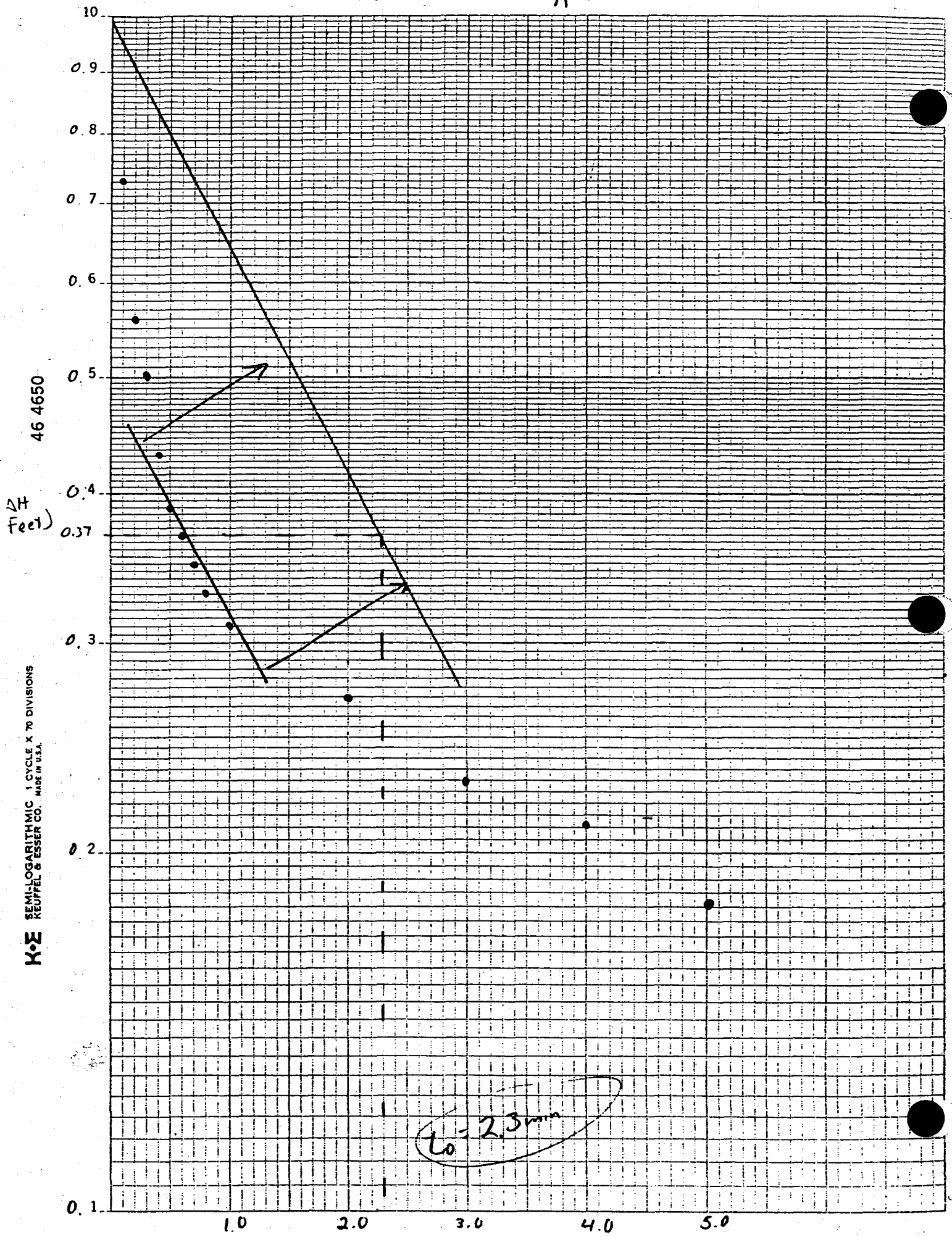
$$\frac{(0.083)^2 \ln(8.65/0.083)}{2(8.65)(2.3)} = \frac{0.032}{39.79} = 8.04 \times 10^{-4} \text{ Ft/min}$$

8.04×10^{-4} Ft/min × 1440 min/day = 1.16 Ft/day ✓

1.16 Ft/day × 3.528×10^{-4} cm/sec = 4.09×10^{-4} cm/sec

NOTE: R = r SANDPACK + AQUIFER ARE SIMILAR

16 MW OIS RISING



HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: NWS CHARLESTON WELL/BORING NO.: 16MW015

PROJECT NO.: 0528 GEOLOGIST: WUDKWYCH

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: TEST NO.: 2

STATIC WATER LEVEL (Depth/Elevation): 8.60 DATE: 10-16-01

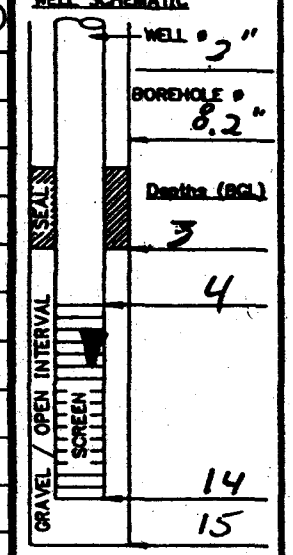
TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: SLUG PAGE 1 OF 1

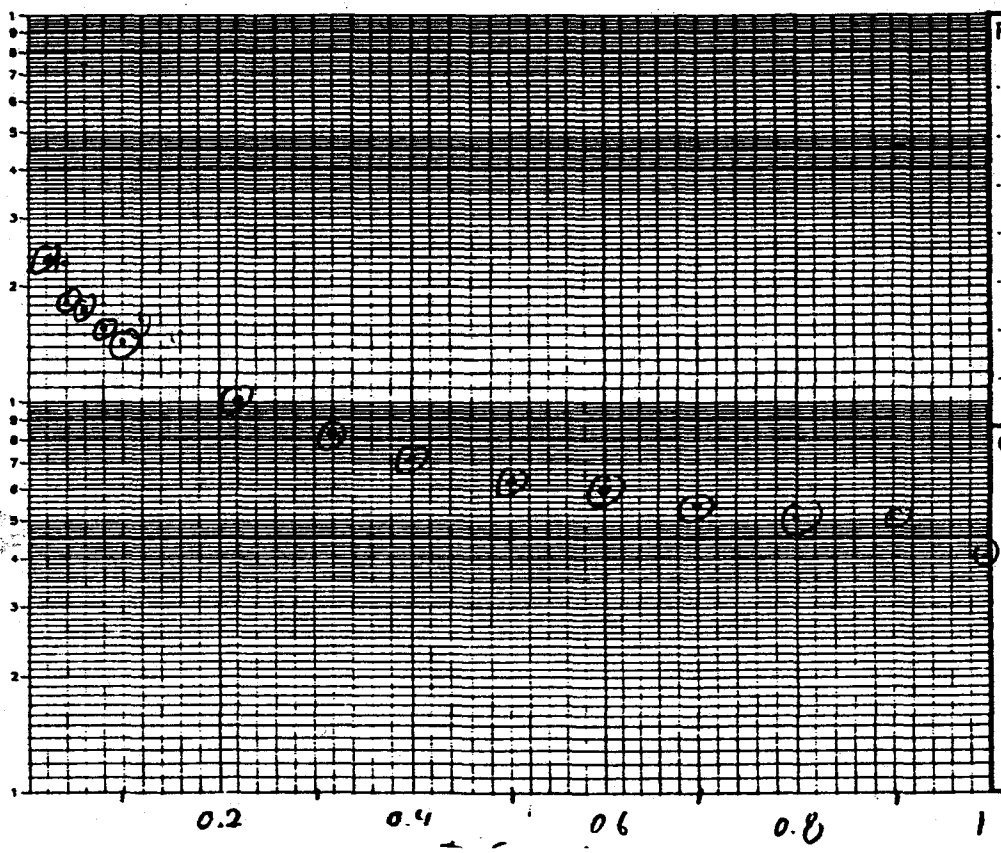
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TROLL 4000

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.02	2.39		0.9	0.51	
0.04	1.81		1.0	0.42	
0.06	1.76		2.0	0.41	
0.08	1.53		3.0	0.35	
0.1	1.41		4.0	0.32	
0.21	1.05				
0.31	0.84				
0.41	0.73				
0.52	0.64				
0.62	0.60				
0.73	0.55				
0.83	0.53				

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

TD = 17.25

8.4'

CALCS, SKETCH MAPS, ETC.:

In-Situ Inc. Troll

Report generated: 11/14/01 9:17:05
Report from file: A:\SN12670 2001-10-16 172549 test2-16mw01.bin
DataMgr Version 3.68

Serial number: 12670
Firmware Version 7.1
Unit name: 16sg03

Test name: test2/16mw01

Test defined on: 10/16/01 17:06:51
Test started on: 10/16/01 17:25:49
Test stopped on: N/A N/A
Test extracted on: 10/16/01 17:28:53

Data gathered using Logarithmic testing
Maximum time between data points: 10.000(Minutes.
Number of data samples: 113

TOTAL DATA SAMPLES 113

Channel number [1]
Measurement type: Temperature
Channel name: OnBoard Temp

Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 30 PSI.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 8.507 Feet H2O

Date	Time	ET (min)	Chan[1] Celsius	Chan[2] Feet H2O
10/16/01	17:25	0	19.73	0
10/16/01	17:25	0.005	19.75	-0.005
10/16/01	17:25	0.01	19.75	1.864
10/16/01	17:25	0.015	19.75	2.68
10/16/01	17:25	0.02	19.75	2.392
10/16/01	17:25	0.025	19.76	1.977
10/16/01	17:25	0.03	19.76	1.921
10/16/01	17:25	0.035	19.76	1.878
10/16/01	17:25	0.04	19.77	1.813
10/16/01	17:25	0.045	19.77	1.748

10/16/01 17:25	0.05	19.78	1.758		
10/16/01 17:25	0.055	19.78	1.859		
10/16/01 17:25	0.06	19.78	1.762		
10/16/01 17:25	0.065	19.78	1.631		
10/16/01 17:25	0.07	19.78	1.539		
10/16/01 17:25	0.075	19.79	1.552	0	100
10/16/01 17:25	0.08	19.79	1.534		
10/16/01 17:25	0.085	19.8	1.483		
10/16/01 17:25	0.09	19.8	1.467		
10/16/01 17:25	0.095	19.8	1.435		
10/16/01 17:25	0.1	19.8	1.412		
10/16/01 17:25	0.1058	19.8	1.384		
10/16/01 17:25	0.112	19.81	1.356		
10/16/01 17:25	0.1185	19.81	1.329		
10/16/01 17:25	0.1255	19.82	1.306		
10/16/01 17:25	0.1328	19.82	1.278		
10/16/01 17:25	0.1407	19.82	1.248		
10/16/01 17:25	0.149	19.82	1.22		
10/16/01 17:25	0.1578	19.83	1.193		
10/16/01 17:25	0.1672	19.83	1.16		
10/16/01 17:25	0.177	19.83	1.133	0.1	0.73
10/16/01 17:26	0.1875	19.84	1.11		
10/16/01 17:26	0.1985	19.84	1.082		
10/16/01 17:26	0.2102	19.85	1.052		
10/16/01 17:26	0.2227	19.85	1.015		
10/16/01 17:26	0.2358	19.86	0.978		
10/16/01 17:26	0.2498	19.86	0.927		
10/16/01 17:26	0.2647	19.86	0.9		
10/16/01 17:26	0.2803	19.86	0.872	0.2	0.56
10/16/01 17:26	0.297	19.86	0.853		
10/16/01 17:26	0.3147	19.87	0.837		
10/16/01 17:26	0.3333	19.88	0.819		
10/16/01 17:26	0.3532	19.88	0.791		
10/16/01 17:26	0.3742	19.88	0.773	0.3	0.50
10/16/01 17:26	0.3963	19.88	0.75		
10/16/01 17:26	0.4198	19.88	0.727		
10/16/01 17:26	0.4447	19.88	0.699		
10/16/01 17:26	0.4697	19.88	0.685		
10/16/01 17:26	0.4963	19.88	0.662	0.4	0.43
10/16/01 17:26	0.5247	19.88	0.644		
10/16/01 17:26	0.5547	19.88	0.632		
10/16/01 17:26	0.5863	19.88	0.614	0.5	0.39
10/16/01 17:26	0.6213	19.88	0.6		
10/16/01 17:26	0.658	19.88	0.581		
10/16/01 17:26	0.6963	19.88	0.572	0.62	0.37
10/16/01 17:26	0.738	19.88	0.554		
10/16/01 17:26	0.7813	19.88	0.549	0.70	0.35
10/16/01 17:26	0.828	19.88	0.535		
10/16/01 17:26	0.8763	19.88	0.521	0.80	0.33
10/16/01 17:26	0.928	19.88	0.512		
10/16/01 17:26	0.983	19.88	0.507		
10/16/01 17:26	1.0413	19.88	0.494		

10/16/01 17:26	1.103	19.88	0.489	- 1.0	0.31
10/16/01 17:26	1.168	19.88	0.48		
10/16/01 17:27	1.238	19.88	0.471		
10/16/01 17:27	1.3113	19.88	0.461		
10/16/01 17:27	1.3897	19.89	0.457		
10/16/01 17:27	1.473	19.89	0.452		
10/16/01 17:27	1.5613	19.89	0.447		
10/16/01 17:27	1.6547	19.9	0.438		
10/16/01 17:27	1.753	19.9	0.434		
10/16/01 17:27	1.858	19.9	0.424		
10/16/01 17:27	1.968	19.9	0.422		
10/16/01 17:27	2.0847	19.9	0.418	- 2.0	0.27
10/16/01 17:28	2.2097	19.91	0.408		
10/16/01 17:28	2.3413	19.91	0.399		
10/16/01 17:28	2.4813	19.91	0.394		
10/16/01 17:28	2.6297	19.92	0.385		
10/16/01 17:28	2.7863	19.93	0.376		
10/16/01 17:28	2.953	19.93	0.371		
10/16/01 17:28	3.1297	20.01	0.371	- 3.0	0.23
10/16/01 17:29	3.3163	19.99	0.358		
10/16/01 17:29	3.5147	19.99	0.348		
10/16/01 17:29	3.7247	19.99	0.339		
10/16/01 17:29	3.9463	19.99	0.33		
10/16/01 17:29	4.1813	19.99	0.325	- 4.0	0.21
10/16/01 17:30	4.4297	20.02	0.316		
10/16/01 17:30	4.693	20.02	0.307		
10/16/01 17:30	4.973	20.02	0.298		
10/16/01 17:31	5.2697	20.02	0.288	- 5.1	0.18
10/16/01 17:31	5.583	20.02	0.284		
10/16/01 17:31	5.9147	20.02	0.277		
10/16/01 17:32	6.2663	20.02	0.268		
10/16/01 17:32	6.6397	20.04	0.258		
10/16/01 17:32	7.0347	20.04	0.254		
10/16/01 17:33	7.453	20.04	0.24		
10/16/01 17:33	7.8963	20.05	0.231		
10/16/01 17:34	8.3663	20.06	0.221		
10/16/01 17:34	8.8647	20.09	0.212		
10/16/01 17:35	9.3913	20.09	0.203		
10/16/01 17:35	9.9497	20.09	0.198		
10/16/01 17:36	10.5413	20.09	0.189		
10/16/01 17:36	11.168	20.1	0.175		
10/16/01 17:37	11.8313	20.1	0.166		
10/16/01 17:38	12.5347	20.11	0.157		
10/16/01 17:39	13.2797	20.14	0.152		
10/16/01 17:39	14.0697	20.14	0.143		
10/16/01 17:40	14.9063	20.14	0.134		
10/16/01 17:41	15.7913	20.14	0.131		
10/16/01 17:42	16.7297	20.18	0.122		
10/16/01 17:43	17.723	20.17	0.118		
10/16/01 17:44	18.7763	20.17	0.113		
10/16/01 17:45	19.8913	20.19	0.108		

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT NWS CHARLESTON	JOB NUMBER 0528
SUBJECT 16MW025 FALLING HEAD SLUG TEST	
BASED ON HVORSLEV	DRAWING NUMBER
BY FCW / CHECKED BY 12-5-01	APPROVED BY / DATE 11-15-01

$$K = \frac{r^2 \ln(L/R)}{2L\,T_0}$$

K = HYDRAULIC CONDUCTIVITY

r = RADIUS OF WELL CASING — r = 0.083 Feet

R = RADIUS OF WELL SCREEN — R = 0.292 Feet

L = LENGTH OF WELL SCREEN — L = 11 Feet

T_0 = TIME FOR WATER LEVEL TO RISE OR FALL 37% OF INTIAL CHANGE — T_0 = ~~7.6~~ 5.1 min

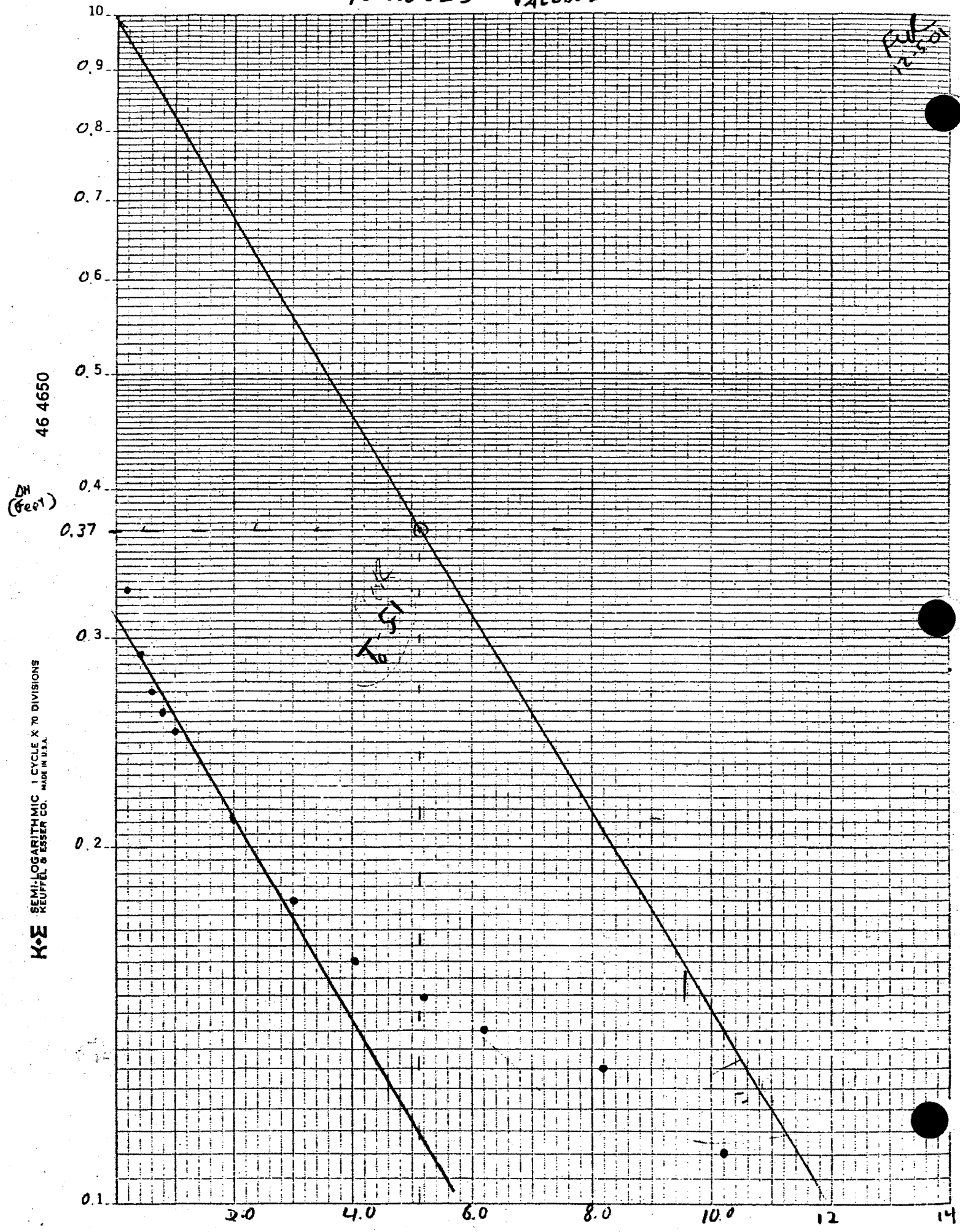
$$\frac{(0.083)^2 \ln(11/0.292)}{2(11)(5.1)} = \frac{0.025}{112.2} = 2.23 \times 10^{-4}\ \text{Ft/min}$$

$$2.23 \times 10^{-4}\ \text{Ft/min} \times 1440\ \text{min/day} = 3.21 \times 10^{-1}\ \text{Ft/day}$$

$$3.21 \times 10^{-1}\ \text{Ft/day} \times 3.528 \times 10^{-4}\ \text{cm/sec} = 1.13 \times 10^{-4}\ \text{cm/sec}$$

NOTE: R ≠ r SANDPACK + AQUIFER ARE DIFFERENT K

16MW025 FALLING



HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: NWS CHARLESTON WELL/BORING NO.: 16MW023

PROJECT NO.: 0528 GEOLOGIST: WUDKWYCH

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10' 3'-13' TEST NO.: 2

STATIC WATER LEVEL (Depth/Elevation): 4.14 DATE: 10-20-01

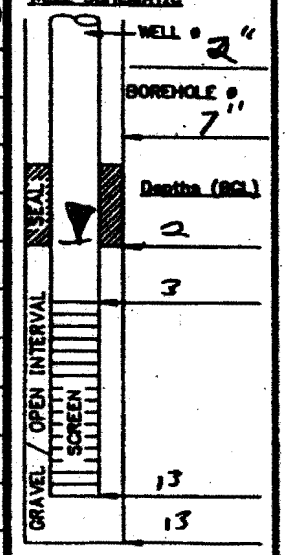
TEST TYPE (Rising/Falling/Constant Head): FALLING CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: SLUG PAGE 1 OF 1

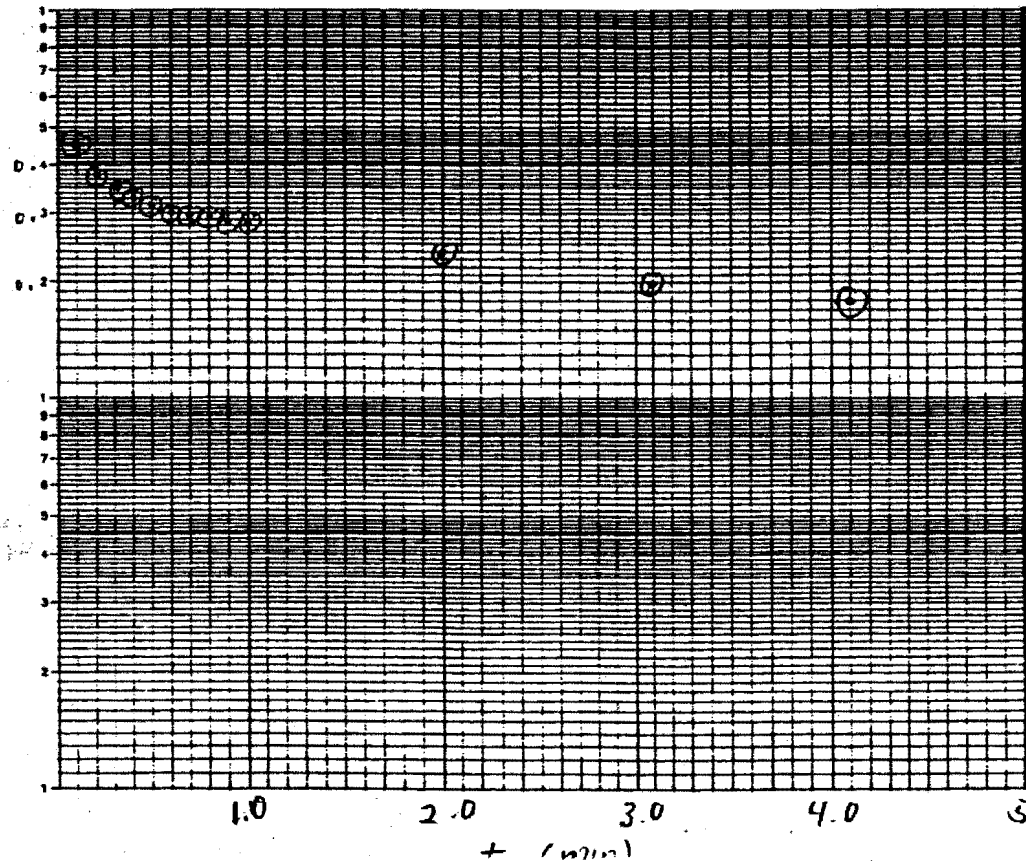
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TROLL 4000

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.1	0.45		4.1	0.18	
0.21	0.38		5.2	0.17	
0.31	0.35		10	0.12	
0.41	0.33				
0.52	0.32				
0.62	0.31				
0.73	0.30				
0.82	0.30				
0.92	0.29				
1.0	0.29				
2.0	0.24				
3.0	0.20				

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

TD - 18.3

13.53

CALCS, SKETCH MAPS, ETC.:

In-Situ Inc.	Troll
Report generated:	11/14/01 10:00:54
Report from file:	A:\SN12990 2001-10-20 075019 test2-16mw02-f.bin
DataMgr Version	3.68
Serial number:	12990
Firmware Version	7.1
Unit name:	
Test name:	test2/16mw02-f
Test defined on:	10/20/01 7:47:23
Test started on:	10/20/01 7:50:19
Test stopped on:	N/A N/A
Test extracted on:	10/20/01 7:52:30

Data gathered using Logarithmic testing

Maximum time between data points:10.	Minutes.
Number of data samples:	114
TOTAL DATA SAMPLES	114

Channel number [1]

Measurement type:	Temperature
Channel name:	

Channel number [2]

Measurement type:	Pressure
Channel name:	
Sensor Range:	30 PSI.
Specific gravity:	1
Mode:	Surface
User-defined reference:	0 Feet H2O
Referenced on:	test start
Pressure head at reference:	13.552 Feet H2O

Date	Time	ET (min)	Chan[1] Celsius	Chan[2] Feet H2O
10/20/01	7:50	0	20.04	0
10/20/01	7:50	0.005	20.05	0
10/20/01	7:50	0.01	20.05	0.344
10/20/01	7:50	0.015	20.05	0.837
10/20/01	7:50	0.02	20.05	1.294
10/20/01	7:50	0.025	20.06	1.133
10/20/01	7:50	0.03	20.07	0.577
10/20/01	7:50	0.035	20.07	0.309
10/20/01	7:50	0.04	20.08	0.39
10/20/01	7:50	0.045	20.08	0.24

10/20/01 7:50	0.05	20.08	0.3		
10/20/01 7:50	0.055	20.08	0.496		
10/20/01 7:50	0.06	20.08	0.558		
10/20/01 7:50	0.065	20.08	0.581		
10/20/01 7:50	0.07	20.1	0.563		
10/20/01 7:50	0.075	20.1	0.487		
10/20/01 7:50	0.08	20.1	0.42		
10/20/01 7:50	0.085	20.1	0.385		
10/20/01 7:50	0.09	20.1	0.385		
10/20/01 7:50	0.095	20.11	0.42		
10/20/01 7:50	0.1	20.11	0.457		
10/20/01 7:50	0.1058	20.11	0.468		
10/20/01 7:50	0.112	20.11	0.468		
10/20/01 7:50	0.1185	20.12	0.438		
10/20/01 7:50	0.1255	20.11	0.411	- 0.1	0.36
10/20/01 7:50	0.1328	20.12	0.401		
10/20/01 7:50	0.1407	20.13	0.415		
10/20/01 7:50	0.149	20.13	0.424		
10/20/01 7:50	0.1578	20.13	0.42		
10/20/01 7:50	0.1672	20.14	0.401		
10/20/01 7:50	0.177	20.15	0.397		
10/20/01 7:50	0.1875	20.15	0.401		
10/20/01 7:50	0.1985	20.15	0.392		
10/20/01 7:50	0.2102	20.16	0.383		
10/20/01 7:50	0.2227	20.16	0.383		
10/20/01 7:50	0.2358	20.17	0.378	- 0.2	0.33
10/20/01 7:50	0.2498	20.18	0.371		
10/20/01 7:50	0.2647	20.18	0.367		
10/20/01 7:50	0.2803	20.18	0.362		
10/20/01 7:50	0.297	20.19	0.358		
10/20/01 7:50	0.3147	20.19	0.353		
10/20/01 7:50	0.3333	20.19	0.353	- 0.3	0.31
10/20/01 7:50	0.3532	20.2	0.344		
10/20/01 7:50	0.3742	20.2	0.344		
10/20/01 7:50	0.3963	20.2	0.339		
10/20/01 7:50	0.4198	20.2	0.334		
10/20/01 7:50	0.4447	20.2	0.33	- 0.4	0.29
10/20/01 7:50	0.4697	20.2	0.325		
10/20/01 7:50	0.4963	20.2	0.325		
10/20/01 7:50	0.5247	20.2	0.321	- 0.5	0.28
10/20/01 7:50	0.5547	20.2	0.316		
10/20/01 7:50	0.5863	20.2	0.311		
10/20/01 7:50	0.6213	20.2	0.311	- 0.6	0.27
10/20/01 7:50	0.658	20.2	0.311		
10/20/01 7:51	0.6963	20.2	0.311		
10/20/01 7:51	0.738	20.2	0.307	- 0.7	0.27
10/20/01 7:51	0.7813	20.2	0.307		
10/20/01 7:51	0.828	20.2	0.302	- 0.8	0.26
10/20/01 7:51	0.8763	20.2	0.298		
10/20/01 7:51	0.928	20.19	0.298		
10/20/01 7:51	0.983	20.19	0.293		
10/20/01 7:51	1.0413	20.19	0.291	1.0	0.25

10/20/01 7:51	1.103	20.19	0.286		
10/20/01 7:51	1.168	20.19	0.286		
10/20/01 7:51	1.238	20.19	0.281		
10/20/01 7:51	1.3113	20.19	0.277		
10/20/01 7:51	1.3897	20.18	0.277		
10/20/01 7:51	1.473	20.18	0.277		
10/20/01 7:51	1.5613	20.18	0.272		
10/20/01 7:51	1.6547	20.18	0.268		
10/20/01 7:52	1.753	20.18	0.258		
10/20/01 7:52	1.858	20.18	0.249		
10/20/01 7:52	1.968	20.17	0.24		
10/20/01 7:52	2.0847	20.17	0.24	-2.0	0.21
10/20/01 7:52	2.2097	20.23	0.231		
10/20/01 7:52	2.3413	20.22	0.221		
10/20/01 7:52	2.4813	20.21	0.221		
10/20/01 7:52	2.6297	20.2	0.217		
10/20/01 7:53	2.7863	20.19	0.215		
10/20/01 7:53	2.953	20.19	0.21		
10/20/01 7:53	3.1297	20.19	0.205	-3.1	0.18
10/20/01 7:53	3.3163	20.18	0.201		
10/20/01 7:53	3.5147	20.18	0.201		
10/20/01 7:54	3.7247	20.17	0.196		
10/20/01 7:54	3.9463	20.16	0.191		
10/20/01 7:54	4.1813	20.16	0.187	-4.1	0.16
10/20/01 7:54	4.4297	20.15	0.182		
10/20/01 7:55	4.693	20.14	0.178		
10/20/01 7:55	4.973	20.14	0.173		
10/20/01 7:55	5.2697	20.14	0.173	5.2	0.15
10/20/01 7:55	5.583	20.13	0.168		
10/20/01 7:56	5.9147	20.16	0.164		
10/20/01 7:56	6.2663	20.14	0.164	-6.2	0.14
10/20/01 7:56	6.6397	20.13	0.155		
10/20/01 7:57	7.0347	20.13	0.155	-7.0	0.14
10/20/01 7:57	7.453	20.11	0.152		
10/20/01 7:58	7.8963	20.1	0.148		
10/20/01 7:58	8.3663	20.1	0.143	-8.2	0.13
10/20/01 7:59	8.8647	20.1	0.138		
10/20/01 7:59	9.3913	20.11	0.138		
10/20/01 8:00	9.9497	20.09	0.134		
10/20/01 8:00	10.5413	20.08	0.129	-10	0.11
10/20/01 8:01	11.168	20.07	0.129		
10/20/01 8:02	11.8313	20.06	0.125		
10/20/01 8:02	12.5347	20.07	0.12		
10/20/01 8:03	13.2797	20.05	0.12		
10/20/01 8:04	14.0697	20.05	0.115		
10/20/01 8:05	14.9063	20.04	0.115		
10/20/01 8:06	15.7913	20.04	0.12		
10/20/01 8:07	16.7297	20.02	0.115		
10/20/01 8:08	17.723	20.02	0.111		
10/20/01 8:09	18.7763	20.02	0.111		
10/20/01 8:10	19.8913	20	0.106		
10/20/01 8:11	21.073	20	0.101		

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT NWS CHARLESTON		JOB NUMBER 0528	
SUBJECT 11MW02S RISING HEAD SLUG TEST			
BASED ON HVORSLEV		DRAWING NUMBER	
BY FCW	CHECKED BY SLR 12-5-01	APPROVED BY	DATE 11-15-01

$$K = \frac{r^2 \ln(L/R)}{2L\,T_0}$$

K = HYDRAULIC CONDUCTIVITY
r = RADIUS OF WELL CASING — r = 0.083 Feet
R = RADIUS OF WELL SCREEN — R = 0.292 Feet
L = LENGTH OF WELL SCREEN — L = 11 Feet
T_0 = TIME FOR WATER LEVEL TO RISE OR FALL 37% OF INTIAL CHANGE — T_0 = 8.8 min

$$\frac{(0.083)^2 \ln(11/0.292)}{2(11)(8.8)} = \frac{0.025}{193.6} = 1.29 \times 10^{-4} \text{ ft/min}$$

$$1.29 \times 10^{-4} \text{ ft/min} \times 1440 \text{ min/day} = 1.86 \times 10^{-1} \text{ ft/day}$$

$$1.86 \times 10^{-1} \text{ ft/day} \times 3.528 \times 10^{-4} \text{ cm/sec} = 6.56 \times 10^{-5} \text{ cm/sec}$$

NOTE: R ≠ r SANDPACK + AQUIFER ARE DIFFERENT K

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: NWS CHARLESTON WELL/BORING NO.: 16MW025

PROJECT NO.: 0528 GEOLOGIST: WUDKWYCH

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10' - 3-13' TEST NO.: 3

STATIC WATER LEVEL (Depth/Elevation): 4.14 DATE: 10-20-01

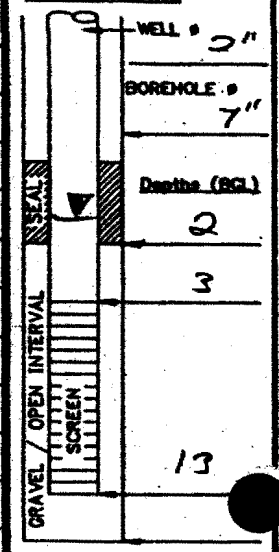
TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: SLUG PAGE ___ OF ___

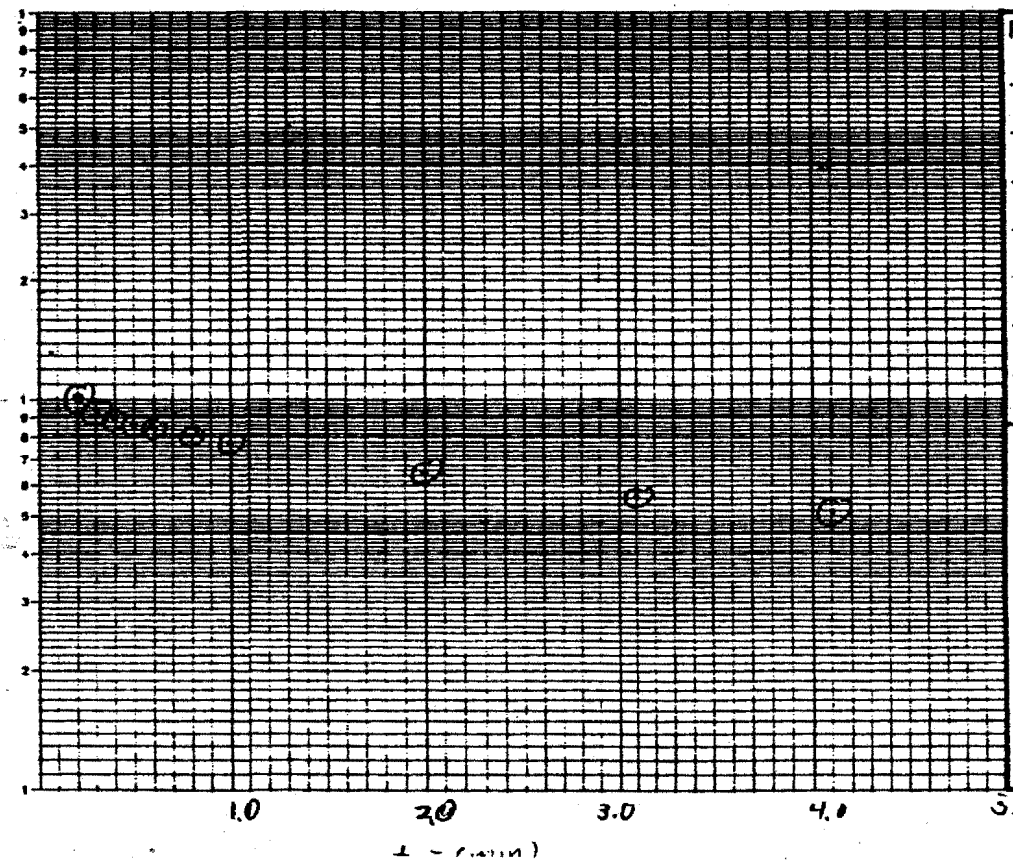
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TROLL 4000

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.21	1.03		10	0.29	
0.31	0.95		15	0.19	
0.41	0.91				
0.52	0.88				
0.62	0.86				
0.82	0.81				
1.0	0.79				
2.0	0.65				
3.1	0.57				
4.1	0.50				
5.2	0.44				
8.3	0.34				

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

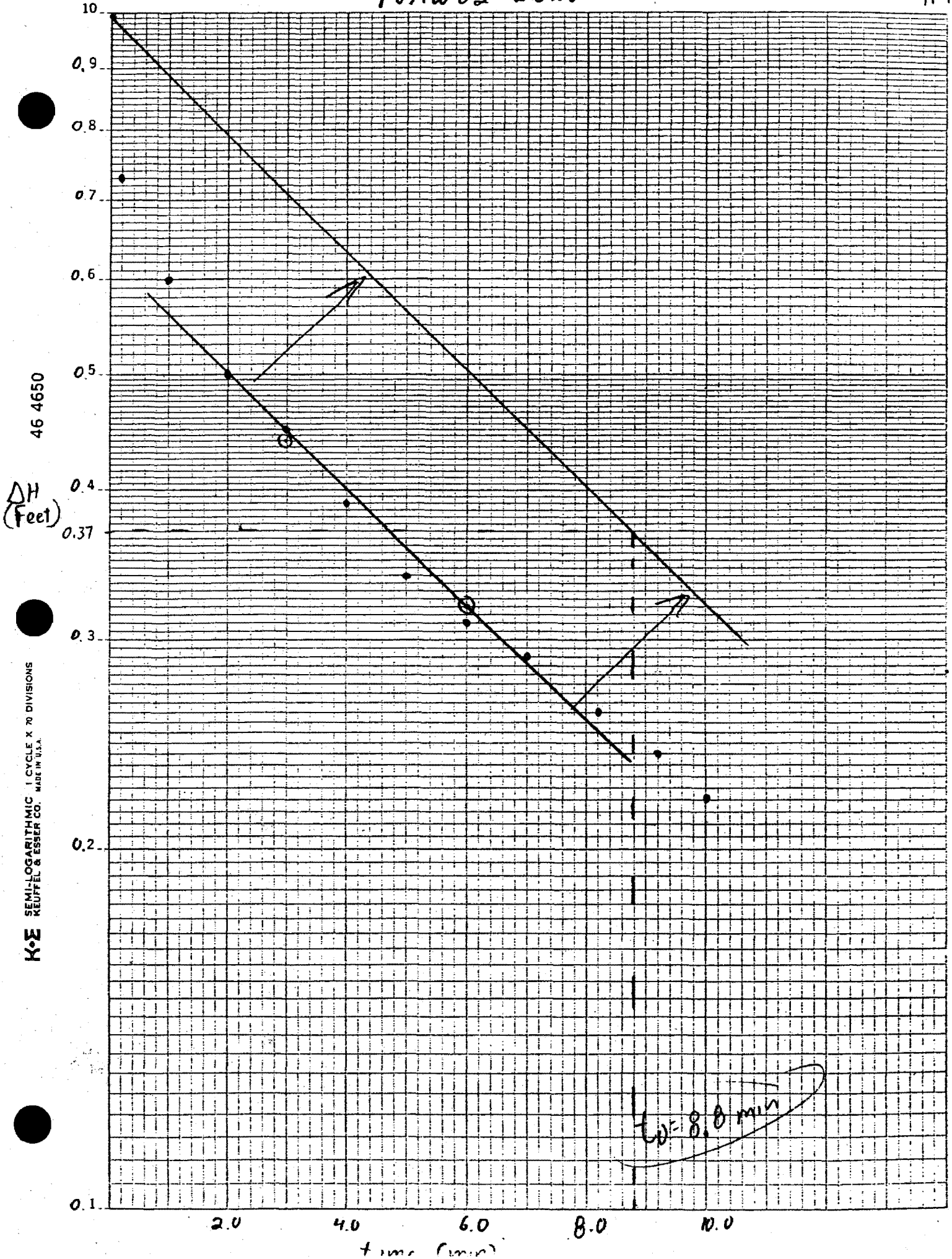
TD = 18.3

13.66

CALCS, SKETCH MAPS, ETC.:

16MW02 RISING

11-19-



In-Situ Inc.	Troll
Report generated:	11/14/01 10:04:06
Report from file:	A:\SN12990 2001-10-20 081950 test3-16mw02-r.bin
DataMgr Version	3.68
Serial number:	12990
Firmware Version	7.1
Unit name:	
Test name:	test3/16mw02-r
Test defined on:	10/20/01 8:19:02
Test started on:	10/20/01 8:19:50
Test stopped on:	N/A N/A
Test extracted on:	10/20/01 8:22:36
Data gathered using Logarithmic testing	
Maximum time between data points:10	Minutes.
Number of data samples:	111
TOTAL DATA SAMPLES	111
Channel number [1]	
Measurement type:	Temperature
Channel name:	
Channel number [2]	
Measurement type:	Pressure
Channel name:	
Sensor Range:	30 PSI.
Specific gravity:	1
Mode:	TOC
User-defined reference:	0 Feet H2O
Referenced on:	test start
Pressure head at reference:	13.662 Feet H2O

Date	Time	ET (min)	Chan[1] Celsius	Chan[2] Feet H2O
10/20/01	8:19	0	20.05	0
10/20/01	8:19	0.005	20.06	1.089
10/20/01	8:19	0.01	20.06	2.837
10/20/01	8:19	0.015	20.07	1.926
10/20/01	8:19	0.02	20.07	0.166
10/20/01	8:19	0.025	20.08	0.371
10/20/01	8:19	0.03	20.07	1.714
10/20/01	8:19	0.035	20.08	1.984
10/20/01	8:19	0.04	20.08	0.8
10/20/01	8:19	0.045	20.08	0.408

10/20/01 8:20	1.103	20.2	0.775		
10/20/01 8:21	1.168	20.2	0.761		
10/20/01 8:21	1.238	20.2	0.752		
10/20/01 8:21	1.3113	20.2	0.743		
10/20/01 8:21	1.3897	20.2	0.736		
10/20/01 8:21	1.473	20.19	0.727		
10/20/01 8:21	1.5613	20.19	0.713		
10/20/01 8:21	1.6547	20.2	0.699		
10/20/01 8:21	1.753	20.19	0.69		
10/20/01 8:21	1.858	20.19	0.671		
10/20/01 8:21	1.968	20.19	0.662		
10/20/01 8:21	2.0847	20.18	0.655	2.0	0.50
10/20/01 8:22	2.2097	20.18	0.641		
10/20/01 8:22	2.3413	20.18	0.632		
10/20/01 8:22	2.4813	20.18	0.618		
10/20/01 8:22	2.6297	20.18	0.604		
10/20/01 8:22	2.7863	20.22	0.595		
10/20/01 8:22	2.953	20.22	0.579		
10/20/01 8:22	3.1297	20.21	0.57	-3.0	0.44
10/20/01 8:23	3.3163	20.2	0.551		
10/20/01 8:23	3.5147	20.2	0.542		
10/20/01 8:23	3.7247	20.19	0.528		
10/20/01 8:23	3.9463	20.19	0.514		
10/20/01 8:24	4.1813	20.18	0.503	-4.0	0.39
10/20/01 8:24	4.4297	20.18	0.489		
10/20/01 8:24	4.693	20.18	0.48		
10/20/01 8:24	4.973	20.18	0.461		
10/20/01 8:25	5.2697	20.18	0.447	-5.1	0.34
10/20/01 8:25	5.583	20.17	0.434		
10/20/01 8:25	5.9147	20.16	0.427		
10/20/01 8:26	6.2663	20.16	0.413	-6.1	0.32
10/20/01 8:26	6.6397	20.16	0.399		
10/20/01 8:26	7.0347	20.16	0.385	-7.0	0.29
10/20/01 8:27	7.453	20.15	0.371		
10/20/01 8:27	7.8963	20.14	0.358		
10/20/01 8:28	8.3663	20.15	0.346	-8.2	0.26
10/20/01 8:28	8.8647	20.14	0.332		
10/20/01 8:29	9.3913	20.18	0.318	-9.2	0.24
10/20/01 8:29	9.9497	20.16	0.304		
10/20/01 8:30	10.5413	20.16	0.291	-10.4	0.22
10/20/01 8:31	11.168	20.16	0.277		
10/20/01 8:31	11.8313	20.18	0.265		
10/20/01 8:32	12.5347	20.18	0.251		
10/20/01 8:33	13.2797	20.18	0.233		
10/20/01 8:33	14.0697	20.18	0.224		
10/20/01 8:34	14.9063	20.2	0.21		
10/20/01 8:35	15.7913	20.19	0.198		
10/20/01 8:36	16.7297	20.19	0.189		
10/20/01 8:37	17.723	20.2	0.171	-16.7	0.13

10/20/01 8:19	0.05	20.1	1.123		
10/20/01 8:19	0.055	20.1	1.698		
10/20/01 8:19	0.06	20.1	1.241		
10/20/01 8:19	0.065	20.11	0.632		
10/20/01 8:19	0.07	20.1	0.851		
10/20/01 8:19	0.075	20.1	1.398		
10/20/01 8:19	0.08	20.11	1.342		
10/20/01 8:19	0.085	20.11	0.86		
10/20/01 8:19	0.09	20.11	0.793		
10/20/01 8:19	0.095	20.12	1.169		
10/20/01 8:19	0.1	20.13	1.303	0	100
10/20/01 8:19	0.1058	20.13	1.013		
10/20/01 8:19	0.112	20.13	0.828		
10/20/01 8:19	0.1185	20.13	1.08		
10/20/01 8:19	0.1255	20.13	1.204		
10/20/01 8:19	0.1328	20.13	0.923		
10/20/01 8:19	0.1407	20.14	0.994		
10/20/01 8:19	0.149	20.15	1.133		
10/20/01 8:19	0.1578	20.15	0.918		
10/20/01 8:20	0.1672	20.15	1.089		
10/20/01 8:20	0.177	20.16	0.95		
10/20/01 8:20	0.1875	20.16	1.052		
10/20/01 8:20	0.1985	20.17	0.95		
10/20/01 8:20	0.2102	20.17	1.036	0.1	0.79
10/20/01 8:20	0.2227	20.18	0.966		
10/20/01 8:20	0.2358	20.19	0.964		
10/20/01 8:20	0.2498	20.18	0.971		
10/20/01 8:20	0.2647	20.19	0.98		
10/20/01 8:20	0.2803	20.2	0.96		
10/20/01 8:20	0.297	20.2	0.955		
10/20/01 8:20	0.3147	20.2	0.95	0.21	0.73
10/20/01 8:20	0.3333	20.2	0.95		
10/20/01 8:20	0.3532	20.2	0.941		
10/20/01 8:20	0.3742	20.2	0.927		
10/20/01 8:20	0.3963	20.21	0.923		
10/20/01 8:20	0.4198	20.21	0.918		
10/20/01 8:20	0.4447	20.21	0.913		
10/20/01 8:20	0.4697	20.22	0.909		
10/20/01 8:20	0.4963	20.22	0.895		
10/20/01 8:20	0.5247	20.22	0.888		
10/20/01 8:20	0.5547	20.22	0.879		
10/20/01 8:20	0.5863	20.22	0.874		
10/20/01 8:20	0.6213	20.22	0.865		
10/20/01 8:20	0.658	20.22	0.86		
10/20/01 8:20	0.6963	20.22	0.851		
10/20/01 8:20	0.738	20.22	0.837		
10/20/01 8:20	0.7813	20.22	0.828		
10/20/01 8:20	0.828	20.22	0.819		
10/20/01 8:20	0.8763	20.22	0.817		
10/20/01 8:20	0.928	20.21	0.803		
10/20/01 8:20	0.983	20.2	0.793		
10/20/01 8:20	1.0413	20.2	0.784	1.0	0.60

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT NWS CHARLESTON		JOB NUMBER 0528	
SUBJECT 16MW035 FALLING HEAD SLUG TEST			
BASED ON HVORSLEV		DRAWING NUMBER	
BY FCW	CHECKED BY SWR 12-5-01	APPROVED BY	DATE 11-15-01

$$K = \frac{r^2 \ln(L/R)}{2L\,T_0}$$

K = HYDRAULIC CONDUCTIVITY
r = RADIUS OF WELL CASING — r = 0.083 Feet
R = RADIUS OF WELL SCREEN — R = 0.292 Feet
L = LENGTH OF WELL SCREEN — L = 11 Feet
T_0 = TIME FOR WATER LEVEL TO RISE OR FALL 37% OF INTIAL CHANGE — T_0 = 3.2 min

$$\frac{(0.083)^2 \ln(11/0.292)}{2(11)(3.2)} = \frac{0.025}{70.4} = 3.55 \times 10^{-4}\ \text{ft/min}$$

$$3.55 \times 10^{-4}\ \text{ft/min} \times 1440\ \text{min/day} = 5.11 \times 10^{-1}\ \text{ft/day}$$

$$5.11 \times 10^{-1} \times 3.528 \times 10^{-4}\ \text{cm/sec} = 1.80 \times 10^{-4}\ \text{cm/sec}$$

NOTE: R ≠ r SAND PACK + AQUIFER ARE DIFFERENT K

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: NWS CHARLESTON WELL/BORING NO.: 16MW035

PROJECT NO.: 0528 GEOLOGIST: WOKWICH

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10' 3'-13' TEST NO.: 5

STATIC WATER LEVEL (Depth/Elevation): 2.78 DATE: 10-21-01

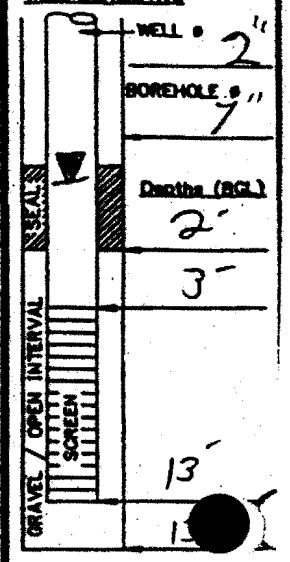
TEST TYPE (Rising/Falling/Constant Head): FALLING CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: SLUG PAGE 1 OF 1

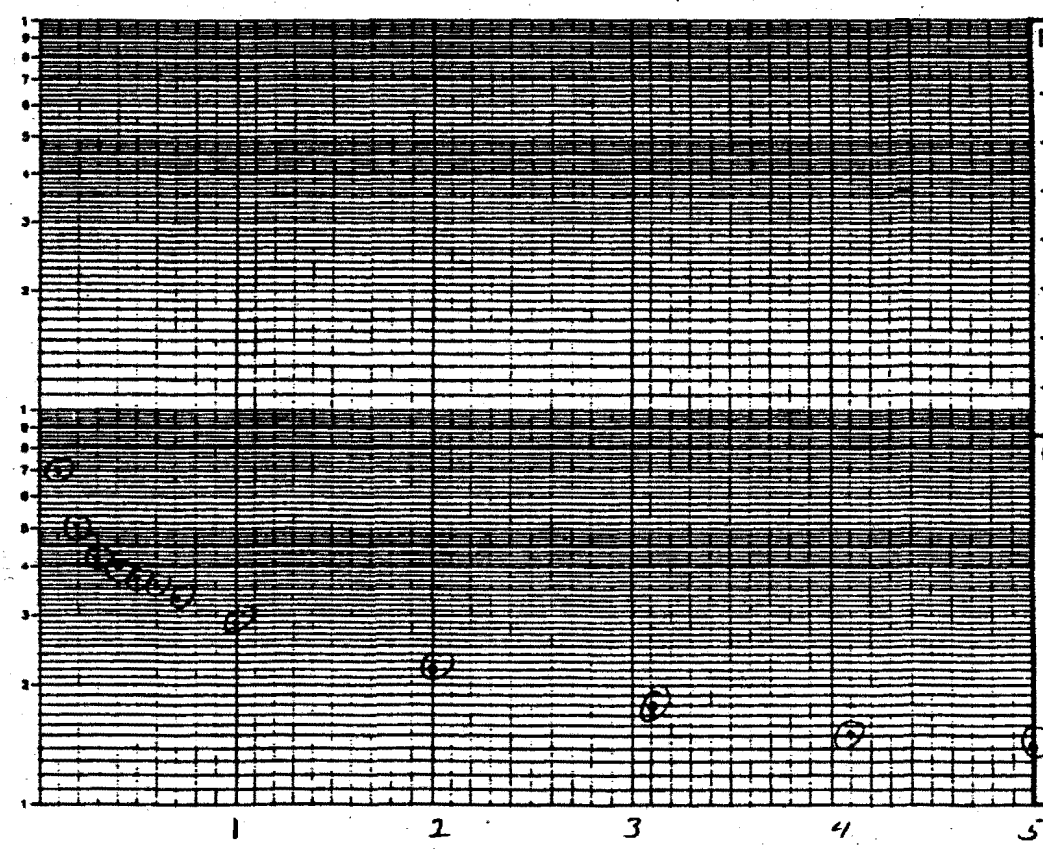
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TROLL 4000

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.04	1.10		4.1	0.15	
0.08	0.704		5.2	0.14	
0.1	0.708				
0.21	0.51				
0.31	0.47				
0.41	0.40				
0.51	0.38				
0.62	0.36				
0.73	0.33				
1.0	0.29				
2.0	0.22				
3.1	0.18				

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing

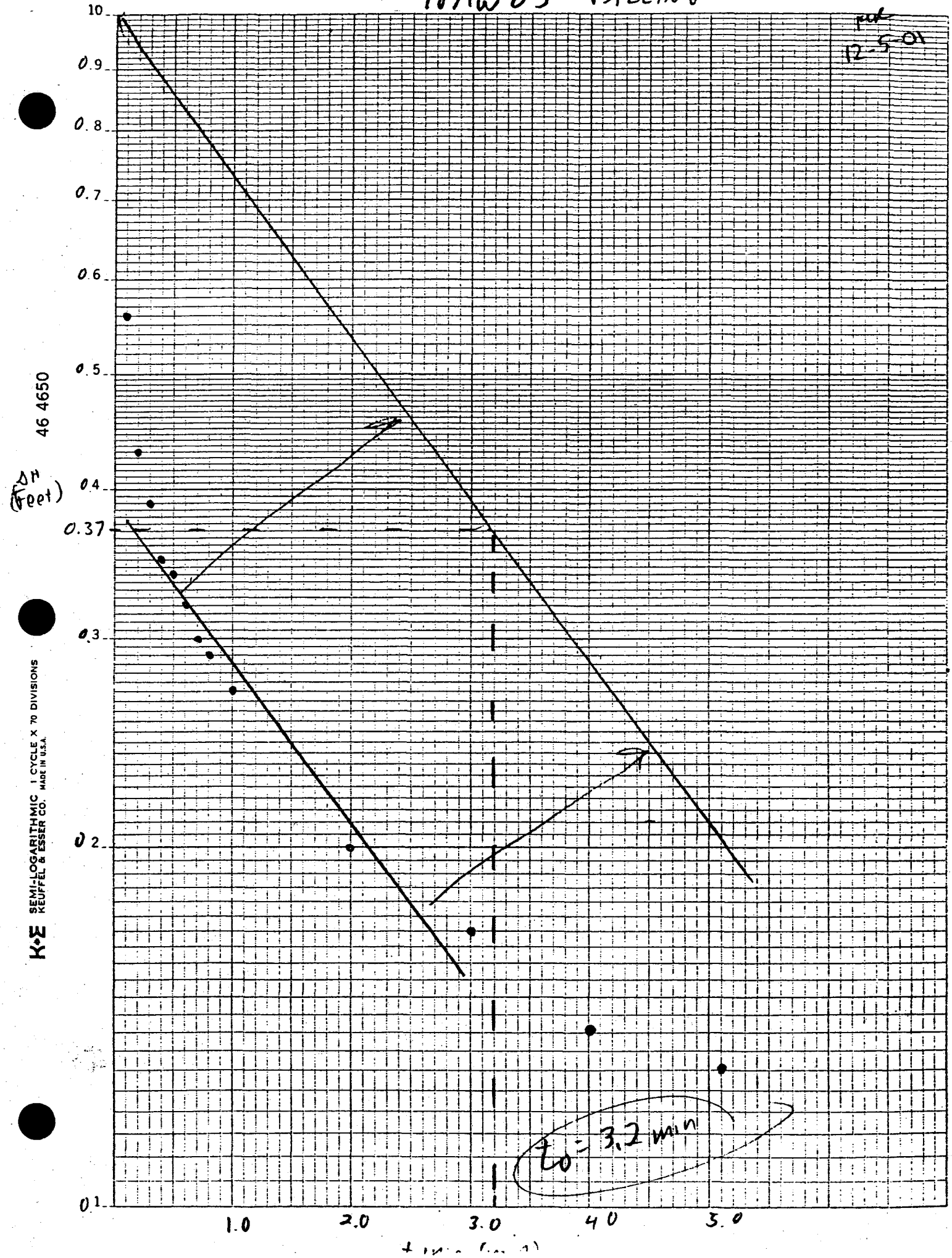


REMARKS:
TD = 16.45
13.57

CALCS, SKETCH MAPS, ETC.:

16MW03 FALLING

12-5-01



In-Situ Inc. Troll

Report generated: 11/14/01 9:24:29
Report from file: A:\SN12670 2001-10-21 080324 test5-16mw03-f.bin
DataMgr Version 3.68

Serial number: 12670
Firmware Version 7.1
Unit name: 16sg03

Test name: test5/16mw03-f

Test defined on: 10/21/01 8:01:33
Test started on: 10/21/01 8:03:24
Test stopped on: N/A N/A
Test extracted on: 10/21/01 8:06:08

Data gathered using Logarithmic testing
Maximum time between data points:10.0000 Minutes.
Number of data samples: 104

TOTAL DATA SAMPLES 104

Channel number [1]
Measurement type: Temperature
Channel name: OnBoard Temp

Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 30 PSI.
Specific gravity: 1
Mode: Surface
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.579 Feet H2O

Date	Time	ET (min)	Chan[1] Celsius	Chan[2] Feet H2O
10/21/01	8:03	0	19.93	0
10/21/01	8:03	0.005	19.94	0.362
10/21/01	8:03	0.01	19.95	0.893
10/21/01	8:03	0.015	19.95	1.029
10/21/01	8:03	0.02	19.95	0.81
10/21/01	8:03	0.025	19.96	1.07
10/21/01	8:03	0.03	19.96	1.093
10/21/01	8:03	0.035	19.96	1.024
10/21/01	8:03	0.04	19.96	1.107
10/21/01	8:03	0.045	19.97	0.81

0 10 0

10/21/01 8:03	0.05	19.98	0.657		
10/21/01 8:03	0.055	19.98	0.586		
10/21/01 8:03	0.06	19.98	0.736		
10/21/01 8:03	0.065	19.98	0.865		
10/21/01 8:03	0.07	19.98	0.87		
10/21/01 8:03	0.075	19.99	0.791		
10/21/01 8:03	0.08	19.99	0.704		
10/21/01 8:03	0.085	19.99	0.657		
10/21/01 8:03	0.09	19.99	0.676		
10/21/01 8:03	0.095	19.99	0.69		
10/21/01 8:03	0.1	20	0.708		
10/21/01 8:03	0.1058	20	0.69		
10/21/01 8:03	0.112	20.01	0.653		
10/21/01 8:03	0.1185	20.01	0.625		
10/21/01 8:03	0.1255	20.01	0.63		
10/21/01 8:03	0.1328	20.01	0.639		
10/21/01 8:03	0.1407	20.01	0.625	- 0.1	0.56
10/21/01 8:03	0.149	20.02	0.586		
10/21/01 8:03	0.1578	20.02	0.581		
10/21/01 8:03	0.1672	20.02	0.577		
10/21/01 8:03	0.177	20.03	0.558		
10/21/01 8:03	0.1875	20.03	0.544		
10/21/01 8:03	0.1985	20.04	0.535		
10/21/01 8:03	0.2102	20.04	0.517		
10/21/01 8:03	0.2227	20.05	0.507		
10/21/01 8:03	0.2358	20.06	0.494		
10/21/01 8:03	0.2498	20.06	0.475	0.2	0.43
10/21/01 8:03	0.2647	20.06	0.471		
10/21/01 8:03	0.2803	20.06	0.461		
10/21/01 8:03	0.297	20.06	0.447		
10/21/01 8:03	0.3147	20.06	0.438		
10/21/01 8:03	0.3333	20.07	0.438	- 0.3	0.39
10/21/01 8:03	0.3532	20.06	0.424		
10/21/01 8:03	0.3742	20.07	0.42		
10/21/01 8:03	0.3963	20.08	0.406		
10/21/01 8:03	0.4198	20.08	0.401		
10/21/01 8:03	0.4447	20.08	0.397	0.4	0.35
10/21/01 8:03	0.4697	20.08	0.392		
10/21/01 8:03	0.4963	20.08	0.383		
10/21/01 8:03	0.5247	20.08	0.378		
10/21/01 8:03	0.5547	20.07	0.374	- 0.51	0.34
10/21/01 8:03	0.5863	20.08	0.378		
10/21/01 8:04	0.6213	20.08	0.369		
10/21/01 8:04	0.658	20.08	0.355	0.62	0.32
10/21/01 8:04	0.6963	20.07	0.346		
10/21/01 8:04	0.738	20.07	0.337	- 0.70	0.30
10/21/01 8:04	0.7813	20.07	0.332		
10/21/01 8:04	0.828	20.07	0.323	- 0.80	0.29
10/21/01 8:04	0.8763	20.06	0.318	- 1	
10/21/01 8:04	0.928	20.06	0.311		
10/21/01 8:04	0.983	20.06	0.307		
10/21/01 8:04	1.0413	20.06	0.298	-1.0	0.27

10/21/01 8:04	1.103	20.06	0.288		
10/21/01 8:04	1.168	20.06	0.284		
10/21/01 8:04	1.238	20.06	0.279		
10/21/01 8:04	1.3113	20.06	0.27		
10/21/01 8:04	1.3897	20.05	0.265		
10/21/01 8:04	1.473	20.05	0.256		
10/21/01 8:04	1.5613	20.05	0.256		
10/21/01 8:05	1.6547	20.04	0.247		
10/21/01 8:05	1.753	20.04	0.242		
10/21/01 8:05	1.858	20.04	0.233		
10/21/01 8:05	1.968	20.04	0.228		
10/21/01 8:05	2.0847	20.03	0.228	-2.0	0.20
10/21/01 8:05	2.2097	20.03	0.219		
10/21/01 8:05	2.3413	20.03	0.21		
10/21/01 8:05	2.4813	20.03	0.21		
10/21/01 8:06	2.6297	20.02	0.205		
10/21/01 8:06	2.7863	20.1	0.196		
10/21/01 8:06	2.953	20.08	0.191		
10/21/01 8:06	3.1297	20.07	0.187	-3.0	0.17
10/21/01 8:06	3.3163	20.06	0.182		
10/21/01 8:06	3.5147	20.05	0.173		
10/21/01 8:07	3.7247	20.04	0.168		
10/21/01 8:07	3.9463	20.04	0.164		
10/21/01 8:07	4.1813	20.02	0.155	4.0	0.14
10/21/01 8:07	4.4297	20.02	0.155		
10/21/01 8:08	4.693	20.01	0.145		
10/21/01 8:08	4.973	20.01	0.141		
10/21/01 8:08	5.2697	20	0.141	-5.1	0.13
10/21/01 8:08	5.583	19.99	0.136		
10/21/01 8:09	5.9147	19.99	0.127		
10/21/01 8:09	6.2663	20	0.127		
10/21/01 8:10	6.6397	19.99	0.122		
10/21/01 8:10	7.0347	19.98	0.113		
10/21/01 8:10	7.453	19.97	0.118		
10/21/01 8:11	7.8963	19.96	0.12		
10/21/01 8:11	8.3663	19.95	0.111		
10/21/01 8:12	8.8647	19.94	0.101		
10/21/01 8:12	9.3913	19.96	0.097		
10/21/01 8:13	9.9497	19.94	0.088		
10/21/01 8:13	10.5413	19.93	0.088		
10/21/01 8:14	11.168	19.93	0.083		
10/21/01 8:15	11.8313	19.92	0.069		

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT NWS CHARLESTON		JOB NUMBER 0528	
SUBJECT 16MW03S RISING HEAD SLUG TEST			
BASED ON HVORSLEV		DRAWING NUMBER	
BY FCW	CHECKED BY SWR 12-5-01	APPROVED BY	DATE 12-15-01

$$K = \frac{r^2 \ln(L/R)}{2L\,T_0}$$

K = HYDRAULIC CONDUCTIVITY

r = RADIUS OF WELL CASING — r = 0.083 Feet

R = RADIUS OF WELL SCREEN — R = 0.292 Feet

L = LENGTH OF WELL SCREEN — L = 11 Feet

T_0 = TIME FOR WATER LEVEL TO RISE OR FALL 37% OF INTIAL CHANGE — T_0 = 2.8 min

$$\frac{(0.083)^2 \ln(11/0.292)}{2(11)(2.8)} = \frac{0.025}{61.6} = 4.06 \times 10^{-4} \text{ Ft/min}$$

$$4.06 \times 10^{-4} \text{ Ft/min} \times 1440 \text{ min/day} = 5.84 \times 10^{-1} \text{ Ft/day}$$

$$5.84 \times 10^{-1} \text{ Ft/day} \times 3.528 \times 10^{-4} \text{ cm/sec} = 2.06 \times 10^{-4} \text{ cm/sec}$$

NOTE: R7T SANDPACK + AQUIFER ARE DIFFERENT

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: NWS CHARLESTON WELL/BORING NO.: 16AW035

PROJECT NO.: 0528 GEOLOGIST: WUDKWYCH

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10' 3-13' TEST NO.: 6

STATIC WATER LEVEL (Depth/Elevation): 2.78 DATE: 10-21-01

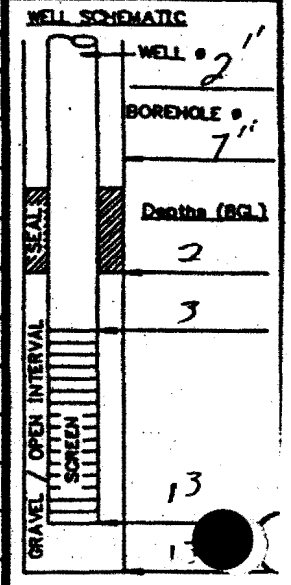
TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: SLUG PAGE 1 OF 1

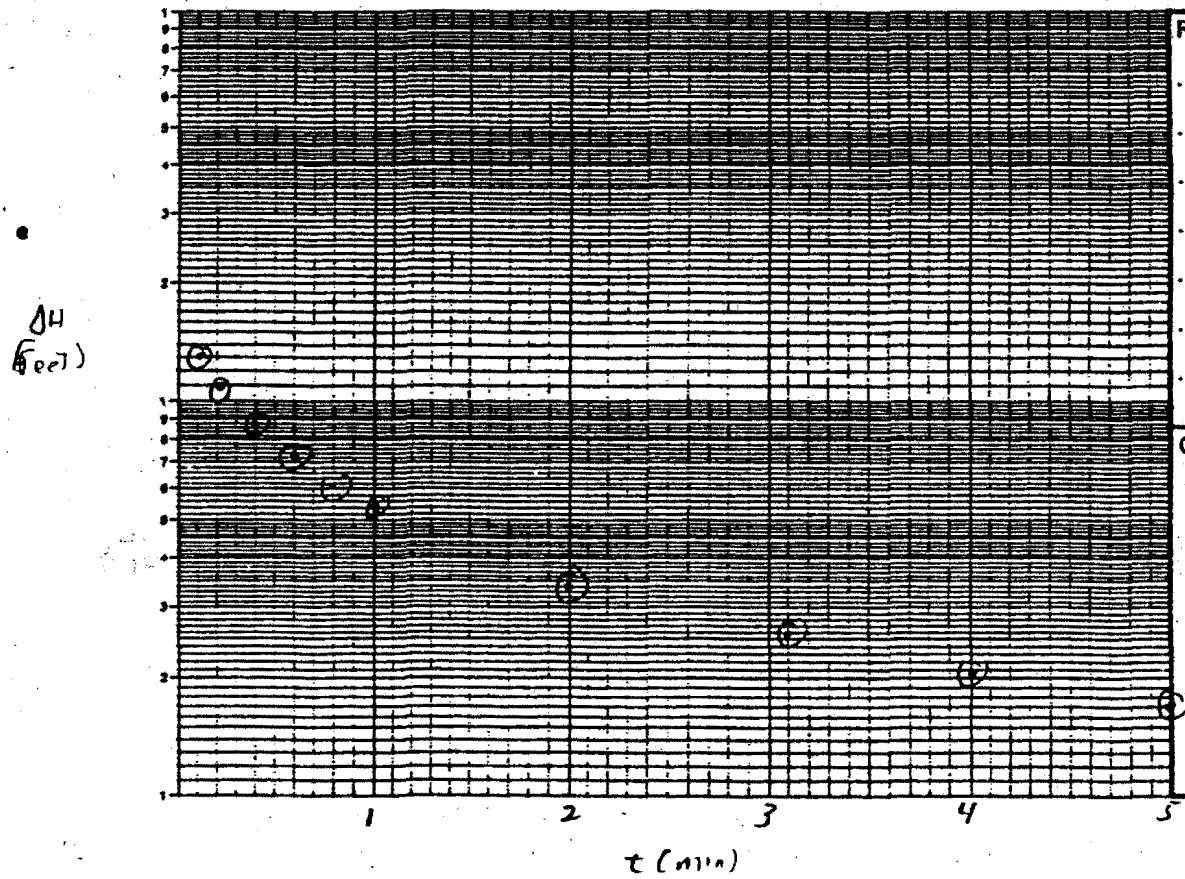
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TROLL 4000

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.02	1.76		4.0	0.20	
0.04	1.58		5.0	0.17	
0.06	1.43				
0.08	1.40				
0.1	1.35				
0.2	1.13				
0.42	0.88				
0.62	0.73				
0.82	0.61				
1.0	0.54				
2.0	0.34				
3.1	0.26				

WELL SCHEMATIC



Indicate SWL Depth on Drawing



REMARKS:

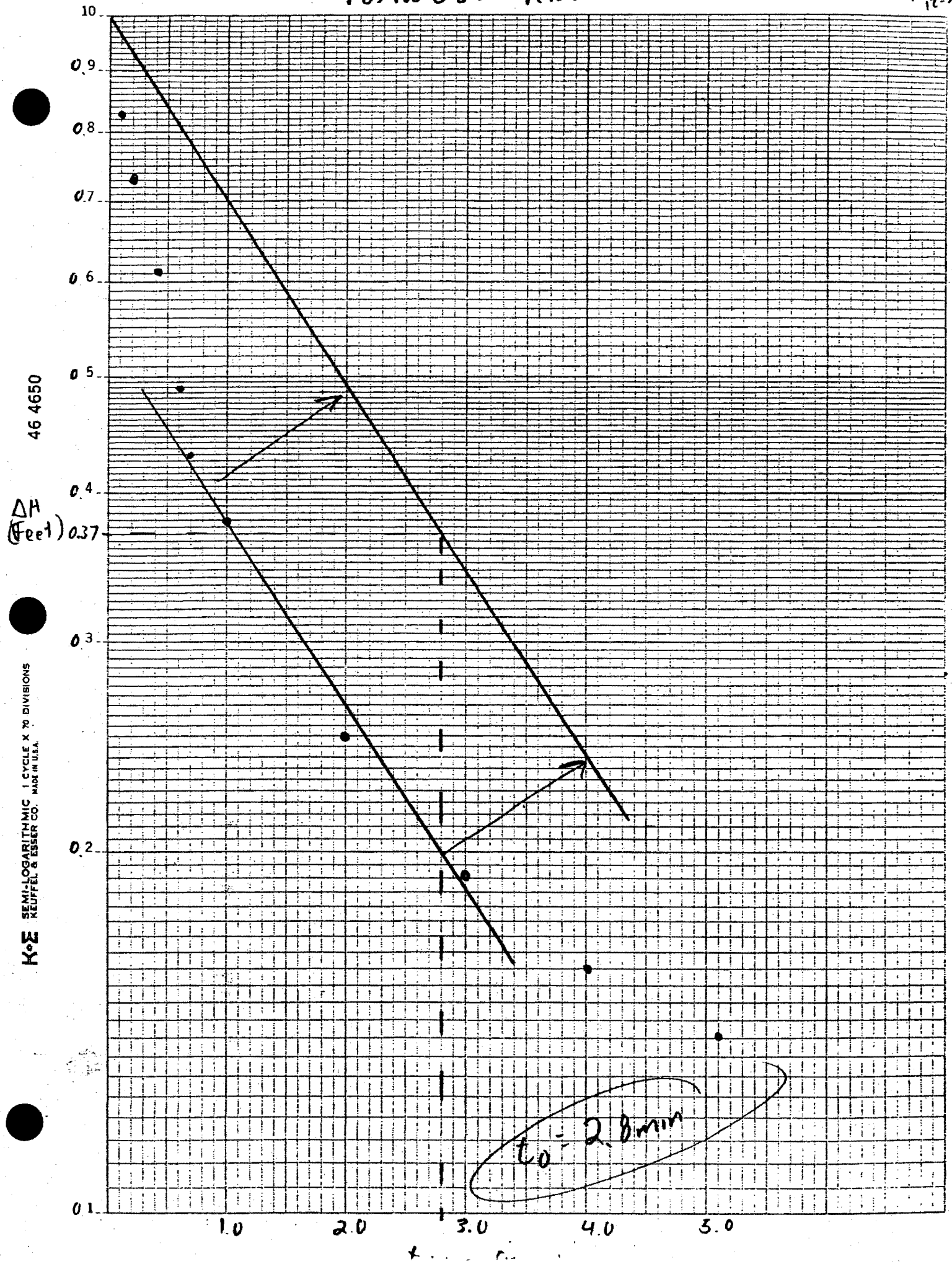
TD = 16.45

12.65

CALCS, SKETCH MAPS, ETC.:

16MW035 RISING

FWK 12-5-01



In-Situ Inc. Troll

Report generated: 11/14/01 9:50:56
Report from file: A:\SN12670 2001-10-21 081911 test6-16mw03-r.bin
DataMgr Version 3.68

Serial number: 12670
Firmware Version 7.1
Unit name: 16sg03

Test name: test6/16mw03-r

Test defined on: 10/21/01 8:18:21
Test started on: 10/21/01 8:19:11
Test stopped on: N/A N/A
Test extracted on: 10/21/01 8:22:32

Data gathered using Logarithmic testing
Maximum time between data points:10 Minutes.
Number of data samples: 98

TOTAL DATA SAMPLES 98

Channel number [1]
Measurement type: Temperature
Channel name: OnBoard Temp

Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 30 PSI.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.602 Feet H2O

Date	Time	ET (min)	Chan[1] Celsius	Chan[2] Feet H2O
10/21/01	8:19	0	19.96	0
10/21/01	8:19	0.005	19.96	2.364
10/21/01	8:19	0.01	19.96	1.716
10/21/01	8:19	0.015	19.97	1.629
10/21/01	8:19	0.02	19.98	1.76
10/21/01	8:19	0.025	19.98	1.485
10/21/01	8:19	0.03	19.98	1.721
10/21/01	8:19	0.035	19.99	1.479
10/21/01	8:19	0.04	19.99	1.587
10/21/01	8:19	0.045	19.99	1.518

10/21/01 8:19	0.05	19.99	1.483		
10/21/01 8:19	0.055	19.99	1.513		
10/21/01 8:19	0.06	20	1.437		
10/21/01 8:19	0.065	20.01	1.474		
10/21/01 8:19	0.07	20.01	1.423		
10/21/01 8:19	0.075	20.01	1.423		
10/21/01 8:19	0.08	20.01	1.405		
10/21/01 8:19	0.085	20.01	1.382		
10/21/01 8:19	0.09	20.01	1.386		
10/21/01 8:19	0.095	20.02	1.34		
10/21/01 8:19	0.1	20.02	1.354	0	100
10/21/01 8:19	0.1058	20.02	1.326		
10/21/01 8:19	0.112	20.02	1.322		
10/21/01 8:19	0.1185	20.02	1.303		
10/21/01 8:19	0.1255	20.03	1.289		
10/21/01 8:19	0.1328	20.03	1.276		
10/21/01 8:19	0.1407	20.04	1.264		
10/21/01 8:19	0.149	20.04	1.246		
10/21/01 8:19	0.1578	20.04	1.227		
10/21/01 8:19	0.1672	20.04	1.209		
10/21/01 8:19	0.177	20.05	1.19		
10/21/01 8:19	0.1875	20.06	1.172		
10/21/01 8:19	0.1985	20.06	1.149		
10/21/01 8:19	0.2102	20.06	1.13	0.1	0.83
10/21/01 8:19	0.2227	20.07	1.112		
10/21/01 8:19	0.2358	20.08	1.084		
10/21/01 8:19	0.2498	20.08	1.056		
10/21/01 8:19	0.2647	20.08	1.036		
10/21/01 8:19	0.2803	20.08	1.022		
10/21/01 8:19	0.297	20.09	0.999		
10/21/01 8:19	0.3147	20.09	0.99	0.2	0.73
10/21/01 8:19	0.3333	20.1	0.966		
10/21/01 8:19	0.3532	20.1	0.943		
10/21/01 8:19	0.3742	20.09	0.93		
10/21/01 8:19	0.3963	20.1	0.907		
10/21/01 8:19	0.4198	20.1	0.888		
10/21/01 8:19	0.4447	20.1	0.87		
10/21/01 8:19	0.4697	20.1	0.847		
10/21/01 8:19	0.4963	20.1	0.823	0.4	0.61
10/21/01 8:19	0.5247	20.1	0.8		
10/21/01 8:19	0.5547	20.1	0.775		
10/21/01 8:19	0.5863	20.09	0.757		
10/21/01 8:19	0.6213	20.09	0.734		
10/21/01 8:19	0.658	20.1	0.706		
10/21/01 8:19	0.6963	20.09	0.687	0.6	0.49
10/21/01 8:19	0.738	20.09	0.669		
10/21/01 8:19	0.7813	20.09	0.641		
10/21/01 8:20	0.828	20.09	0.618		
10/21/01 8:20	0.8763	20.09	0.604		
10/21/01 8:20	0.928	20.09	0.577	0.82	0.43
10/21/01 8:20	0.983	20.08	0.563		
10/21/01 8:20	1.0413	20.08	0.544		

10/21/01 8:20	1.103	20.08	0.521	1.0	0.38
10/21/01 8:20	1.168	20.08	0.51		
10/21/01 8:20	1.238	20.08	0.487		
10/21/01 8:20	1.3113	20.07	0.468		
10/21/01 8:20	1.3897	20.07	0.454		
10/21/01 8:20	1.473	20.07	0.436		
10/21/01 8:20	1.5613	20.06	0.418		
10/21/01 8:20	1.6547	20.06	0.408		
10/21/01 8:20	1.753	20.06	0.39		
10/21/01 8:21	1.858	20.06	0.376		
10/21/01 8:21	1.968	20.06	0.362		
10/21/01 8:21	2.0847	20.05	0.348	2.0	0.25
10/21/01 8:21	2.2097	20.05	0.334		
10/21/01 8:21	2.3413	20.04	0.316		
10/21/01 8:21	2.4813	20.04	0.307		
10/21/01 8:21	2.6297	20.04	0.293		
10/21/01 8:21	2.7863	20.04	0.279		
10/21/01 8:22	2.953	20.02	0.27		
10/21/01 8:22	3.1297	20.02	0.261	3.0	0.19
10/21/01 8:22	3.3163	20.04	0.251		
10/21/01 8:22	3.5147	20.07	0.24		
10/21/01 8:22	3.7247	20.06	0.231		
10/21/01 8:23	3.9463	20.05	0.226		
10/21/01 8:23	4.1813	20.04	0.212	4.0	0.16
10/21/01 8:23	4.4297	20.03	0.203		
10/21/01 8:23	4.693	20.02	0.194		
10/21/01 8:24	4.973	20.02	0.189		
10/21/01 8:24	5.2697	20.01	0.185	5.1	0.14
10/21/01 8:24	5.583	20	0.175		
10/21/01 8:25	5.9147	20.02	0.166		
10/21/01 8:25	6.2663	20.01	0.161		
10/21/01 8:25	6.6397	20	0.152		
10/21/01 8:26	7.0347	19.99	0.148		
10/21/01 8:26	7.453	19.98	0.143		
10/21/01 8:27	7.8963	19.97	0.138		
10/21/01 8:27	8.3663	19.96	0.129		

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT NWS CHARLESTON	JOB NUMBER 0528
SUBJECT 16MW045 FALLING HEAD SLUG TEST	
BASED ON HVORSLEV	DRAWING NUMBER
BY FCW / CHECKED BY JWR 12-5-01	APPROVED BY / DATE 11-15-01

$$K = \frac{r^2 \ln(L/R)}{2L\,T_0}$$

K = HYDRAULIC CONDUCTIVITY
r = RADIUS OF WELL CASING — r = 0.083 feet
R = RADIUS OF WELL SCREEN — R = 0.292 feet
L = LENGTH OF WELL SCREEN — L = 11 feet
T_0 = TIME FOR WATER LEVEL TO RISE OR FALL 37% OF INTIAL CHANGE — T_0 = 0.6 min

$$\frac{(0.083)^2 \ln(11/0.292)}{2(11)(0.6)} = \frac{0.025}{13.2} = 1.90 \times 10^{-3} \text{ ft/min}$$

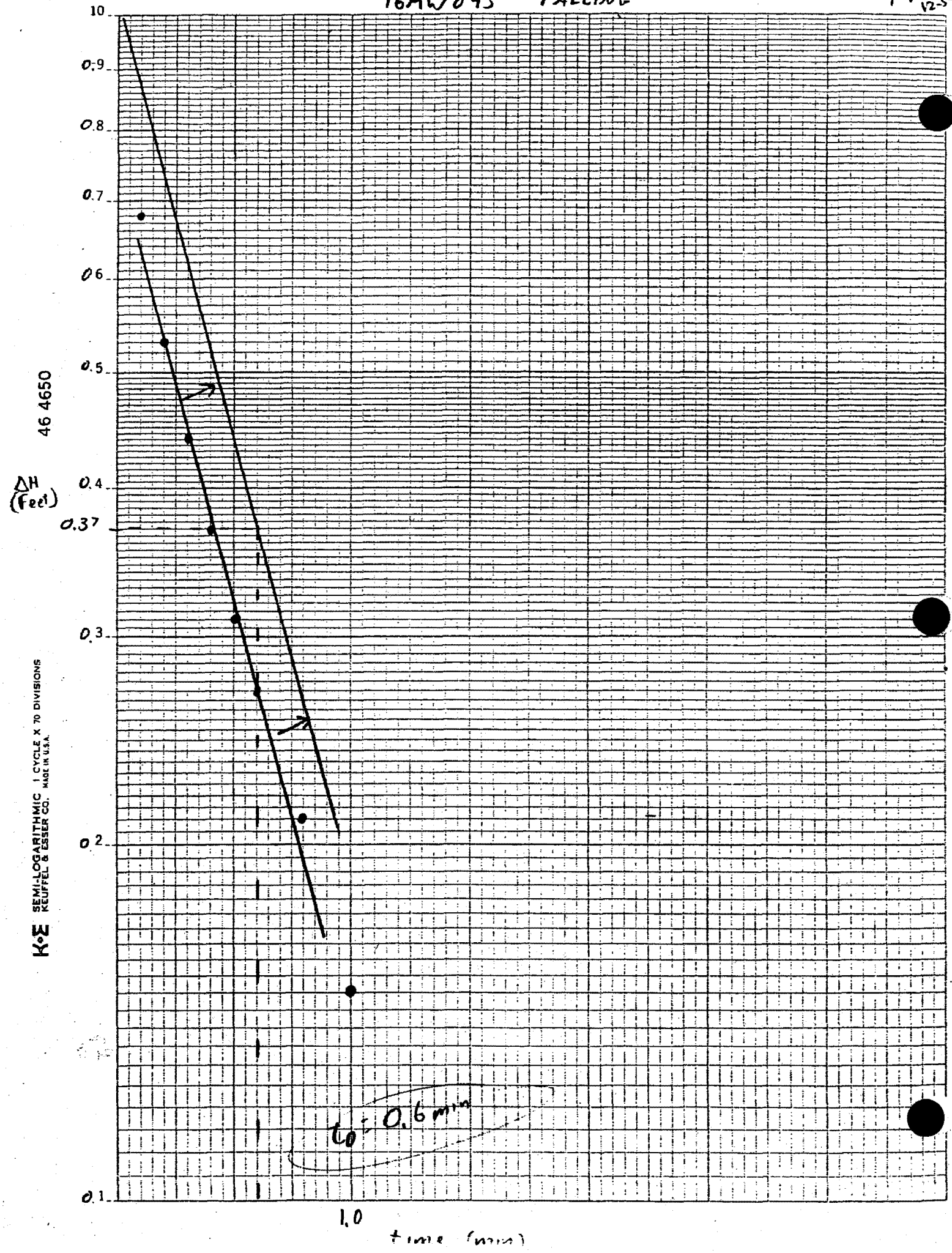
$$1.90 \times 10^{-3} \text{ ft/min} \times 1440 \text{ min/day} = 2.73 \text{ ft/day}$$

$$2.73 \text{ ft/day} \times 3.528 \times 10^{-4} \text{ cm/sec} = 9.62 \times 10^{-4} \text{ cm/sec}$$

NOTE: R ≠ r SAND PACK + AQUIFER ARE DIFFERENT!

16MW045 FALLING

PWR 12-5-01



HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: NWS CHARLESTON WELL/BORING NO.: 16MW045

PROJECT NO.: 0528 GEOLOGIST: WVDKWYCH

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10' 3-13 TEST NO.: 3

STATIC WATER LEVEL (Depth/Elevation): 2.85 DATE: 10-20-01

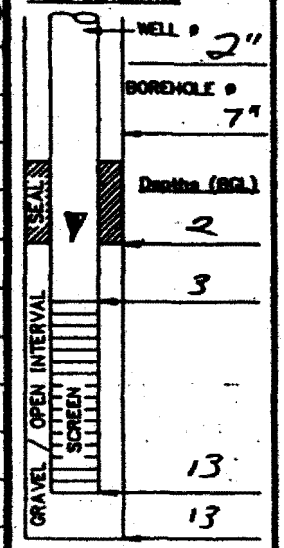
TEST TYPE (Rising/Falling/Constant Head): FALLING CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: SLUG PAGE 1 OF 1

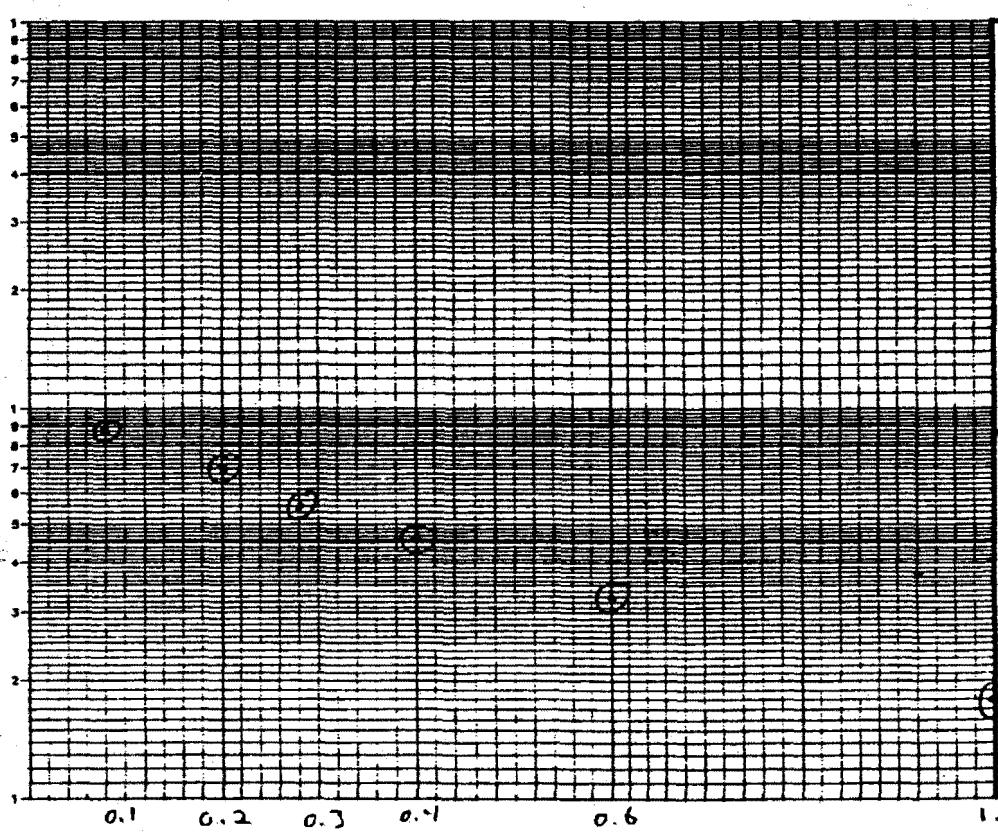
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TROLL 4000

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.09	1.04				
0.1	0.897				
0.2	0.70				
0.3	0.56				
0.4	0.46				
0.6	0.33				
1.0	0.18				
2.0	0.09				

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

TD = 16.5

13.26

CALCS, SKETCH MAPS, ETC.:

In-Situ Inc. Troll

Report generated: 11/14/01 9:19:31
Report from file: A:\SN12670 2001-10-20 090059 test3-16mw04-f.bin
DataMgr Version 3.68

Serial number: 12670
Firmware Version 7.1
Unit name: 16sg03

Test name: test3/16mw04-f

Test defined on: 10/20/01 8:57:36
Test started on: 10/20/01 9:00:59
Test stopped on: N/A N/A
Test extracted on: 10/20/01 9:06:40

Data gathered using Logarithmic testing
Maximum time between data points: 10.000 Minutes.
Number of data samples: 101

TOTAL DATA SAMPLES 101

Channel number [1]
Measurement type: Temperature
Channel name: OnBoard Temp

Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 30 PSI.
Specific gravity: 1
Mode: Surface
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.293 Feet H2O

Date	Time	ET (min)	Chan[1] Celsius	Chan[2] Feet H2O
10/20/01	9:00	0	19.51	0
10/20/01	9:00	0.005	19.52	0.773
10/20/01	9:00	0.01	19.52	1.287
10/20/01	9:00	0.015	19.53	0.595
10/20/01	9:01	0.02	19.53	0.507
10/20/01	9:01	0.025	19.53	1.186
10/20/01	9:01	0.03	19.54	1.555
10/20/01	9:01	0.035	19.54	1.753
10/20/01	9:01	0.04	19.54	1.596
10/20/01	9:01	0.045	19.54	1.153

10/20/01 9:01	0.05	19.54	0.701		
10/20/01 9:01	0.055	19.55	0.697		
10/20/01 9:01	0.06	19.55	1.149	0	100
10/20/01 9:01	0.065	19.56	1.28		
10/20/01 9:01	0.07	19.56	1.167		
10/20/01 9:01	0.075	19.56	0.934		
10/20/01 9:01	0.08	19.57	0.86	0.02	0.74
10/20/01 9:01	0.085	19.57	0.962		
10/20/01 9:01	0.09	19.57	1.043		
10/20/01 9:01	0.095	19.57	0.983		
10/20/01 9:01	0.1	19.57	0.897		
10/20/01 9:01	0.1058	19.58	0.879		
10/20/01 9:01	0.112	19.58	0.911		
10/20/01 9:01	0.1185	19.58	0.907		
10/20/01 9:01	0.1255	19.58	0.86		
10/20/01 9:01	0.1328	19.59	0.842		
10/20/01 9:01	0.1407	19.59	0.837		
10/20/01 9:01	0.149	19.6	0.814		
10/20/01 9:01	0.1578	19.6	0.8		
10/20/01 9:01	0.1672	19.6	0.782	0.1	0.68
10/20/01 9:01	0.177	19.6	0.764		
10/20/01 9:01	0.1875	19.61	0.74		
10/20/01 9:01	0.1985	19.62	0.722		
10/20/01 9:01	0.2102	19.62	0.704		
10/20/01 9:01	0.2227	19.63	0.676		
10/20/01 9:01	0.2358	19.63	0.66		
10/20/01 9:01	0.2498	19.64	0.632		
10/20/01 9:01	0.2647	19.63	0.609	0.2	0.53
10/20/01 9:01	0.2803	19.64	0.595		
10/20/01 9:01	0.297	19.64	0.563		
10/20/01 9:01	0.3147	19.64	0.567		
10/20/01 9:01	0.3333	19.64	0.549		
10/20/01 9:01	0.3532	19.64	0.526		
10/20/01 9:01	0.3742	19.65	0.507	0.3	0.44
10/20/01 9:01	0.3963	19.65	0.484		
10/20/01 9:01	0.4198	19.65	0.466		
10/20/01 9:01	0.4447	19.64	0.443		
10/20/01 9:01	0.4697	19.65	0.424	0.4	0.37
10/20/01 9:01	0.4963	19.65	0.406		
10/20/01 9:01	0.5247	19.65	0.388		
10/20/01 9:01	0.5547	19.65	0.367	0.5	0.31
10/20/01 9:01	0.5863	19.64	0.348		
10/20/01 9:01	0.6213	19.64	0.334		
10/20/01 9:01	0.658	19.64	0.316	0.6	0.27
10/20/01 9:01	0.6963	19.64	0.348		
10/20/01 9:01	0.738	19.64	0.311		
10/20/01 9:01	0.7813	19.64	0.288		
10/20/01 9:01	0.828	19.64	0.265		
10/20/01 9:01	0.8763	19.64	0.238	0.8	0.21
10/20/01 9:01	0.928	19.64	0.219		
10/20/01 9:01	0.983	19.64	0.201		
10/20/01 9:02	1.0413	19.64	0.182		

10/20/01 9:02	1.103	19.63	0.173	1.0	0.15
10/20/01 9:02	1.168	19.64	0.155		
10/20/01 9:02	1.238	19.64	0.141		
10/20/01 9:02	1.3113	19.63	0.131		
10/20/01 9:02	1.3897	19.63	0.12		
10/20/01 9:02	1.473	19.62	0.129		
10/20/01 9:02	1.5613	19.62	0.106		
10/20/01 9:02	1.6547	19.62	0.141		
10/20/01 9:02	1.753	19.62	0.101		
10/20/01 9:02	1.858	19.61	0.083		
10/20/01 9:02	1.968	19.61	0.074		
10/20/01 9:03	2.0847	19.6	0.069	2.0	0.06
10/20/01 9:03	2.2097	19.6	0.065		
10/20/01 9:03	2.3413	19.6	0.06		
10/20/01 9:03	2.4813	19.6	0.055		
10/20/01 9:03	2.6297	19.6	0.055		
10/20/01 9:03	2.7863	19.59	0.051		
10/20/01 9:03	2.953	19.59	0.046		
10/20/01 9:04	3.1297	19.59	0.046		
10/20/01 9:04	3.3163	19.58	0.051		
10/20/01 9:04	3.5147	19.58	0.042		
10/20/01 9:04	3.7247	19.57	0.046		
10/20/01 9:04	3.9463	19.57	0.042		
10/20/01 9:05	4.1813	19.57	0.046		
10/20/01 9:05	4.4297	19.56	0.046		
10/20/01 9:05	4.693	19.56	0.046		
10/20/01 9:05	4.973	19.55	0.046		
10/20/01 9:06	5.2697	19.54	0.046		
10/20/01 9:06	5.583	19.54	0.032		
10/20/01 9:06	5.9147	19.59	0.06		
10/20/01 9:07	6.2663	19.57	0.06		
10/20/01 9:07	6.6397	19.56	0.06		
10/20/01 9:08	7.0347	19.55	0.065		
10/20/01 9:08	7.453	19.54	0.074		
10/20/01 9:08	7.8963	19.53	0.069		
10/20/01 9:09	8.3663	19.52	0.074		
10/20/01 9:09	8.8647	19.51	0.074		
10/20/01 9:10	9.3913	19.51	0.078		
10/20/01 9:10	9.9497	19.5	0.092		

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT NWS CHARLESTON		JOB NUMBER 0528	
SUBJECT 16MW043 RISING HEAD SLUG TEST			
BASED ON HVORSLEV		DRAWING NUMBER	
BY FCW	CHECKED BY SWR 12-5-01	APPROVED BY	DATE 11-15-01

$$K = \frac{r^2 \ln(L/R)}{2L\,T_0}$$

K = HYDRAULIC CONDUCTIVITY
r = RADIUS OF WELL CASING — r = 0.083 Feet
R = RADIUS OF WELL SCREEN — R = 0.292 Feet
L = LENGTH OF WELL SCREEN — L = 11 Feet
T_0 = TIME FOR WATER LEVEL TO RISE OR FALL 37% OF INTIAL CHANGE — T_0 = 0.6 min

$$\frac{(0.083)^2 \ln(11/0.292)}{2(11)(0.6)} = \frac{0.025}{13.2} = 1.90 \times 10^{-3} \text{ Ft/min}$$

$$1.90 \times 10^{-3} \text{ Ft/min} \times 1440 \text{ min/day} = 2.73 \text{ Ft/day}$$

$$2.73 \text{ Ft/day} \times 3.528 \times 10^{-4} \text{ cm/sec} = 9.62 \times 10^{-4} \text{ cm/sec}$$

NOTE: R ≠ r SANDPACK + AQUIFER ARE DIFFERENT "K"

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: NWS CHARLESTON WELL/BORING NO.: 16MW045

PROJECT NO.: 0528 GEOLOGIST: WUDKWYCH

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10' 3'-13' TEST NO.: 4

STATIC WATER LEVEL (Depth/Elevation): DATE: 10-20-01

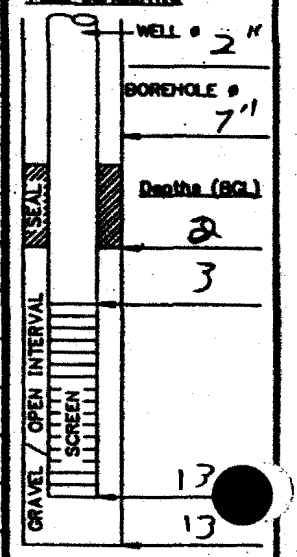
TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: SLUG PAGE 1 OF 1

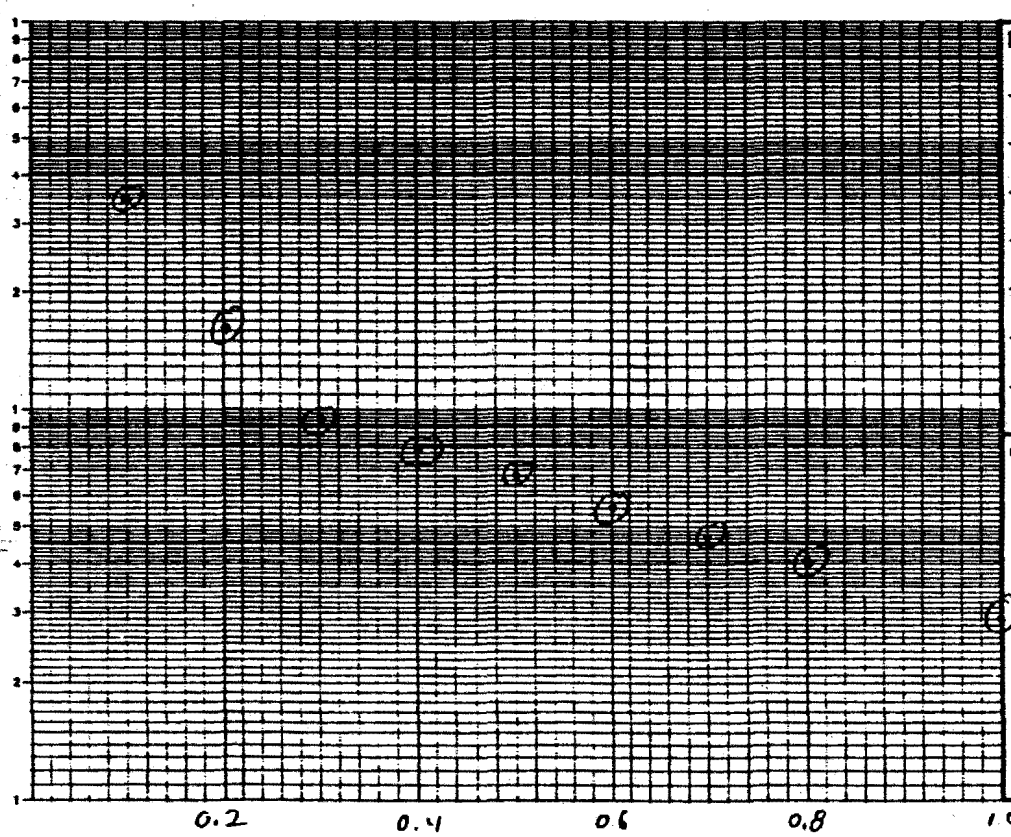
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TROLL 4000

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.1	1.35				
0.2	1.16				
0.3	0.95				
0.4	0.80				
0.5	0.69				
0.6	0.57				
0.7	0.47				
0.8	0.40				
1.0	0.29				
2.0	0.06				

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

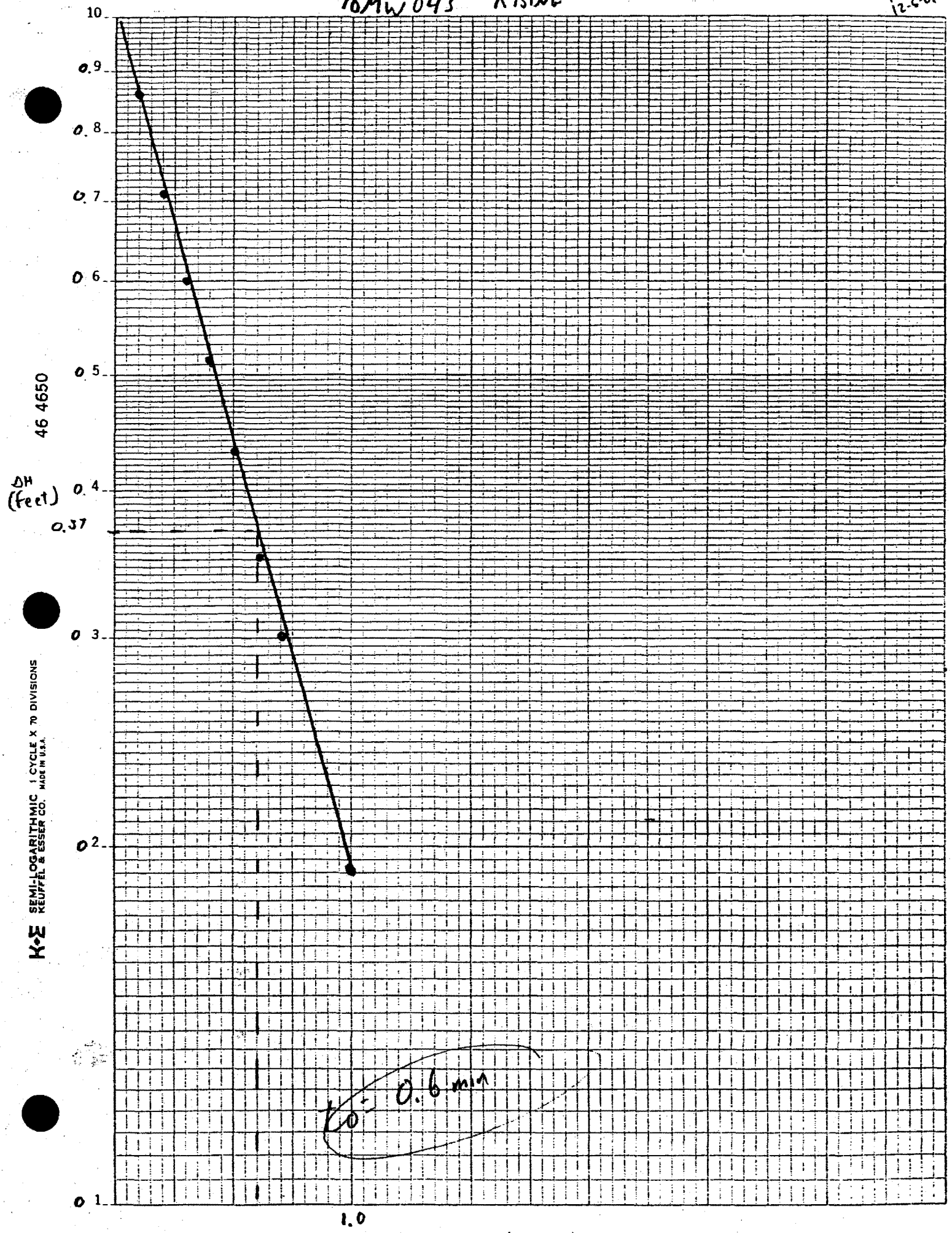
TD=16.5

13.40

CALCS, SKETCH MAPS, ETC.:

16MW045 RISING

FWK 12-5-01



In-Situ Inc. Troll

Report generated: 11/14/01 9:22:07
Report from file: A:\SN12670 2001-10-20 091446 test4-16mwo4-r.bin
DataMgr Version 3.68

Serial number: 12670
Firmware Version 7.1
Unit name: 16sg03

Test name: test4/16mwo4-r

Test defined on: 10/20/01 9:13:44
Test started on: 10/20/01 9:14:46
Test stopped on: N/A N/A
Test extracted on: 10/20/01 9:16:38

Data gathered using Logarithmic testing
Maximum time between data points:10.000C Minutes.
Number of data samples: 89

TOTAL DATA SAMPLES 89

Channel number [1]
Measurement type: Temperature
Channel name: OnBoard Temp

Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 30 PSI.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.404 Feet H2O

Date	Time	ET (min)	Chan[1] Celsius	Chan[2] Feet H2O
10/20/01	9:14	0	19.53	0
10/20/01	9:14	0.005	19.54	4.862
10/20/01	9:14	0.01	19.54	1.596
10/20/01	9:14	0.015	19.54	1.423
10/20/01	9:14	0.02	19.55	2.89
10/20/01	9:14	0.025	19.56	0.623
10/20/01	9:14	0.03	19.56	2.443
10/20/01	9:14	0.035	19.56	1.363
10/20/01	9:14	0.04	19.56	1.522
10/20/01	9:14	0.045	19.56	2.016

10/20/01 9:14	0.05	19.57	1.121		
10/20/01 9:14	0.055	19.57	1.949		
10/20/01 9:14	0.06	19.57	1.372		
10/20/01 9:14	0.065	19.57	1.532		
10/20/01 9:14	0.07	19.58	1.675		
10/20/01 9:14	0.075	19.58	1.317		
10/20/01 9:14	0.08	19.58	1.652		
10/20/01 9:14	0.085	19.59	1.386		
10/20/01 9:14	0.09	19.59	1.46		
10/20/01 9:14	0.095	19.59	1.497		
10/20/01 9:14	0.1	19.59	1.345	0	100
10/20/01 9:14	0.1058	19.6	1.483		
10/20/01 9:14	0.112	19.6	1.363		
10/20/01 9:14	0.1185	19.6	1.405		
10/20/01 9:14	0.1255	19.6	1.349		
10/20/01 9:14	0.1328	19.6	1.368		
10/20/01 9:14	0.1407	19.61	1.312		
10/20/01 9:14	0.149	19.61	1.317		
10/20/01 9:14	0.1578	19.62	1.289		
10/20/01 9:14	0.1672	19.62	1.259		
10/20/01 9:14	0.177	19.62	1.241		
10/20/01 9:14	0.1875	19.63	1.213		
10/20/01 9:14	0.1985	19.64	1.19		
10/20/01 9:14	0.2102	19.64	1.163	0.1	0.86
10/20/01 9:14	0.2227	19.64	1.135		
10/20/01 9:15	0.2358	19.65	1.103		
10/20/01 9:15	0.2498	19.65	1.061		
10/20/01 9:15	0.2647	19.65	1.033		
10/20/01 9:15	0.2803	19.65	1.013		
10/20/01 9:15	0.297	19.65	0.985		
10/20/01 9:15	0.3147	19.65	0.957	0.2	0.71
10/20/01 9:15	0.3333	19.65	0.93		
10/20/01 9:15	0.3532	19.65	0.897		
10/20/01 9:15	0.3742	19.66	0.87		
10/20/01 9:15	0.3963	19.66	0.837		
10/20/01 9:15	0.4198	19.67	0.805	0.3	0.60
10/20/01 9:15	0.4447	19.67	0.78		
10/20/01 9:15	0.4697	19.67	0.747		
10/20/01 9:15	0.4963	19.67	0.715		
10/20/01 9:15	0.5247	19.67	0.692	0.42	0.51
10/20/01 9:15	0.5547	19.67	0.683		
10/20/01 9:15	0.5863	19.67	0.618		
10/20/01 9:15	0.6213	19.66	0.577	0.52	0.43
10/20/01 9:15	0.658	19.67	0.544		
10/20/01 9:15	0.6963	19.67	0.505		
10/20/01 9:15	0.738	19.66	0.477	0.63	0.35
10/20/01 9:15	0.7813	19.66	0.445		
10/20/01 9:15	0.828	19.66	0.408	0.72	0.30
10/20/01 9:15	0.8763	19.65	0.381		
10/20/01 9:15	0.928	19.65	0.348		
10/20/01 9:15	0.983	19.65	0.321		
10/20/01 9:15	1.0413	19.65	0.293		

10/20/01 9:15	1.103	19.65	0.261	1.0	0.19
10/20/01 9:15	1.168	19.65	0.24		
10/20/01 9:16	1.238	19.65	0.212		
10/20/01 9:16	1.3113	19.64	0.189		
10/20/01 9:16	1.3897	19.64	0.171		
10/20/01 9:16	1.473	19.64	0.148		
10/20/01 9:16	1.5613	19.64	0.129		
10/20/01 9:16	1.6547	19.64	0.111		
10/20/01 9:16	1.753	19.64	0.097		
10/20/01 9:16	1.858	19.68	0.069		
10/20/01 9:16	1.968	19.7	0.074		
10/20/01 9:16	2.0847	19.68	0.06	2.0	0.04
10/20/01 9:16	2.2097	19.67	0.051		
10/20/01 9:17	2.3413	19.67	0.042		
10/20/01 9:17	2.4813	19.66	0.032		
10/20/01 9:17	2.6297	19.65	0.028		
10/20/01 9:17	2.7863	19.65	0.023		
10/20/01 9:17	2.953	19.64	0.014		
10/20/01 9:17	3.1297	19.63	0.009		
10/20/01 9:18	3.3163	19.63	0		
10/20/01 9:18	3.5147	19.62	-0.005		
10/20/01 9:18	3.7247	19.61	-0.009		
10/20/01 9:18	3.9463	19.6	-0.014		
10/20/01 9:18	4.1813	19.6	-0.018		
10/20/01 9:19	4.4297	19.6	-0.018		
10/20/01 9:19	4.693	19.6	-0.018		
10/20/01 9:19	4.973	19.6	-0.028		

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT NWS CHARLESTON	JOB NUMBER 0528
SUBJECT 16MW055 RISING HEAD SLUG TEST	
BASED ON HVORSLEV	DRAWING NUMBER
BY FCW / CHECKED BY SWR 12-5-01	APPROVED BY / DATE 11-15-01

$$K = \frac{r^2 \ln(L/R)}{2L\,T_0}$$

K = HYDRAULIC CONDUCTIVITY
r = RADIUS OF WELL CASING — r = 0.083 Feet
R = RADIUS OF WELL SCREEN — R = 0.292 Feet
L = LENGTH OF WELL SCREEN — L = 11 Feet
T_0 = TIME FOR WATER LEVEL TO RISE OR FALL 37% OF INTIAL CHANGE — T_0 = 21.7 min

$$\frac{(0.083)^2 \ln(11/0.292)}{2(11)(21.7)} = \frac{0.025}{477.4} = 5.24 \cdot 10^{-5} \text{ Ft/min}$$

$$5.24 \times 10^{-5} \text{ Ft/min} \times 1440 \text{ min/day} = 7.54\ 10^{-2} \text{ Ft/day}$$

$$7.54 \times 10^{-2} \text{ Ft/day} \times 3.528 \times 10^{-4} = 2.66 \times 10^{-5} \text{ cm/sec}$$

NOTE: R & r SANDPACK + AQUIFER ARE DIFFERENT "K"

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: NWS CHARLESTON WELL/BORING NO.: 16MW055

PROJECT NO.: 0528 GEOLOGIST: WWOKWYCH

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10' / 3'-13' TEST NO.: 5

STATIC WATER LEVEL (Depth/Elevation): 2.97 DATE: 10-21-01

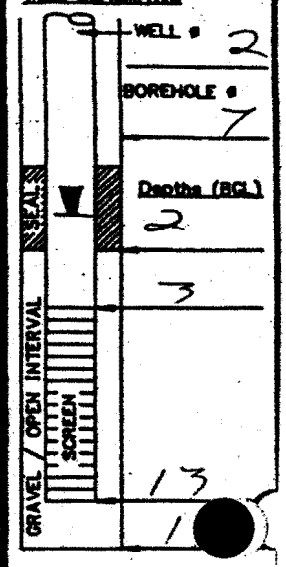
TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: SLUG PAGE 1 OF 1

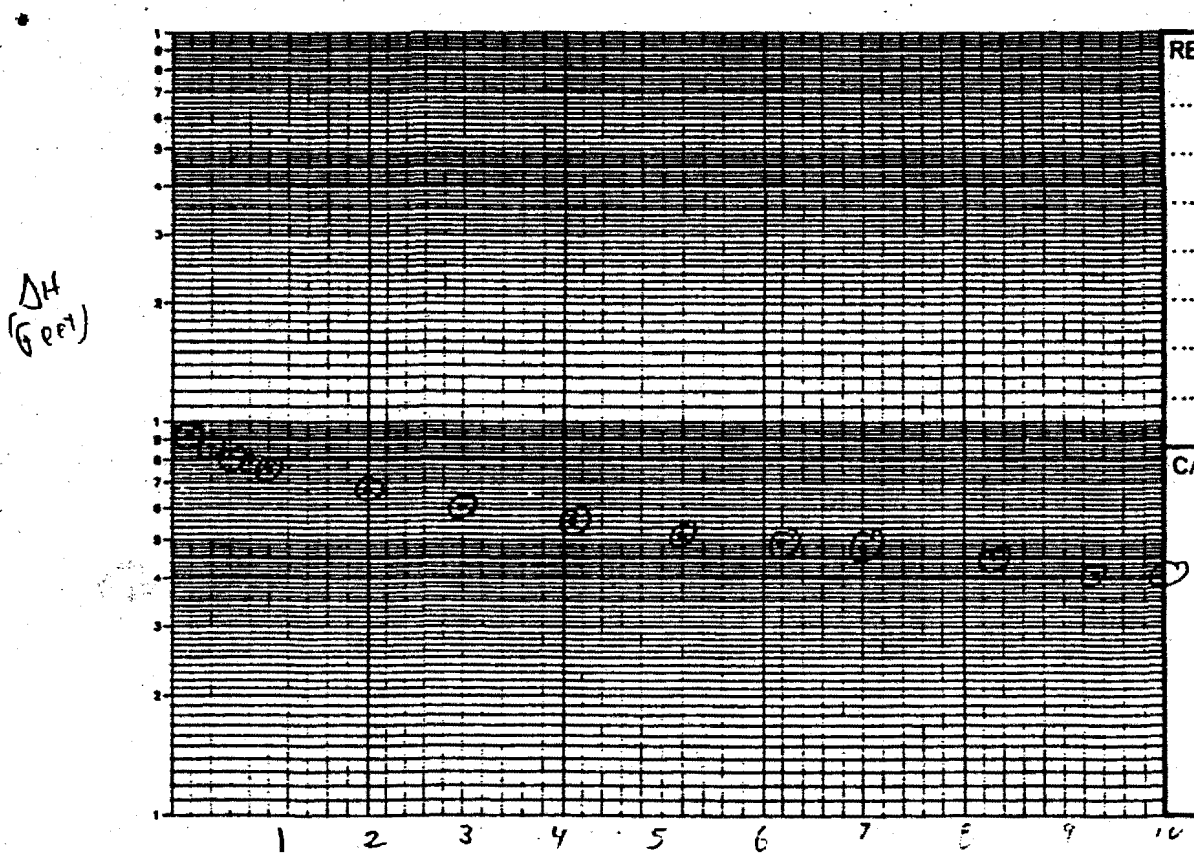
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TROLL 4000

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.03	1.8		5.2	0.52	
0.1	1.1		6.2	0.50	
0.21	0.94		7.0	0.48	
0.31	0.91		8.3	0.46	
0.41	0.88		9.3	0.43	
0.52	0.85		10	0.42	
0.62	0.84		21	0.31	
0.82	0.80		47	0.16	
1.0	0.77				
2.0	0.68				
3.1	0.61				
4.1	0.57				

WELL SCHEMATIC



Indicate SWL Depth on Drawing



REMARKS:

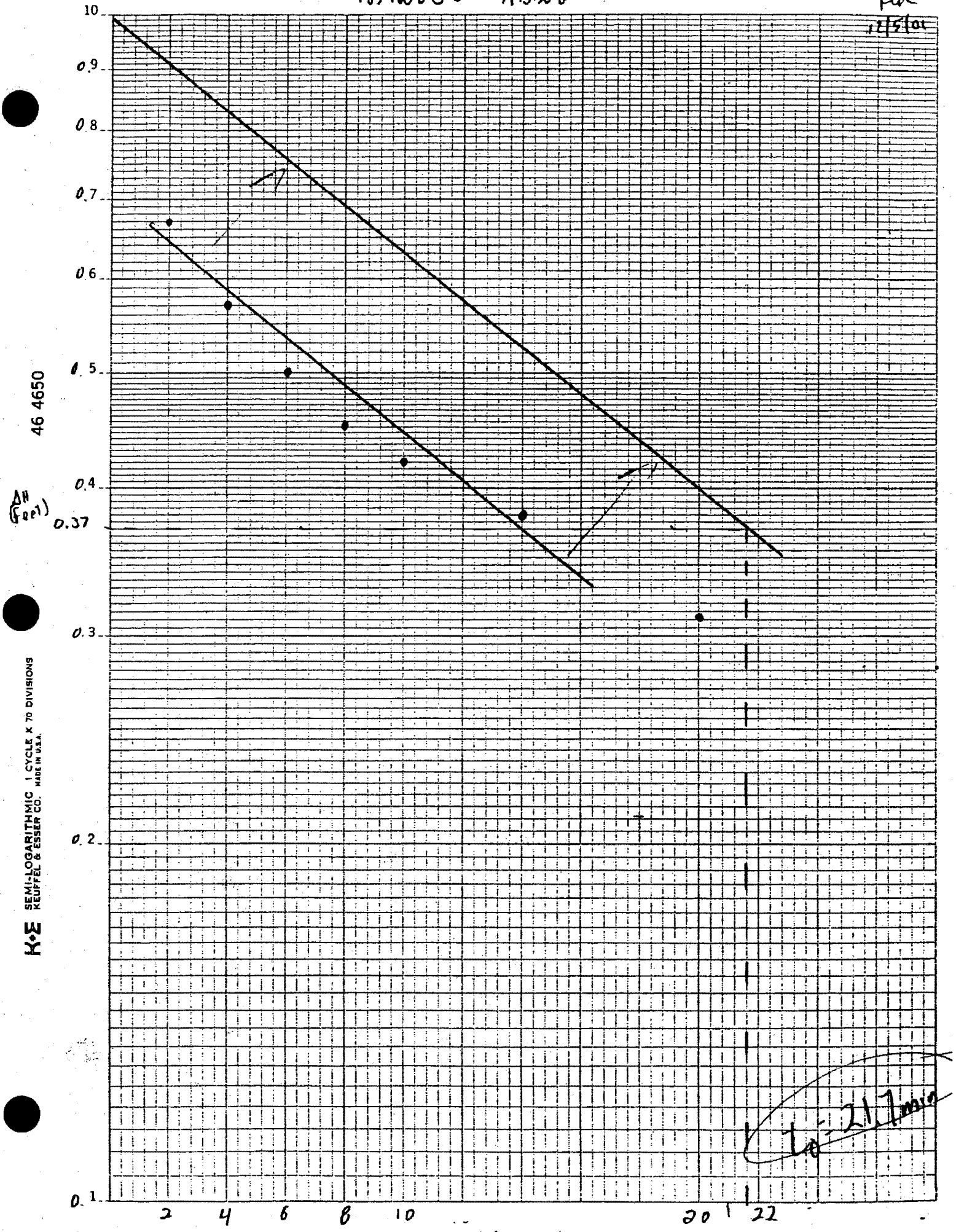
TD = 16.5

13.2

CALCS, SKETCH MAPS, ETC.:

16MW055 RISING

FWR 12/5/01



In-Situ Inc. Troll

Report generated: 11/14/01 10:10:40
Report from file: A:\SN12990 2001-10-21 091826 test5-16mw05-r.bin
DataMgr Version 3.68

Serial number: 12990
Firmware Version 7.1
Unit name:

Test name: test5/16mw05-r

Test defined on: 10/21/01 9:17:45
Test started on: 10/21/01 9:18:26
Test stopped on: 10/21/01 10:37:16
Test extracted on: 10/21/01 10:40:16

Data gathered using Logarithmic testing
Maximum time between data points:10 Minutes.
Number of data samples: 136

TOTAL DATA SAMPLES 136

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name:
Sensor Range: 30 PSI.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.215 Feet H2O

Date	Time	ET (min)	Chan[1] Celsius	Chan[2] Feet H2O
10/21/01	9:18	0	20.14	0
10/21/01	9:18	0.005	20.14	0.3
10/21/01	9:18	0.01	20.14	2.489
10/21/01	9:18	0.015	20.15	2.051
10/21/01	9:18	0.02	20.15	0.551
10/21/01	9:18	0.025	20.15	0.69
10/21/01	9:18	0.03	20.16	1.841
10/21/01	9:18	0.035	20.18	1.518
10/21/01	9:18	0.04	20.17	0.623
10/21/01	9:18	0.045	20.18	0.964

10/21/01 9:18	0.05	20.18	1.564		
10/21/01 9:18	0.055	20.18	1.193		
10/21/01 9:18	0.06	20.18	0.74		
10/21/01 9:18	0.065	20.18	1.093		
10/21/01 9:18	0.07	20.18	1.361		
10/21/01 9:18	0.075	20.19	1.022		
10/21/01 9:18	0.08	20.19	0.847		
10/21/01 9:18	0.085	20.19	1.137		
10/21/01 9:18	0.09	20.19	1.209		
10/21/01 9:18	0.095	20.2	0.95		
10/21/01 9:18	0.1	20.2	0.927		
10/21/01 9:18	0.1058	20.2	1.126		
10/21/01 9:18	0.112	20.21	1.089		
10/21/01 9:18	0.1185	20.21	0.923		
10/21/01 9:18	0.1255	20.21	1.031		
10/21/01 9:18	0.1328	20.21	1.056		
10/21/01 9:18	0.1407	20.22	0.941		
10/21/01 9:18	0.149	20.22	1.05		
10/21/01 9:18	0.1578	20.22	0.95		
10/21/01 9:18	0.1672	20.24	1.013	0	100
10/21/01 9:18	0.177	20.24	0.946		
10/21/01 9:18	0.1875	20.24	0.99		
10/21/01 9:18	0.1985	20.24	0.95		
10/21/01 9:18	0.2102	20.25	0.946		
10/21/01 9:18	0.2227	20.26	0.955		
10/21/01 9:18	0.2358	20.27	0.946		
10/21/01 9:18	0.2498	20.27	0.937		
10/21/01 9:18	0.2647	20.27	0.927		
10/21/01 9:18	0.2803	20.27	0.918	0.1	0.91
10/21/01 9:18	0.297	20.27	0.911		
10/21/01 9:18	0.3147	20.27	0.911		
10/21/01 9:18	0.3333	20.28	0.907		
10/21/01 9:18	0.3532	20.28	0.902		
10/21/01 9:18	0.3742	20.28	0.897	0.2	0.88
10/21/01 9:18	0.3963	20.28	0.888		
10/21/01 9:18	0.4198	20.28	0.879		
10/21/01 9:18	0.4447	20.3	0.874		
10/21/01 9:18	0.4697	20.3	0.87		
10/21/01 9:18	0.4963	20.3	0.86		
10/21/01 9:18	0.5247	20.3	0.856		
10/21/01 9:18	0.5547	20.3	0.851		
10/21/01 9:19	0.5863	20.3	0.842	0.4	0.83
10/21/01 9:19	0.6213	20.3	0.84		
10/21/01 9:19	0.658	20.3	0.83		
10/21/01 9:19	0.6963	20.29	0.826		
10/21/01 9:19	0.738	20.29	0.807		
10/21/01 9:19	0.7813	20.29	0.807		
10/21/01 9:19	0.828	20.3	0.803		
10/21/01 9:19	0.8763	20.29	0.789		
10/21/01 9:19	0.928	20.28	0.784		
10/21/01 9:19	0.983	20.28	0.78	0.8	0.77
10/21/01 9:19	1.0413	20.28	0.77		

10/21/01 9:19	1.103	20.28	0.766		
10/21/01 9:19	1.168	20.28	0.759	1.0	0.74
10/21/01 9:19	1.238	20.28	0.75		
10/21/01 9:19	1.3113	20.28	0.745		
10/21/01 9:19	1.3897	20.27	0.736		
10/21/01 9:19	1.473	20.27	0.727		
10/21/01 9:19	1.5613	20.27	0.717		
10/21/01 9:20	1.6547	20.27	0.713		
10/21/01 9:20	1.753	20.25	0.704		
10/21/01 9:20	1.858	20.25	0.694		
10/21/01 9:20	1.968	20.26	0.685		
10/21/01 9:20	2.0847	20.25	0.68	2.0	0.67
10/21/01 9:20	2.2097	20.3	0.669		
10/21/01 9:20	2.3413	20.28	0.664		
10/21/01 9:20	2.4813	20.27	0.65		
10/21/01 9:21	2.6297	20.27	0.646		
10/21/01 9:21	2.7863	20.27	0.641		
10/21/01 9:21	2.953	20.27	0.627		
10/21/01 9:21	3.1297	20.25	0.618	3.0	0.61
10/21/01 9:21	3.3163	20.25	0.609		
10/21/01 9:21	3.5147	20.25	0.602		
10/21/01 9:22	3.7247	20.25	0.593		
10/21/01 9:22	3.9463	20.25	0.584		
10/21/01 9:22	4.1813	20.24	0.574	4.0	0.57
10/21/01 9:22	4.4297	20.25	0.57		
10/21/01 9:23	4.693	20.24	0.547		
10/21/01 9:23	4.973	20.24	0.537		
10/21/01 9:23	5.2697	20.23	0.528	5.1	0.52
10/21/01 9:24	5.583	20.22	0.521		
10/21/01 9:24	5.9147	20.22	0.512		
10/21/01 9:24	6.2663	20.22	0.503	6.1	0.50
10/21/01 9:25	6.6397	20.2	0.494		
10/21/01 9:25	7.0347	20.2	0.489	7.0	0.48
10/21/01 9:25	7.453	20.19	0.48		
10/21/01 9:26	7.8963	20.19	0.471		
10/21/01 9:26	8.3663	20.18	0.461	8.2	0.45
10/21/01 9:27	8.8647	20.17	0.457		
10/21/01 9:27	9.3913	20.16	0.443		
10/21/01 9:28	9.9497	20.15	0.438		
10/21/01 9:28	10.5413	20.15	0.427	10.3	0.42
10/21/01 9:29	11.168	20.14	0.418		
10/21/01 9:30	11.8313	20.13	0.408		
10/21/01 9:30	12.5347	20.13	0.399		
10/21/01 9:31	13.2797	20.12	0.394		
10/21/01 9:32	14.0697	20.11	0.385	14	0.38
10/21/01 9:33	14.9063	20.11	0.376		
10/21/01 9:34	15.7913	20.11	0.367		
10/21/01 9:35	16.7297	20.1	0.358		
10/21/01 9:36	17.723	20.1	0.346		
10/21/01 9:37	18.7763	20.1	0.337		
10/21/01 9:38	19.8913	20.09	0.328		
10/21/01 9:39	21.073	20.08	0.318	21	0.31

10/21/01 9:40	22.3247	20.09	0.309		
10/21/01 9:42	23.6497	20.08	0.3		
10/21/01 9:43	25.0547	20.08	0.291		
10/21/01 9:44	26.543	20.08	0.277		
10/21/01 9:46	28.118	20.08	0.268		
10/21/01 9:48	29.7863	20.07	0.261		
10/21/01 9:49	31.5547	20.07	0.247	30	0.24
10/21/01 9:51	33.428	20.07	0.242		
10/21/01 9:53	35.4113	20.06	0.228		
10/21/01 9:55	37.513	20.06	0.215		
10/21/01 9:58	39.7397	20.06	0.205		
10/21/01 10:00	42.098	20.06	0.191	42	0.19
10/21/01 10:03	44.5963	20.06	0.175		
10/21/01 10:05	47.243	20.06	0.161		
10/21/01 10:08	50.0463	20.62	13.109		
10/21/01 10:11	53.0147	21.61	13.097		
10/21/01 10:14	56.1597	22.57	13.09		
10/21/01 10:17	59.4913	23.29	13.118		
10/21/01 10:21	63.0197	23.6	13.12		
10/21/01 10:25	66.758	23.6	13.143		
10/21/01 10:29	70.718	23.54	13.173		
10/21/01 10:33	74.9113	23.48	13.187		

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT NWS CHARLESTON		JOB NUMBER 0528	
SUBJECT RISING HEAD SLUG TEST		17MW015	
BASED ON HVORSLEV		DRAWING NUMBER	
BY FCW	CHECKED BY FCW 11-19-01	APPROVED BY	DATE 11-15-01

$$K = \frac{r^2 \ln(L/R)}{2L\,T_0}$$

K = HYDRAULIC CONDUCTIVITY
r = RADIUS OF WELL CASING — r = 0.083 Feet
R = RADIUS OF WELL SCREEN — R = 0.083 Feet
L = LENGTH OF WELL SCREEN — L = 5.46 Feet
T_0 = TIME FOR WATER LEVEL TO RISE OR FALL 37% OF INTIAL CHANGE — T_0 = 4.45 min

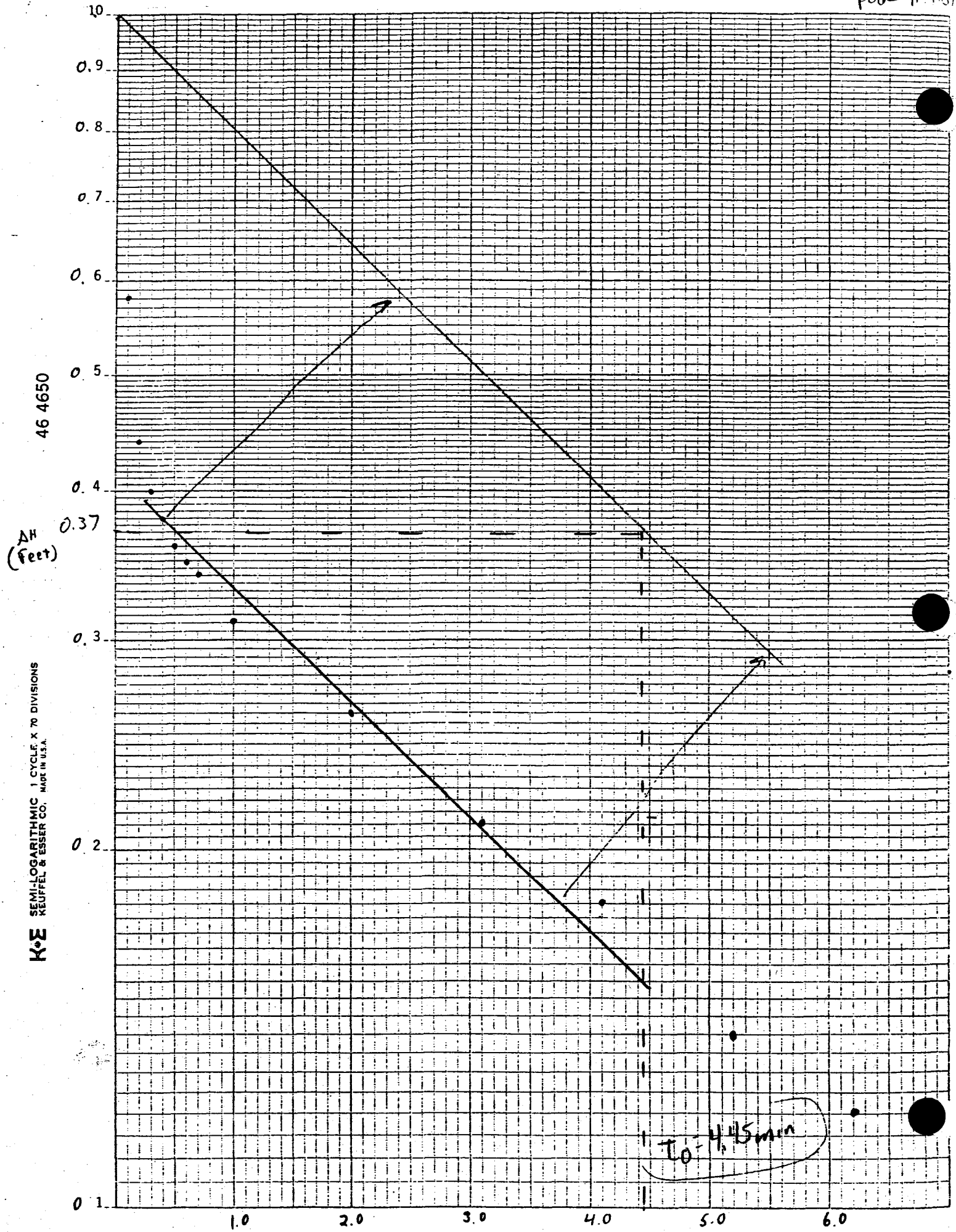
$$\frac{(0.083)^2 \ln(5.46/0.083)}{2(5.46)\,4.45} = \frac{0.029}{48.59} = 5.93 \times 10^{-4} \text{ ft/min}$$

$$5.93 \times 10^{-4} \text{ ft/min} \times 1440 \text{ min/day} = 8.5 \times 10^{-1} \text{ ft/day}$$

$$8.5 \times 10^{-1} \text{ ft/day} \times 3.528 \times 10^{-4} \text{ cm/sec} = 3.0 \times 10^{-4} \text{ cm/sec}$$

NOTE: R = r SANDPACK + AQUIFER SIMILAR

17MW01S RISING



In-Situ Inc. Troll

Report generated: 11/14/01 8:32:42
Report from file: A:\SN10283 2001-10-16 161709 test2-17mw01.bin
DataMgr Version 3.68

Serial number: 10283
Firmware Version 7.1
Unit name: SP4000

Test name: test2/17mw01

Test defined on: 10/16/01 16:01:16
Test started on: 10/16/01 16:17:09
Test stopped on: N/A N/A
Test extracted on: 10/16/01 16:22:14

Data gathered using Logarithmic testing
aximum time between data points: 10.0 Minutes.
Number of data samples: 113

TOTAL DATA SAMPLES 113

Channel number [1]
Measurement type: Temperature
Channel name: OnBoard Temp

Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 30 PSI.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 5.266 Feet H2O

Date	Time	ET (min)	Chan[1] Celsius	Chan[2] Feet H2O		
10/16/01	16:17	0	20.82	0		
10/16/01	16:17	0.005	20.84	0.572		
10/16/01	16:17	0.01	20.84	3.179		
10/16/01	16:17	0.015	20.85	2.124		
10/16/01	16:17	0.02	20.85	1.359	0	100
10/16/01	16:17	0.025	20.85	1.294		
10/16/01	16:17	0.03	20.86	1.25		
10/16/01	16:17	0.035	20.86	1.176		
10/16/01	16:17	0.04	20.87	1.156	0.02	0.85
10/16/01	16:17	0.045	20.88	1.066		

10/16/01 16:17	0.05	20.87	1.086		
10/16/01 16:17	0.055	20.88	1.07		
10/16/01 16:17	0.06	20.88	1.043	0.04	0.77
10/16/01 16:17	0.065	20.88	1.024		
10/16/01 16:17	0.07	20.89	0.996		
10/16/01 16:17	0.075	20.89	0.973		
10/16/01 16:17	0.08	20.89	0.957	0.06	0.70
10/16/01 16:17	0.085	20.89	0.934		
10/16/01 16:17	0.09	20.89	0.916		
10/16/01 16:17	0.095	20.9	0.893		
10/16/01 16:17	0.1	20.9	0.874	0.08	~~0.52~~ 0.64
10/16/01 16:17	0.1058	20.9	0.858		
10/16/01 16:17	0.112	20.9	0.84		
10/16/01 16:17	0.1185	20.9	0.817		
10/16/01 16:17	0.1255	20.91	0.793	0.10	0.58
10/16/01 16:17	0.1328	20.92	0.777		
10/16/01 16:17	0.1407	20.92	0.754		
10/16/01 16:17	0.149	20.93	0.731		
10/16/01 16:17	0.1578	20.94	0.708		
10/16/01 16:17	0.1672	20.94	0.685		
10/16/01 16:17	0.177	20.94	0.664		
10/16/01 16:17	0.1875	20.95	0.65		
10/16/01 16:17	0.1985	20.95	0.632		
10/16/01 16:17	0.2102	20.96	0.618		
10/16/01 16:17	0.2227	20.96	0.6	0.20	0.44
10/16/01 16:17	0.2358	20.96	0.591		
10/16/01 16:17	0.2498	20.96	0.579		
10/16/01 16:17	0.2647	20.96	0.574		
10/16/01 16:17	0.2803	20.96	0.565		
10/16/01 16:17	0.297	20.97	0.556		
10/16/01 16:17	0.3147	20.97	0.547		
10/16/01 16:17	0.3333	20.98	0.542	0.31	0.40
10/16/01 16:17	0.3532	20.98	0.537		
10/16/01 16:17	0.3742	20.99	0.528		
10/16/01 16:17	0.3963	21	0.524		
10/16/01 16:17	0.4198	20.99	0.519	0.40	0.38
10/16/01 16:17	0.4447	20.99	0.514		
10/16/01 16:17	0.4697	20.99	0.505		
10/16/01 16:17	0.4963	20.99	0.501		
10/16/01 16:17	0.5247	20.99	0.496	0.50	0.36
10/16/01 16:17	0.5547	21	0.491		
10/16/01 16:17	0.5863	21	0.482		
10/16/01 16:17	0.6213	21	0.48	0.60	0.35
10/16/01 16:17	0.658	21	0.475		
10/16/01 16:17	0.6963	21	0.471		
10/16/01 16:17	0.738	21.01	0.461	0.71	0.34
10/16/01 16:17	0.7813	21.01	0.457		
10/16/01 16:17	0.828	21	0.452		
10/16/01 16:18	0.8763	21	0.447		
10/16/01 16:18	0.928	21	0.443		
10/16/01 16:18	0.983	21	0.434		
10/16/01 16:18	1.0413	21.01	0.429	1.0	0.31

10/16/01 16:18	1.103	21.01	0.424				
10/16/01 16:18	1.168	21.02	0.415				
10/16/01 16:18	1.238	21.01	0.411				
10/16/01 16:18	1.3113	21.02	0.406				
10/16/01 16:18	1.3897	21.01	0.397				
10/16/01 16:18	1.473	21.01	0.392				
10/16/01 16:18	1.5613	21.01	0.383				
10/16/01 16:18	1.6547	21.01	0.376				
10/16/01 16:18	1.753	21.03	0.376				
10/16/01 16:19	1.858	21.02	0.367				
10/16/01 16:19	1.968	21.01	0.358				
10/16/01 16:19	2.0847	21.01	0.348	2.0	0.26		
10/16/01 16:19	2.2097	21.01	0.344				
10/16/01 16:19	2.3413	21.02	0.334				
10/16/01 16:19	2.4813	21.02	0.325				
10/16/01 16:19	2.6297	21.02	0.316				
10/16/01 16:19	2.7863	21.02	0.307				
10/16/01 16:20	2.953	21.01	0.298				
10/16/01 16:20	3.1297	21.02	0.288	3.1	0.21		
10/16/01 16:20	3.3163	21.02	0.281				
10/16/01 16:20	3.5147	21.02	0.272				
10/16/01 16:20	3.7247	21.03	0.263				
10/16/01 16:21	3.9463	21.02	0.249				
10/16/01 16:21	4.1813	21.01	0.24	4.1	0.18		
10/16/01 16:21	4.4297	21.03	0.231				
10/16/01 16:21	4.693	21.02	0.221				
10/16/01 16:22	4.973	21.02	0.208				
10/16/01 16:22	5.2697	21.08	0.198	5.2	0.14	5.1	0.17
10/16/01 16:22	5.583	21.06	0.189				
10/16/01 16:23	5.9147	21.04	0.182				
10/16/01 16:23	6.2663	21.04	0.168	6.2	0.12		
10/16/01 16:23	6.6397	21.03	0.159				
10/16/01 16:24	7.0347	21.03	0.155				
10/16/01 16:24	7.453	21.01	0.145				
10/16/01 16:25	7.8963	21.01	0.136				
10/16/01 16:25	8.3663	21	0.127	8.2	0.1		
10/16/01 16:26	8.8647	21	0.118				
10/16/01 16:26	9.3913	21	0.108				
10/16/01 16:27	9.9497	21	0.104				
10/16/01 16:27	10.5413	20.98	0.095				
10/16/01 16:28	11.168	20.98	0.09				
10/16/01 16:28	11.8313	20.97	0.085				
10/16/01 16:29	12.5347	20.96	0.076				
10/16/01 16:30	13.2797	20.96	0.074				
10/16/01 16:31	14.0697	20.95	0.069				
10/16/01 16:32	14.9063	20.94	0.06				
10/16/01 16:32	15.7913	20.95	0.055				
10/16/01 16:33	16.7297	20.94	0.055				
10/16/01 16:34	17.723	20.93	0.051				
10/16/01 16:35	18.7763	20.92	0.046				
10/16/01 16:37	19.8913	20.93	0.042				

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: NWS CHARLESTON WELL/BORING NO.: 17MW015

PROJECT NO.: 0528 GEOLOGIST: W.W.DKWYLL

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10'- 4-14' TEST NO.: 2

STATIC WATER LEVEL (Depth/Elevation): 11.94 TOC DATE: 10-16-01

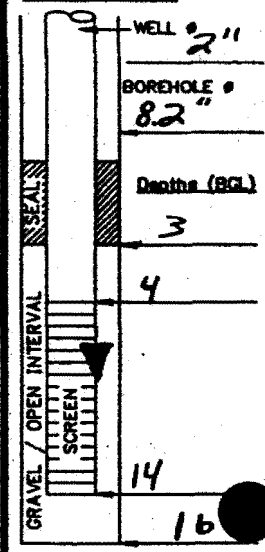
TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG PAGE 1 OF 1

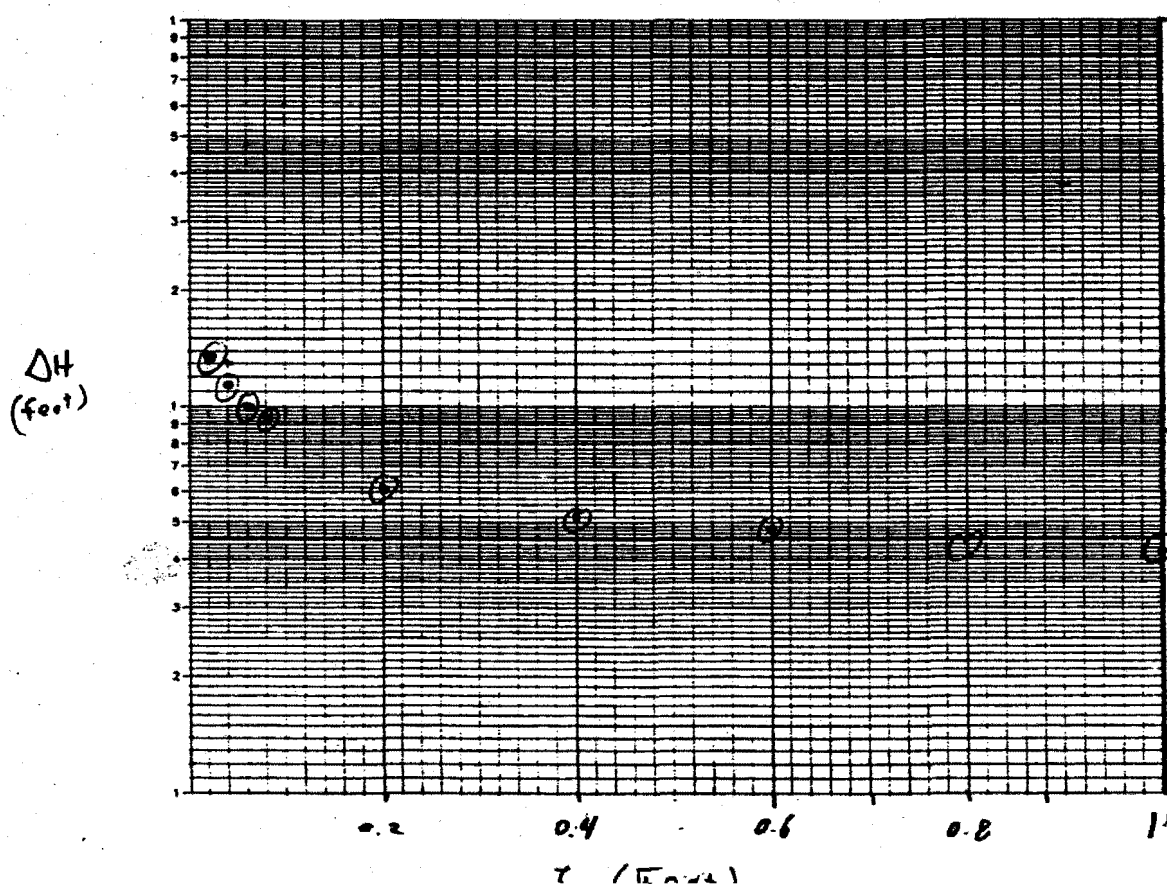
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TROLL 4000

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.02	1.35				
0.04	1.15				
0.06	1.04				
0.08	0.95				
0.2	0.61				
0.4	0.51				
0.6	0.48				
0.8	0.45				
1.0	0.42				
2.0	0.35				
3.1	0.28				
4.1	0.24				

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

TD = 17.4

5.443

CALCS, SKETCH MAPS, ETC.:

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT NWS CHARLESTON	JOB NUMBER 0528
SUBJECT 17MW02S FALLING HEAD SLUG TEST	
BASED ON HVORSLEV	DRAWING NUMBER
BY FCW / CHECKED BY FCW 11-19-01	APPROVED BY / DATE 11-15-01

$$K = \frac{r^2 \ln(L/R)}{2L\,T_0}$$

K = HYDRAULIC CONDUCTIVITY
r = RADIUS OF WELL CASING — r = 0.083 Feet
R = RADIUS OF WELL SCREEN — R = 0.083 Feet
L = LENGTH OF WELL SCREEN — L = 9.92 Feet
T_0 = TIME FOR WATER LEVEL TO RISE OR FALL 37% OF INTIAL CHANGE — T_0 = 1.45 min

$$\frac{(0.083)^2 \ln(9.92/0.083)}{2(9.92)(1.45)} = \frac{0.033}{28.77} = 1.14 \times 10^{-3} \text{ Ft/min}$$

$$1.14 \times 10^{-3} \text{ Ft/min} \times 1440 \text{ min/day} = 1.65 \text{ Ft/day}$$

$$1.65 \text{ Ft/day} \times 3.528 \times 10^{-4} \text{ cm/sec} = 5.82 \times 10^{-4} \text{ cm/}$$

NOTE: R=r SANDPACK + AQUIFER ARE SIMILAR

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: NWS CHARLESTON WELL/BORING NO.: 17MW02

PROJECT NO.: 0528 GEOLOGIST: WWOKWYCH

WELL DIAMETER: 2 SCREEN LENGTH/DEPTH: 10' 5-15' TEST NO.: 2

STATIC WATER LEVEL (Depth/Elevation): 8.09 DATE: 10-18-01

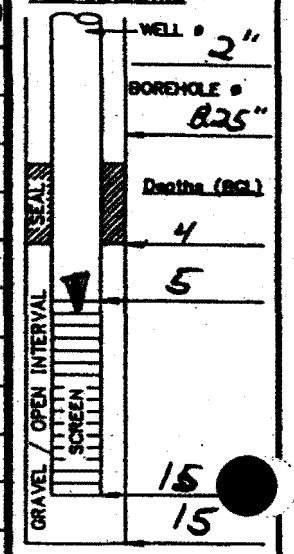
TEST TYPE (Rising/Falling/Constant Head): FALLING CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: SLUG PAGE 1 OF 1

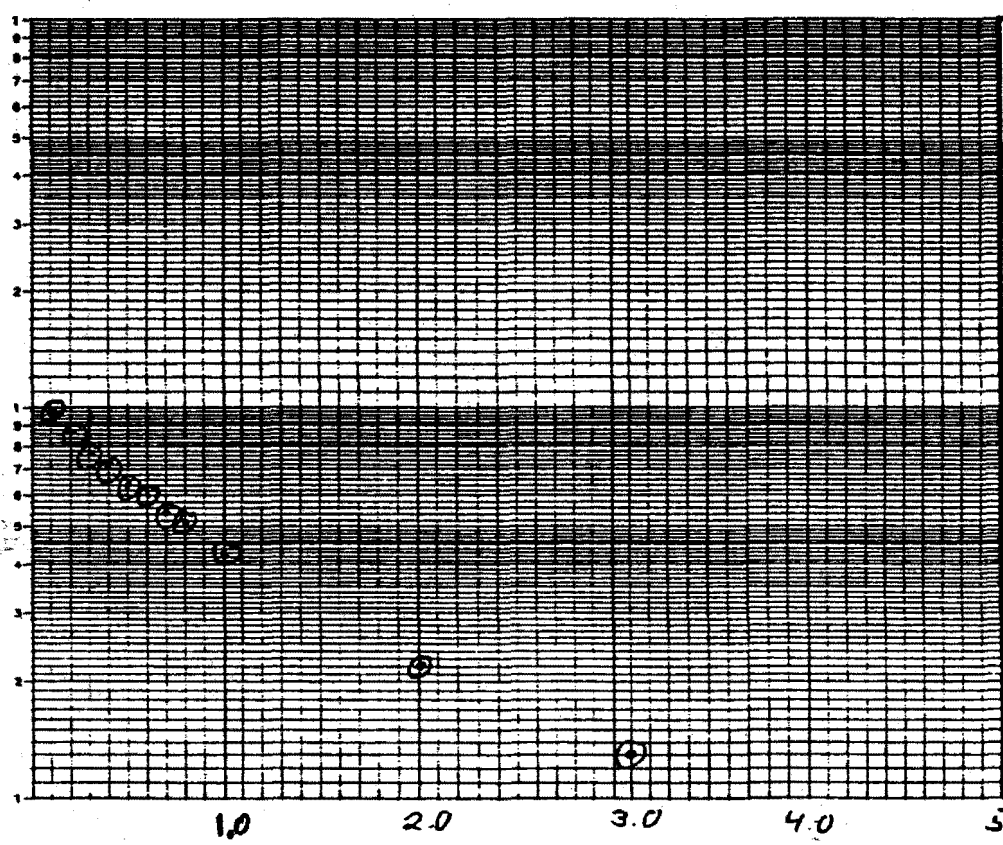
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TROLL 4000

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.01	3.172		2.0	0.22	
0.02	0.62		3.1	0.13	
0.09	1.00		4.1	0.09	
0.1	0.99		5.2	0.06	
0.2	0.87				
0.31	0.78				
0.41	0.71				
0.52	0.64				
0.62	0.61				
0.72	0.56				
0.82	0.52				
1.0	0.44				

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

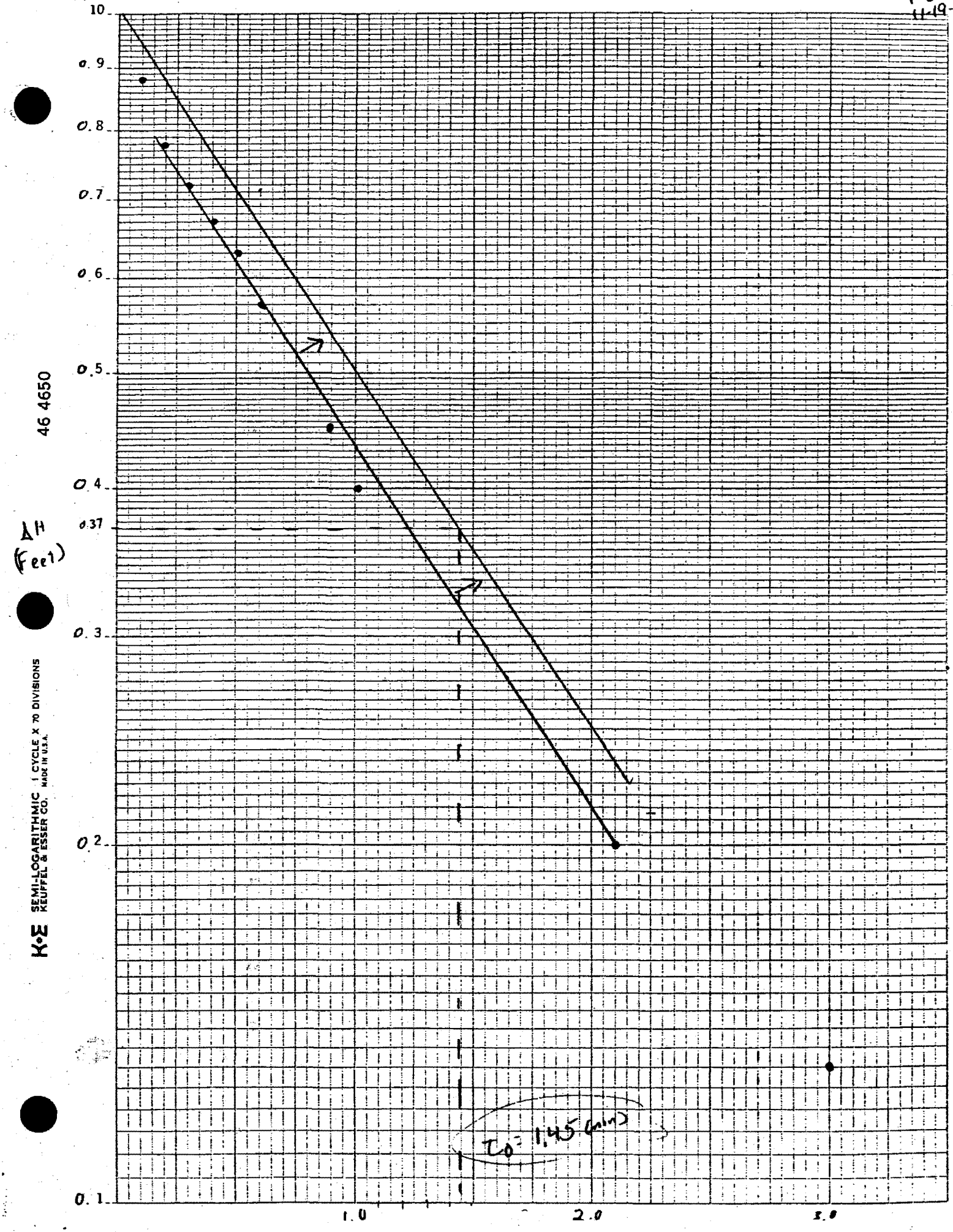
TD = 18.01

9.71

CALCS, SKETCH MAPS, ETC.:

17MW025 FALLING

FWR 11-19-01



In-Situ Inc. Troll

Report generated: 11/14/01 8:48:39
Report from file: A:\SN10364 2001-10-18 085853 test-17mw02-f.bin
DataMgr Version 3.68

Serial number: 10364
Firmware Version 7.1
Unit name: 17sg04

Test name: test/17mw02-f

Test defined on: 10/18/01 8:56:03
Test started on: 10/18/01 8:58:53
Test stopped on: N/A N/A
Test extracted on: 10/18/01 9:03:20

Data gathered using Logarithmic testing
Maximum time between data points: 10.00 Minutes.
Number of data samples: 103

TOTAL DATA SAMPLES 103

Channel number [1]
Measurement type: Temperature
Channel name: OnBoard Temp

Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 30 PSI.
Specific gravity: 1
Mode: Surface
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 9.753 Feet H2O

Date	Time	ET (min)	Chan[1] Celsius	Chan[2] Feet H2O
10/18/01	8:58	0	19.61	0
10/18/01	8:58	0.005	19.61	0.734
10/18/01	8:58	0.01	19.62	3.172
10/18/01	8:58	0.015	19.62	3.033
10/18/01	8:58	0.02	19.62	0.623
10/18/01	8:58	0.025	19.64	0.418
10/18/01	8:58	0.03	19.64	0.807
10/18/01	8:58	0.035	19.64	1.402
10/18/01	8:58	0.04	19.64	1.269
10/18/01	8:58	0.045	19.65	0.833

10/18/01 8:58	0.05	19.65	0.897		
10/18/01 8:58	0.055	19.65	1.119		
10/18/01 8:58	0.06	19.66	1.096		
10/18/01 8:58	0.065	19.66	0.971		
10/18/01 8:58	0.07	19.66	0.971		
10/18/01 8:58	0.075	19.66	1.045		
10/18/01 8:58	0.08	19.66	1.054		
10/18/01 8:58	0.085	19.66	0.985		
10/18/01 8:58	0.09	19.66	0.985		
10/18/01 8:58	0.095	19.68	1.008	0	
10/18/01 8:58	0.1	19.68	0.994		
10/18/01 8:58	0.1058	19.68	0.985		
10/18/01 8:58	0.112	19.68	0.971		
10/18/01 8:59	0.1185	19.68	0.971		
10/18/01 8:59	0.1255	19.68	0.966		
10/18/01 8:59	0.1328	19.68	0.962		
10/18/01 8:59	0.1407	19.69	0.953		
10/18/01 8:59	0.149	19.7	0.943		
10/18/01 8:59	0.1578	19.7	0.925		
10/18/01 8:59	0.1672	19.71	0.925		
10/18/01 8:59	0.177	19.71	0.916		
10/18/01 8:59	0.1875	19.71	0.897		
10/18/01 8:59	0.1985	19.71	0.888	0.1	0.88
10/18/01 8:59	0.2102	19.73	0.874		
10/18/01 8:59	0.2227	19.73	0.865		
10/18/01 8:59	0.2358	19.74	0.851		
10/18/01 8:59	0.2498	19.73	0.828		
10/18/01 8:59	0.2647	19.73	0.814		
10/18/01 8:59	0.2803	19.74	0.805		
10/18/01 8:59	0.297	19.74	0.791	0.2	0.78
10/18/01 8:59	0.3147	19.74	0.782		
10/18/01 8:59	0.3333	19.74	0.777		
10/18/01 8:59	0.3532	19.74	0.759		
10/18/01 8:59	0.3742	19.75	0.74		
10/18/01 8:59	0.3963	19.75	0.731	0.3	0.72
10/18/01 8:59	0.4198	19.74	0.717		
10/18/01 8:59	0.4447	19.75	0.706		
10/18/01 8:59	0.4697	19.75	0.692		
10/18/01 8:59	0.4963	19.75	0.674	0.4	0.67
10/18/01 8:59	0.5247	19.75	0.646		
10/18/01 8:59	0.5547	19.75	0.641		
10/18/01 8:59	0.5863	19.74	0.641	0.5	0.63
10/18/01 8:59	0.6213	19.75	0.614		
10/18/01 8:59	0.658	19.75	0.595		
10/18/01 8:59	0.6963	19.74	0.577	0.6	0.57
10/18/01 8:59	0.738	19.74	0.563		
10/18/01 8:59	0.7813	19.74	0.54		
10/18/01 8:59	0.828	19.75	0.521		
10/18/01 8:59	0.8763	19.74	0.503		
10/18/01 8:59	0.928	19.74	0.484		
10/18/01 8:59	0.983	19.75	0.461	0.9	0.45
10/18/01 8:59	1.0413	19.74	0.443		

10/18/01 8:59	1.103	19.74	0.429		
10/18/01 9:00	1.168	19.74	0.406	1.0	0.40
10/18/01 9:00	1.238	19.74	0.394		
10/18/01 9:00	1.3113	19.73	0.376		
10/18/01 9:00	1.3897	19.74	0.353		
10/18/01 9:00	1.473	19.73	0.334		
10/18/01 9:00	1.5613	19.73	0.316		
10/18/01 9:00	1.6547	19.73	0.293		
10/18/01 9:00	1.753	19.73	0.274		
10/18/01 9:00	1.858	19.72	0.261		
10/18/01 9:00	1.968	19.73	0.242		
10/18/01 9:00	2.0847	19.73	0.224		
10/18/01 9:01	2.2097	19.72	0.205	2.1	0.20
10/18/01 9:01	2.3413	19.72	0.196		
10/18/01 9:01	2.4813	19.72	0.182		
10/18/01 9:01	2.6297	19.71	0.164		
10/18/01 9:01	2.7863	19.71	0.155		
10/18/01 9:01	2.953	19.71	0.145		
10/18/01 9:02	3.1297	19.71	0.131	3.0	0.13
10/18/01 9:02	3.3163	19.7	0.118		
10/18/01 9:02	3.5147	19.7	0.113		
10/18/01 9:02	3.7247	19.7	0.106		
10/18/01 9:02	3.9463	19.7	0.092		
10/18/01 9:03	4.1813	19.7	0.092		
10/18/01 9:03	4.4297	19.72	0.074		
10/18/01 9:03	4.693	19.74	0.074		
10/18/01 9:03	4.973	19.73	0.065		
10/18/01 9:04	5.2697	19.71	0.065		
10/18/01 9:04	5.583	19.71	0.055		
10/18/01 9:04	5.9147	19.7	0.051		
10/18/01 9:05	6.2663	19.7	0.046		
10/18/01 9:05	6.6397	19.69	0.042		
10/18/01 9:05	7.0347	19.68	0.037		
10/18/01 9:06	7.453	19.68	0.032		
10/18/01 9:06	7.8963	19.68	0.028		
10/18/01 9:07	8.3663	19.68	0.028		
10/18/01 9:07	8.8647	19.68	0.023		
10/18/01 9:08	9.3913	19.68	0.014		
10/18/01 9:08	9.9497	19.68	0.014		
10/18/01 9:09	10.5413	19.69	0.014		
10/18/01 9:10	11.168	19.7	0.009		

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT NWS CHARLESTON	JOB NUMBER 0528
SUBJECT 17MW025 RISING HEAD SLUG TEST	
BASED ON HVORSLEV	DRAWING NUMBER
BY FCW / CHECKED BY SWR 11-19-01	APPROVED BY / DATE 11-15-01

$$K = \frac{r^2 \ln(L/R)}{2L\,T_0}$$

K = HYDRAULIC CONDUCTIVITY
r = RADIUS OF WELL CASING — r = 0.083 Feet
R = RADIUS OF WELL SCREEN — R = 0.083 Feet
L = LENGTH OF WELL SCREEN — L = 9.92 Feet
T_0 = TIME FOR WATER LEVEL TO RISE OR FALL 37% OF INTIAL CHANGE — T_0 = 3.9 min

$$\frac{(0.083)^2 \ln(9.92/0.083)}{2(9.92)(3.9)} = \frac{0.033}{77.38} = 4.25 \times 10^{-4} \text{ Ft/min}$$

$$4.25 \times 10^{-4} \text{ Ft/min} \times 1440 \text{ min/day} = 6.13 \times 10^{-1} \text{ Ft/day}$$

$$6.13 \times 10^{-1} \text{ Ft/day} \times 3.528 \times 10^{-4} \text{ cm/sec} = 2.16 \times 10^{-4} \text{ cm/sec}$$

NOTE: R=r SANDPACK + AQUIFER ARE SIMILAR

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: NWS CHARLESTON WELL/BORING NO.: 17MW02S

PROJECT NO.: 0528 GEOLOGIST: WUDKWYCH

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10' 5'-15' TEST NO.: 3

STATIC WATER LEVEL (Depth/Elevation): 8.09 DATE: 10-18-01

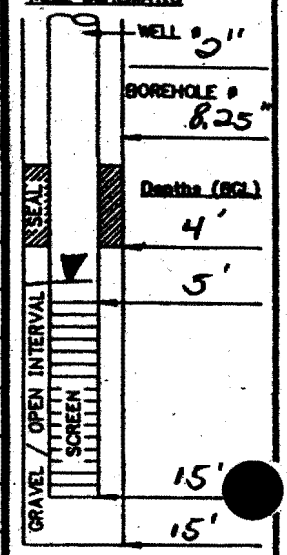
TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: SLUG PAGE 1 OF 1

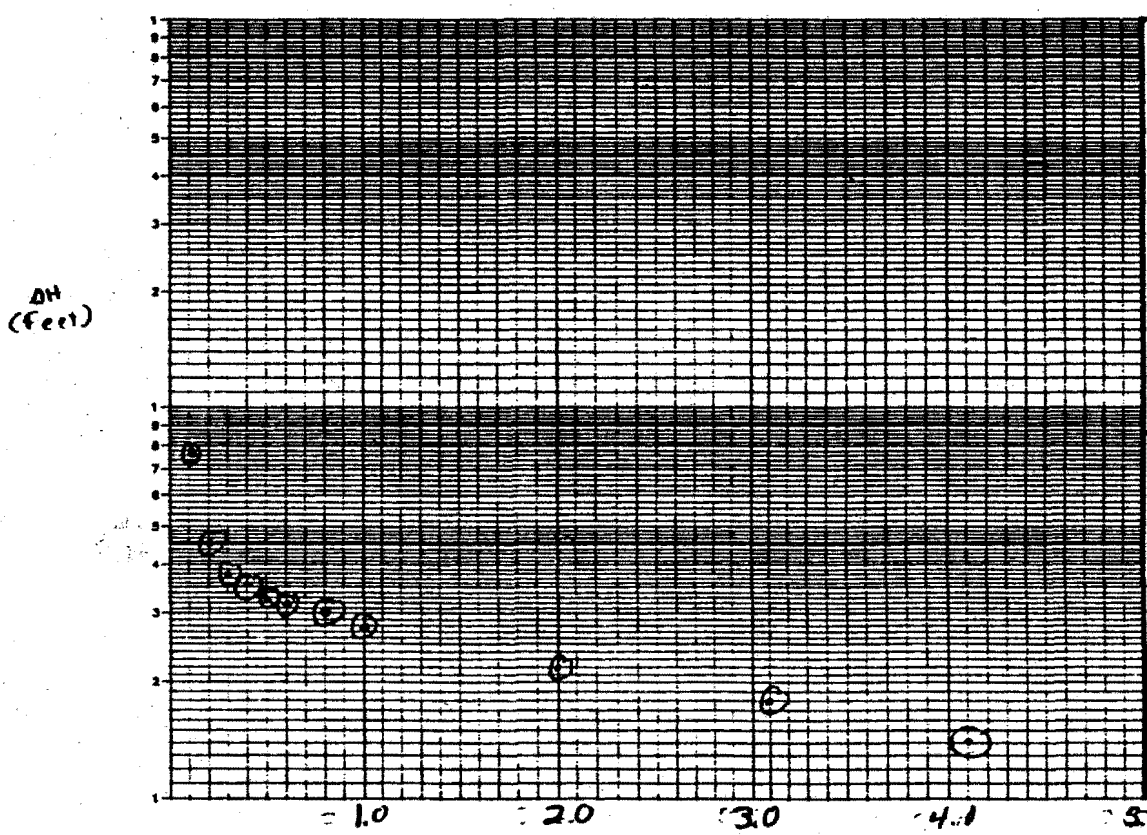
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TROLL 4000

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.02	1.31		2.0	0.22	
0.04	1.06		3.1	0.181	
0.06	1.01		4.1	0.14	
0.08	0.94		5.2	0.12	
0.1	0.78				
0.21	0.45				
0.31	0.38				
0.41	0.36				
0.52	0.33				
0.62	0.32				
0.82	0.30				
1.0	0.28				

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



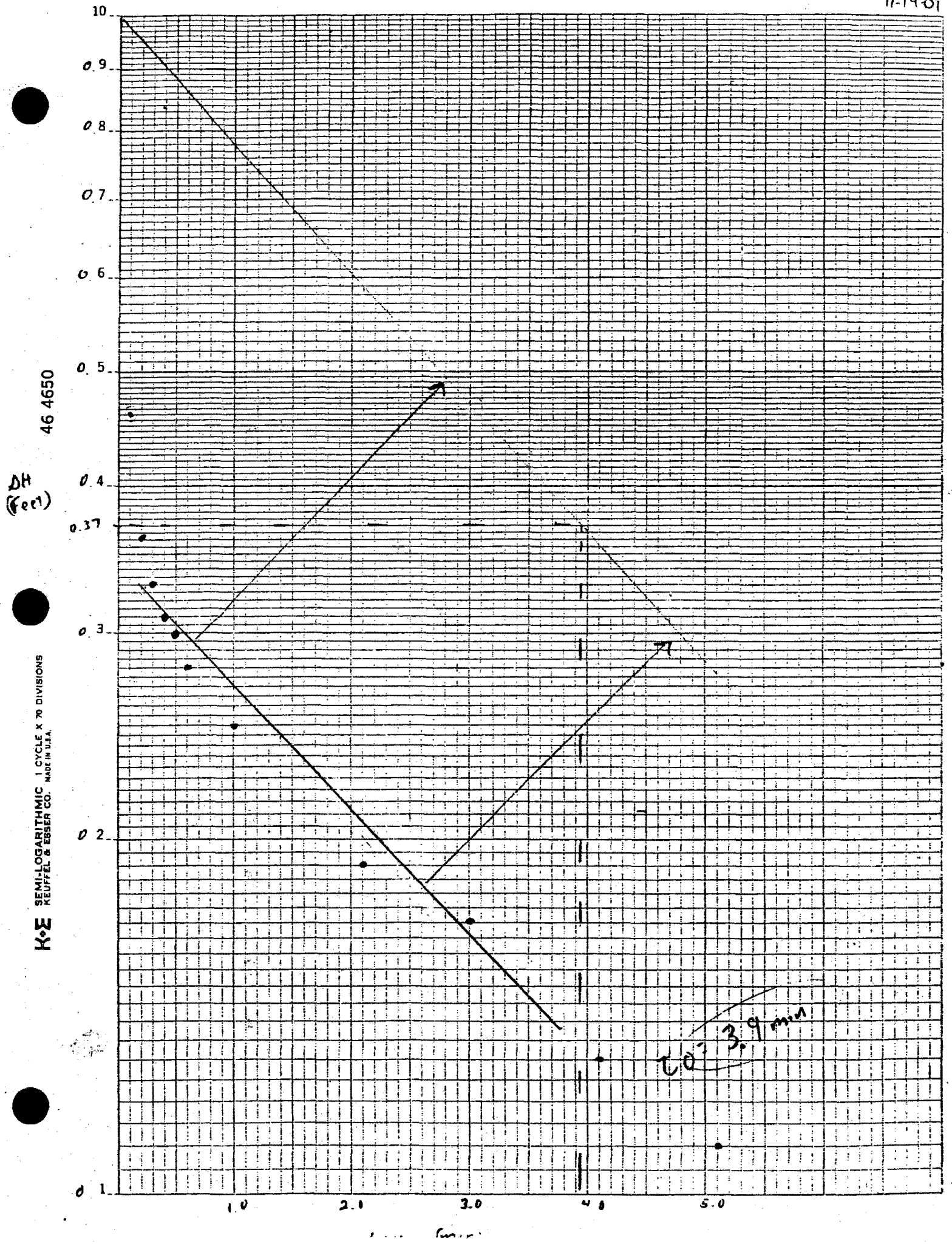
REMARKS:

TO = 18.01

CALCS, SKETCH MAPS, ETC.:

17MW025 RISING

11-14-01



In-Situ Inc. Troll

Report generated: 11/14/01 8:54:41
Report from file: A:\SN10364 2001-10-18 091849 test3-17mw02-r.bin
DataMgr Version 3.68

Serial number: 10364
Firmware Version 7.1
Unit name: 17sg04

Test name: test3/17mw02-r

Test defined on: 10/18/01 9:15:50
Test started on: 10/18/01 9:18:49
Test stopped on: N/A N/A
Test extracted on: 10/18/01 9:20:12

Data gathered using Logarithmic testing
aximum time between data points: 10.0 Minutes.
Number of data samples: 107

TOTAL DATA SAMPLES 107

Channel number [1]
Measurement type: Temperature
Channel name: OnBoard Temp

Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 30 PSI.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 9.739 Feet H2O

Date	Time	ET (min)	Chan[1] Celsius	Chan[2] Feet H2O
10/18/01	9:18	0	19.77	0
10/18/01	9:18	0.005	19.78	0.152
10/18/01	9:18	0.01	19.79	4.36
10/18/01	9:18	0.015	19.79	1.566
10/18/01	9:18	0.02	19.79	1.319
10/18/01	9:18	0.025	19.8	1.887
10/18/01	9:18	0.03	19.8	1.133
10/18/01	9:18	0.035	19.8	1.663
10/18/01	9:18	0.04	19.81	1.063
10/18/01	9:18	0.045	19.81	1.449

10/18/01 9:18	0.05	19.82	1.04		
10/18/01 9:18	0.055	19.82	1.31		
10/18/01 9:18	0.06	19.82	1.017		
10/18/01 9:18	0.065	19.82	1.16		
10/18/01 9:18	0.07	19.82	0.99		
10/18/01 9:18	0.075	19.83	1.105	0	100
10/18/01 9:18	0.08	19.83	0.941		
10/18/01 9:18	0.085	19.83	0.932		
10/18/01 9:18	0.09	19.84	0.835		
10/18/01 9:18	0.095	19.84	0.872	0.02	0.79
10/18/01 9:18	0.1	19.84	0.789		
10/18/01 9:18	0.1058	19.84	0.757		
10/18/01 9:18	0.112	19.85	0.757		
10/18/01 9:18	0.1185	19.85	0.697	0.04	0.67
10/18/01 9:18	0.1255	19.85	0.692		
10/18/01 9:18	0.1328	19.85	0.616		
10/18/01 9:18	0.1407	19.86	0.602	0.06	0.54
10/18/01 9:18	0.149	19.86	0.57		
10/18/01 9:18	0.1578	19.87	0.561	0.08	0.51
10/18/01 9:18	0.1672	19.87	0.533		
10/18/01 9:18	0.177	19.87	0.51	0.1	0.46
10/18/01 9:19	0.1875	19.89	0.491		
10/18/01 9:19	0.1985	19.89	0.473		
10/18/01 9:19	0.2102	19.89	0.454		
10/18/01 9:19	0.2227	19.89	0.445		
10/18/01 9:19	0.2358	19.9	0.431		
10/18/01 9:19	0.2498	19.9	0.418		
10/18/01 9:19	0.2647	19.9	0.408	0.2	0.40
10/18/01 9:19	0.2803	19.9	0.399	0.2	0.36
10/18/01 9:19	0.297	19.91	0.394		
10/18/01 9:19	0.3147	19.91	0.388		
10/18/01 9:19	0.3333	19.92	0.383		
10/18/01 9:19	0.3532	19.92	0.374		
10/18/01 9:19	0.3742	19.92	0.369	0.3	0.33
10/18/01 9:19	0.3963	19.92	0.364		
10/18/01 9:19	0.4198	19.92	0.36		
10/18/01 9:19	0.4447	19.92	0.351		
10/18/01 9:19	0.4697	19.92	0.346	0.4	0.31
10/18/01 9:19	0.4963	19.92	0.341		
10/18/01 9:19	0.5247	19.92	0.337		
10/18/01 9:19	0.5547	19.92	0.337		
10/18/01 9:19	0.5863	19.92	0.328	0.51	0.30
10/18/01 9:19	0.6213	19.92	0.328		
10/18/01 9:19	0.658	19.91	0.318		
10/18/01 9:19	0.6963	19.91	0.314	0.62	0.28
10/18/01 9:19	0.738	19.91	0.314		
10/18/01 9:19	0.7813	19.91	0.309		
10/18/01 9:19	0.828	19.91	0.304		
10/18/01 9:19	0.8763	19.91	0.3		
10/18/01 9:19	0.928	19.9	0.291		
10/18/01 9:19	0.983	19.9	0.286		
10/18/01 9:19	1.0413	19.9	0.286		

10/18/01 9:19	1.103	19.9	0.281		
10/18/01 9:19	1.168	19.9	0.277	1.0	0.25
10/18/01 9:20	1.238	19.9	0.272		
10/18/01 9:20	1.3113	19.9	0.268		
10/18/01 9:20	1.3897	19.93	0.258		
10/18/01 9:20	1.473	19.96	0.258		
10/18/01 9:20	1.5613	19.95	0.249		
10/18/01 9:20	1.6547	19.93	0.245		
10/18/01 9:20	1.753	19.93	0.24		
10/18/01 9:20	1.858	19.92	0.235		
10/18/01 9:20	1.968	19.92	0.226		
10/18/01 9:20	2.0847	19.92	0.221		
10/18/01 9:21	2.2097	19.91	0.217	2.1	0.19
10/18/01 9:21	2.3413	19.9	0.212		
10/18/01 9:21	2.4813	19.9	0.208		
10/18/01 9:21	2.6297	19.9	0.203		
10/18/01 9:21	2.7863	19.89	0.194		
10/18/01 9:21	2.953	19.89	0.189		
10/18/01 9:21	3.1297	19.88	0.189	3.0	0.17
10/18/01 9:22	3.3163	19.88	0.18		
10/18/01 9:22	3.5147	19.88	0.171		
10/18/01 9:22	3.7247	19.87	0.166		
10/18/01 9:22	3.9463	19.89	0.161		
10/18/01 9:22	4.1813	19.89	0.148	4.1	0.13
10/18/01 9:23	4.4297	19.88	0.143		
10/18/01 9:23	4.693	19.87	0.138		
10/18/01 9:23	4.973	19.87	0.134		
10/18/01 9:24	5.2697	19.86	0.129	5.1	0.11
10/18/01 9:24	5.583	19.86	0.115		
10/18/01 9:24	5.9147	19.85	0.115		
10/18/01 9:25	6.2663	19.85	0.106		
10/18/01 9:25	6.6397	19.85	0.101		
10/18/01 9:25	7.0347	19.84	0.097		
10/18/01 9:26	7.453	19.84	0.083		
10/18/01 9:26	7.8963	19.85	0.069		
10/18/01 9:27	8.3663	19.85	0.06		
10/18/01 9:27	8.8647	19.84	0.055		
10/18/01 9:28	9.3913	19.84	0.046		
10/18/01 9:28	9.9497	19.83	0.042		
10/18/01 9:29	10.5413	19.83	0.042		
10/18/01 9:29	11.168	19.82	0.032		
10/18/01 9:30	11.8313	19.82	0.028		
10/18/01 9:31	12.5347	19.82	0.023		
10/18/01 9:32	13.2797	19.82	0.018		
10/18/01 9:32	14.0697	19.82	0.018		

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT NWS CHARLESTON	JOB NUMBER 0528
SUBJECT 17MW03 RISING HEAD SLUG TEST REDO	
BASED ON HVORSLEV	DRAWING NUMBER
BY FCW / CHECKED BY SLR 11-19-01	APPROVED BY / DATE 11-15-01

$$K = \frac{r^2 \ln(L/R)}{2L\,T_0}$$

K = HYDRAULIC CONDUCTIVITY

r = RADIUS OF WELL CASING — r = 0.083 Feet

R = RADIUS OF WELL SCREEN — R = 0.083 Feet

L = LENGTH OF WELL SCREEN — L = 8.91 Feet

T_0 = TIME FOR WATER LEVEL TO RISE OR FALL 37% OF INTIAL CHANGE — T_0 = 1.0 min

$$\frac{(0.083)^2 \ln(8.91/0.083)}{2(8.91)(1.0)} = \frac{0.032}{17.82} = 1.81 \times 10^{-3} \text{ Ft/min}$$

$$1.81 \times 10^{-3} \text{ Ft/min} \times 1440 \text{ min/day} = 2.60 \text{ Ft/day}$$

$$2.60 \text{ Ft/day} \times 3.528 \times 10^{-4} \text{ cm/sec} = 9.18 \times 10^{-4} \text{ cm/sec}$$

NOTE: R = r SANDPACK + AQUIFER ARE SIMILAR

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: NWS CHARLESTON WELL/BORING NO.: 17MW03

PROJECT NO.: 0528 GEOLOGIST: WUORWYCH

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10' 5'-15' TEST NO.: 3

STATIC WATER LEVEL (Depth/Elevation): 9.40 DATE: 10-18-01

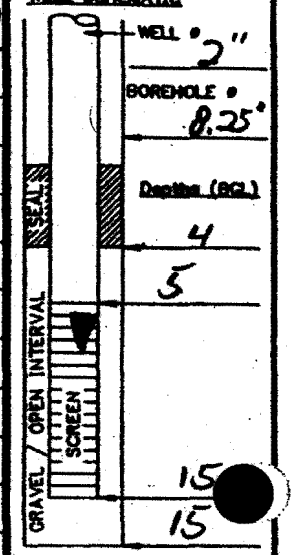
TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

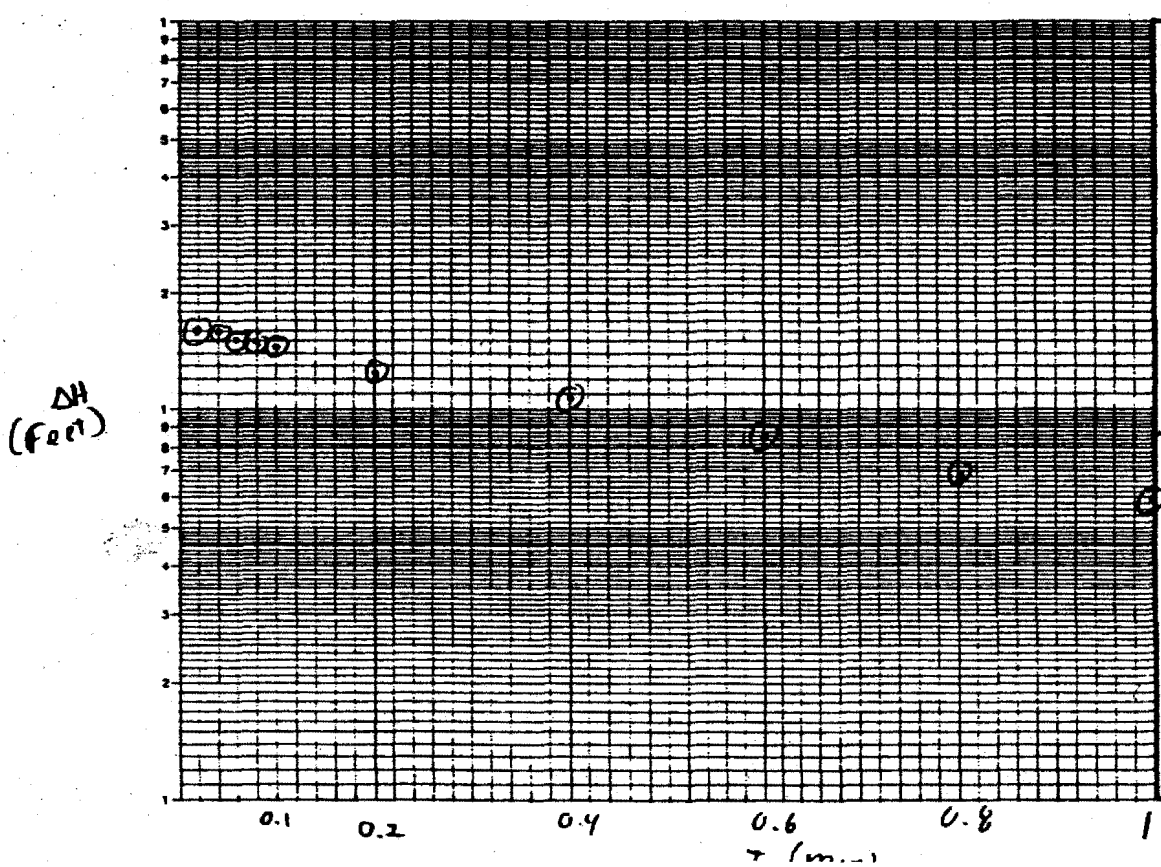
METHOD OF INDUCING WATER LEVEL CHANGE: SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TROLL 4000

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.02	1.62		1.0	0.54	
0.04	1.61		2.0	0.22	
0.06	1.56		3.1	0.12	
0.08	1.52		4.1	0.09	
0.1	1.47				
0.2	1.29				
0.3	1.15				
0.4	1.04				
0.5	0.93				
0.6	0.85				
0.7	0.76				
0.8	0.69				

WELL SCHEMATIC





REMARKS:

10-18.31

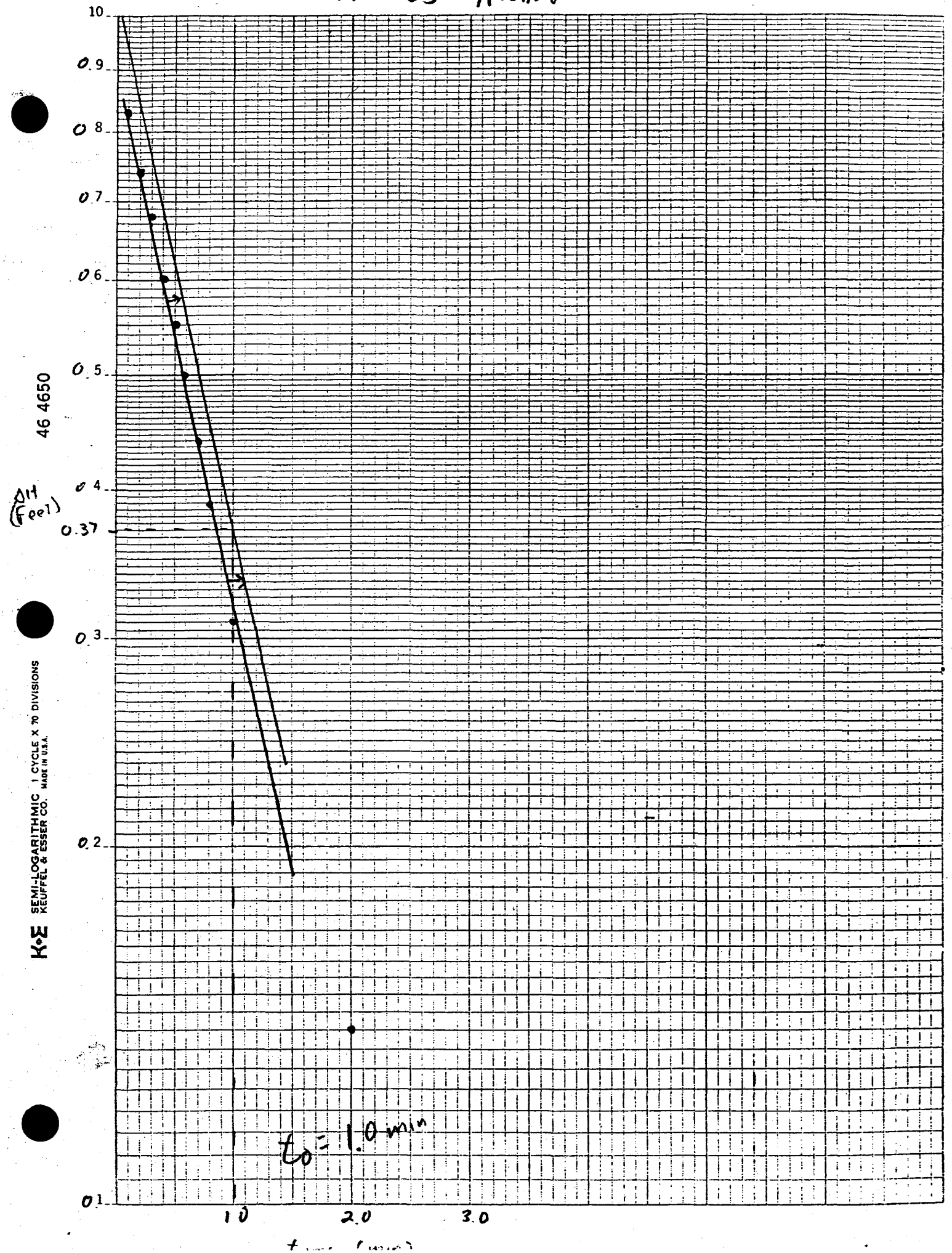
8.60

REDO

CALCS, SKETCH MAPS, ETC.:

17MW03 RISING

V 11-19-01



In-Situ Inc. Troll

Report generated: 11/14/01 9:04:23
Report from file: A:\SN11908 2001-10-18 105450 test3-17mw03-r2.bin
DataMgr Version 3.68

Serial number: 11908
Firmware Version 7.1
Unit name: 17mw03

Test name: test3/17mw03-r2

Test defined on: 10/18/01 10:33:54
Test started on: 10/18/01 10:54:50
Test stopped on: N/A N/A
Test extracted on: 10/18/01 10:57:10

Data gathered using Logarithmic testing
Maximum time between data points: 10.000 Minutes.
Number of data samples: 102

TOTAL DATA SAMPLES 102

Channel number [1]
Measurement type: Temperature
Channel name: OnBoard Temp

Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 30 PSI.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 8.636 Feet H2O

Date	Time	ET (min)	Chan[1] Celsius	Chan[2] Feet H2O
10/18/01	10:54	0	22.34	0
10/18/01	10:54	0.005	22.34	4.835
10/18/01	10:54	0.01	22.36	1.345
10/18/01	10:54	0.015	22.36	1.675
10/18/01	10:54	0.02	22.36	1.629
10/18/01	10:54	0.025	22.37	1.656
10/18/01	10:54	0.03	22.37	1.605
10/18/01	10:54	0.035	22.37	1.601
10/18/01	10:54	0.04	22.37	1.619
10/18/01	10:54	0.045	22.38	1.615

10/18/01 10:54	0.05	22.39	1.652	0	100
10/18/01 10:54	0.055	22.39	1.573		
10/18/01 10:54	0.06	22.39	1.569		
10/18/01 10:54	0.065	22.39	1.557		
10/18/01 10:54	0.07	22.39	1.548	0.02	0.94
10/18/01 10:54	0.075	22.39	1.534		
10/18/01 10:54	0.08	22.4	1.525		
10/18/01 10:54	0.085	22.4	1.511		
10/18/01 10:54	0.09	22.4	1.506		
10/18/01 10:54	0.095	22.41	1.488		
10/18/01 10:54	0.1	22.41	1.479		
10/18/01 10:54	0.1058	22.41	1.469		
10/18/01 10:54	0.112	22.42	1.456		
10/18/01 10:54	0.1185	22.43	1.446		
10/18/01 10:54	0.1255	22.43	1.437		
10/18/01 10:54	0.1328	22.44	1.419		
10/18/01 10:54	0.1407	22.44	1.409		
10/18/01 10:54	0.149	22.44	1.396		
10/18/01 10:54	0.1578	22.44	1.375	0.1	0.83
10/18/01 10:55	0.1672	22.45	1.366		
10/18/01 10:55	0.177	22.45	1.342		
10/18/01 10:55	0.1875	22.46	1.329		
10/18/01 10:55	0.1985	22.46	1.31		
10/18/01 10:55	0.2102	22.47	1.292		
10/18/01 10:55	0.2227	22.48	1.269		
10/18/01 10:55	0.2358	22.48	1.255		
10/18/01 10:55	0.2498	22.49	1.227	0.2	0.74
10/18/01 10:55	0.2647	22.49	1.213		
10/18/01 10:55	0.2803	22.49	1.193		
10/18/01 10:55	0.297	22.49	1.183		
10/18/01 10:55	0.3147	22.49	1.156		
10/18/01 10:55	0.3333	22.49	1.142		
10/18/01 10:55	0.3532	22.49	1.119	0.3	0.68
10/18/01 10:55	0.3742	22.49	1.096		
10/18/01 10:55	0.3963	22.5	1.073		
10/18/01 10:55	0.4198	22.5	1.045		
10/18/01 10:55	0.4447	22.5	1.013		
10/18/01 10:55	0.4697	22.5	0.99	0.4	0.60
10/18/01 10:55	0.4963	22.5	0.96		
10/18/01 10:55	0.5247	22.5	0.932		
10/18/01 10:55	0.5547	22.5	0.909	0.5	0.55
10/18/01 10:55	0.5863	22.5	0.89		
10/18/01 10:55	0.6213	22.5	0.858		
10/18/01 10:55	0.658	22.5	0.83	0.6	0.50
10/18/01 10:55	0.6963	22.5	0.793		
10/18/01 10:55	0.738	22.5	0.764		
10/18/01 10:55	0.7813	22.5	0.727	0.72	0.44
10/18/01 10:55	0.828	22.5	0.69		
10/18/01 10:55	0.8763	22.5	0.653	0.80	0.39
10/18/01 10:55	0.928	22.5	0.616		
10/18/01 10:55	0.983	22.5	0.579		
10/18/01 10:55	1.0413	22.5	0.549		

10/18/01 10:55	1.103	22.5	0.517	- 1.0	0.31
10/18/01 10:56	1.168	22.5	0.489		
10/18/01 10:56	1.238	22.5	0.457		
10/18/01 10:56	1.3113	22.5	0.429		
10/18/01 10:56	1.3897	22.5	0.397		
10/18/01 10:56	1.473	22.5	0.36		
10/18/01 10:56	1.5613	22.5	0.334		
10/18/01 10:56	1.6547	22.5	0.307		
10/18/01 10:56	1.753	22.5	0.279		
10/18/01 10:56	1.858	22.49	0.256		
10/18/01 10:56	1.968	22.5	0.228		
10/18/01 10:56	2.0847	22.5	0.228	- 2.0	0.14
10/18/01 10:57	2.2097	22.49	0.21		
10/18/01 10:57	2.3413	22.53	0.196		
10/18/01 10:57	2.4813	22.54	0.173		
10/18/01 10:57	2.6297	22.53	0.159		
10/18/01 10:57	2.7863	22.52	0.141		
10/18/01 10:57	2.953	22.52	0.136		
10/18/01 10:57	3.1297	22.52	0.125	- 3.0	0.07
10/18/01 10:58	3.3163	22.51	0.12		
10/18/01 10:58	3.5147	22.51	0.111		
10/18/01 10:58	3.7247	22.51	0.106		
10/18/01 10:58	3.9463	22.5	0.097		
10/18/01 10:59	4.1813	22.5	0.097		
10/18/01 10:59	4.4297	22.5	0.092		
10/18/01 10:59	4.693	22.53	0.092		
10/18/01 10:59	4.973	22.51	0.083		
10/18/01 11:00	5.2697	22.51	0.078		
10/18/01 11:00	5.583	22.5	0.074		
10/18/01 11:00	5.9147	22.49	0.069		
10/18/01 11:01	6.2663	22.49	0.069		
10/18/01 11:01	6.6397	22.48	0.065		
10/18/01 11:01	7.0347	22.47	0.06		
10/18/01 11:02	7.453	22.46	0.06		
10/18/01 11:02	7.8963	22.46	0.055		
10/18/01 11:03	8.3663	22.48	0.055		
10/18/01 11:03	8.8647	22.46	0.055		
10/18/01 11:04	9.3913	22.45	0.051		
10/18/01 11:04	9.9497	22.44	0.051		
10/18/01 11:05	10.5413	22.43	0.051		

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT NWS CHARLESTON		JOB NUMBER 0528	
SUBJECT 17MW04S FALLING HEAD SLUG TEST			
BASED ON HVORSLEV		DRAWING NUMBER	
BY FCW	CHECKED BY [illegible] 11-9-01	APPROVED BY	DATE 11-15-01

$$K = \frac{r^2 \ln(L/R)}{2L\,T_0}$$

K = HYDRAULIC CONDUCTIVITY

r = RADIUS OF WELL CASING — r = 0.083 Feet

R = RADIUS OF WELL SCREEN — R = 0.083 Feet

L = LENGTH OF WELL SCREEN — L = 10 Feet

T_0 = TIME FOR WATER LEVEL TO RISE OR FALL 37% OF INTIAL CHANGE — T_0 = 1.3 min

$$\frac{(0.083)^2 \ln(10/0.083)}{2(10)(1.3)} = \frac{0.033}{26} = 1.27 \times 10^{-3} \text{ ft/min}$$

$$1.27 \times 10^{-3} \text{ ft/min} \times 1440 \text{ min/day} = 1.83 \text{ ft/day}$$

$$1.83 \text{ ft/day} \times 3.528 \times 10^{-4} \text{ cm/sec} = 6.45 \times 10^{-4} \text{ cm/sec}$$

NOTE: R = r SANDPACK AND AQUIFER ARE SIMILAR

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: NWS CHARLESTON WELL/BORING NO.: 17MW045

PROJECT NO.: 0528 GEOLOGIST: W.W. OKWUH

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10 5'-15' TEST NO.: 2

STATIC WATER LEVEL (Depth/Elevation): 6.88' DATE: 10-18-01

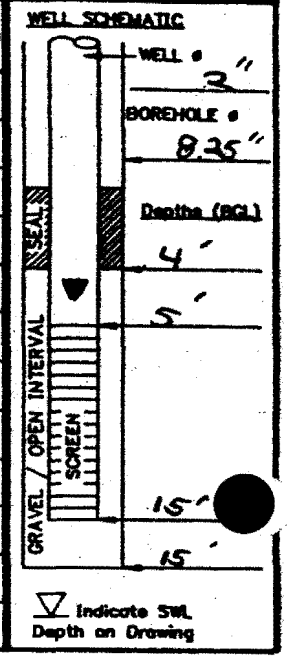
TEST TYPE (Rising/Falling/Constant Head): FALLING CHECKED:

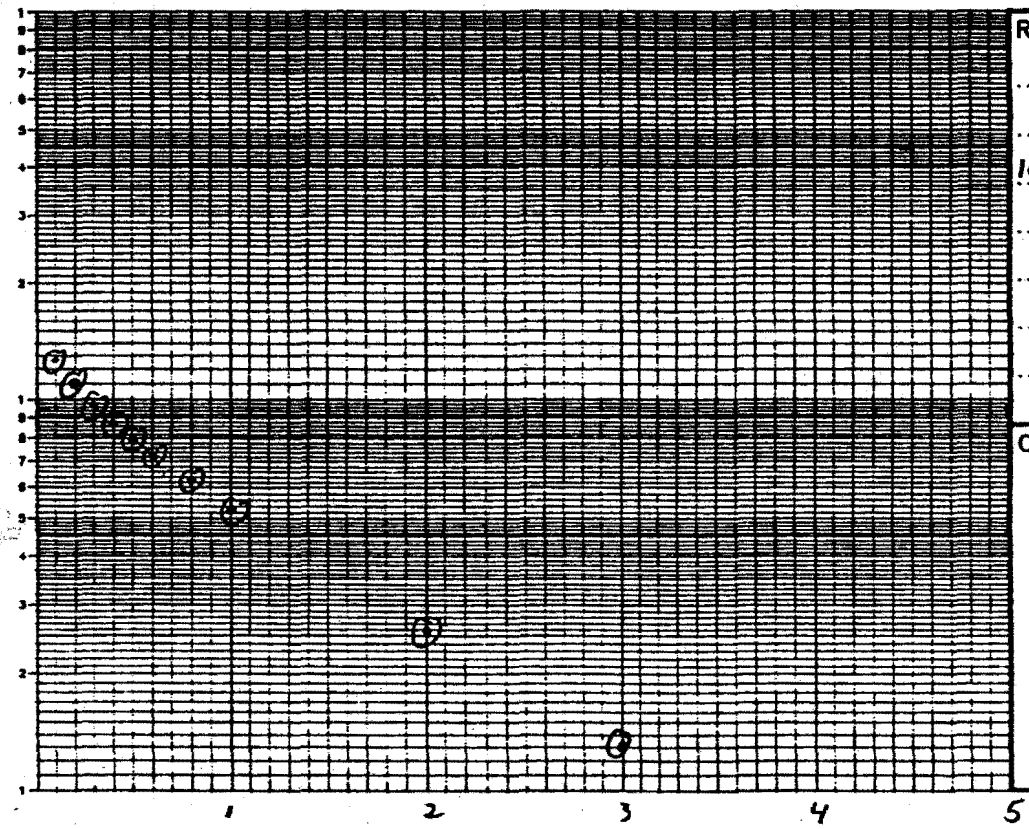
METHOD OF INDUCING WATER LEVEL CHANGE: SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TROLL 4000

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.025	1.51		2.0	0.263	
0.045	1.71		3.1	0.13	
0.065	1.431		4.1	0.076	
0.085	1.32		5.2	0.04	
0.10	1.25				
0.20	1.10				
0.31	0.97				
0.41	0.88				
0.52	0.80				
0.62	0.73				
0.82	0.63				
1.0	0.53				

WELL SCHEMATIC





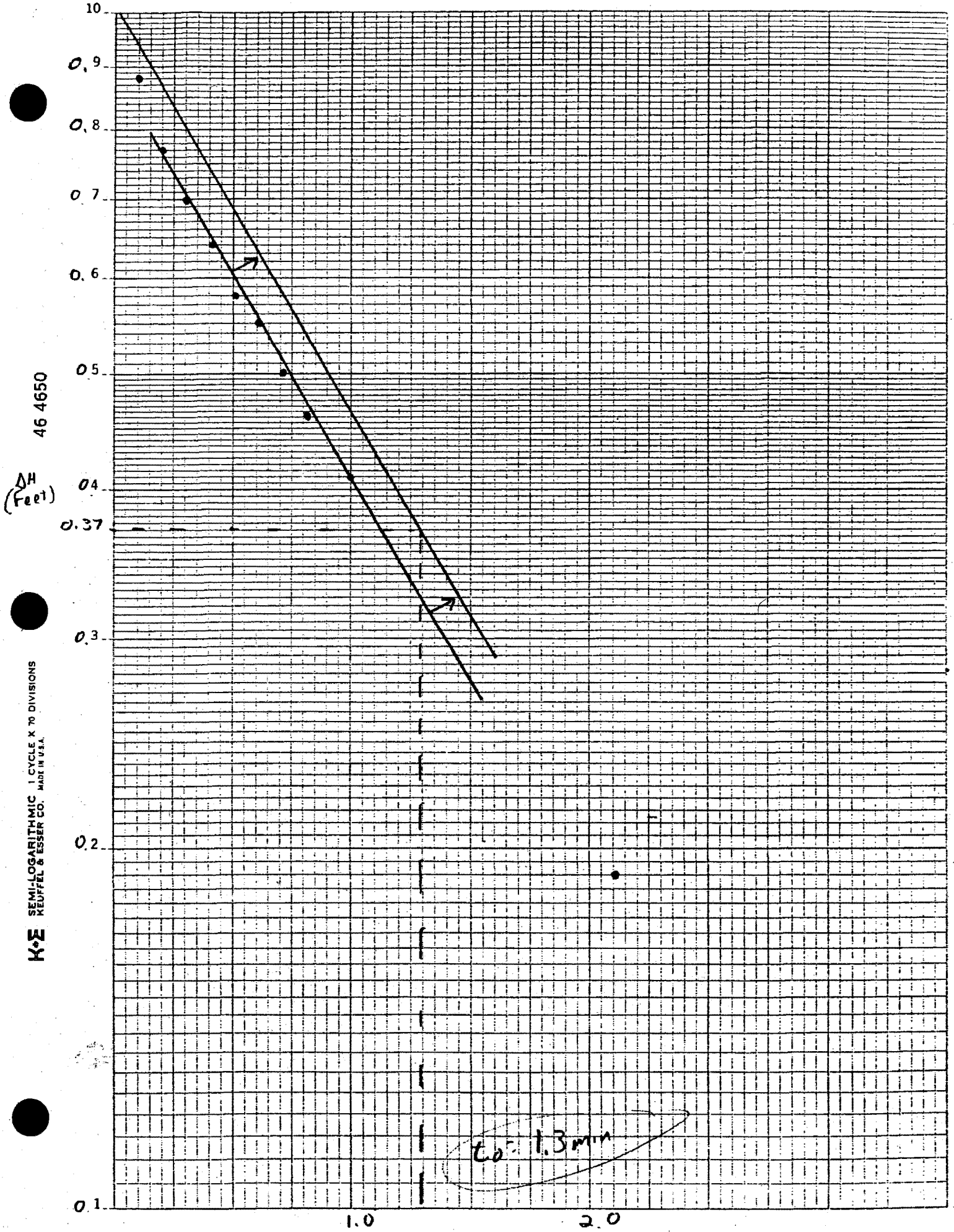
REMARKS:

TD=18.05

10.88

CALCS, SKETCH MAPS, ETC.:

17MW04S FALLING



In-Situ Inc. Troll

Report generated: 11/14/01 9:53:58
Report from file: A:\SN12974 2001-10-18 080650 test2-17mw04.bin
DataMgr Version 3.68

Serial number: 12974
Firmware Version 7.1
Unit name: 16mw03

Test name: test2/17mw04

Test defined on: 10/18/01 8:03:51
Test started on: 10/18/01 8:06:50
Test stopped on: N/A N/A
Test extracted on: 10/18/01 8:11:47

Data gathered using Logarithmic testing
Maximum time between data points:10 Minutes.
Number of data samples: 108

TOTAL DATA SAMPLES 108

Channel number [1]
Measurement type: Temperature
Channel name: OnBoard Temp

Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 30 PSI.
Specific gravity: 1
Mode: Surface
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 10.885 Feet H2O

Date	Time	ET (min)	Chan[1] Celsius	Chan[2] Feet H2O
10/18/01	8:06	0	20.27	0
10/18/01	8:06	0.005	20.28	0
10/18/01	8:06	0.01	20.28	0.844
10/18/01	8:06	0.015	20.29	3.017
10/18/01	8:06	0.02	20.3	2.939
10/18/01	8:06	0.025	20.3	1.515
10/18/01	8:06	0.03	20.3	1.05
10/18/01	8:06	0.035	20.31	0.775
10/18/01	8:06	0.04	20.31	1.509
10/18/01	8:06	0.045	20.31	1.712

10/18/01 8:06	0.05	20.31	1.379		
10/18/01 8:06	0.055	20.31	1.107		
10/18/01 8:06	0.06	20.31	1.289		
10/18/01 8:06	0.065	20.31	1.43		
10/18/01 8:06	0.07	20.31	1.322		
10/18/01 8:06	0.075	20.32	1.229		
10/18/01 8:06	0.08	20.32	1.285		
10/18/01 8:06	0.085	20.33	1.326		
10/18/01 8:06	0.09	20.33	1.276		
10/18/01 8:06	0.095	20.33	1.248		
10/18/01 8:06	0.1	20.33	1.257		1.00
10/18/01 8:06	0.1058	20.33	1.262		
10/18/01 8:06	0.112	20.34	1.243		
10/18/01 8:06	0.1185	20.34	1.225		
10/18/01 8:06	0.1255	20.34	1.225		
10/18/01 8:06	0.1328	20.35	1.22		
10/18/01 8:06	0.1407	20.35	1.199		
10/18/01 8:06	0.149	20.36	1.19		
10/18/01 8:06	0.1578	20.36	1.176		
10/18/01 8:07	0.1672	20.36	1.163		
10/18/01 8:07	0.177	20.37	1.149		
10/18/01 8:07	0.1875	20.37	1.135		
10/18/01 8:07	0.1985	20.38	1.112		
10/18/01 8:07	0.2102	20.39	1.103	0.1	0.88
10/18/01 8:07	0.2227	20.39	1.08		
10/18/01 8:07	0.2358	20.4	1.066		
10/18/01 8:07	0.2498	20.4	1.038		
10/18/01 8:07	0.2647	20.4	1.022		
10/18/01 8:07	0.2803	20.41	1.003		
10/18/01 8:07	0.297	20.41	0.99		
10/18/01 8:07	0.3147	20.42	0.971	0.2	0.77
10/18/01 8:07	0.3333	20.42	0.957		
10/18/01 8:07	0.3532	20.42	0.934		
10/18/01 8:07	0.3742	20.42	0.916		
10/18/01 8:07	0.3963	20.43	0.902		
10/18/01 8:07	0.4198	20.43	0.879	0.3	0.70
10/18/01 8:07	0.4447	20.43	0.863		
10/18/01 8:07	0.4697	20.43	0.844		
10/18/01 8:07	0.4963	20.43	0.821		
10/18/01 8:07	0.5247	20.43	0.807	0.42	0.64
10/18/01 8:07	0.5547	20.43	0.784		
10/18/01 8:07	0.5863	20.42	0.761		
10/18/01 8:07	0.6213	20.43	0.734	0.52	0.58
10/18/01 8:07	0.658	20.43	0.722		
10/18/01 8:07	0.6963	20.43	0.699	0.6	0.55
10/18/01 8:07	0.738	20.42	0.676		
10/18/01 8:07	0.7813	20.43	0.653		
10/18/01 8:07	0.828	20.43	0.63	0.72	0.50
10/18/01 8:07	0.8763	20.42	0.607		
10/18/01 8:07	0.928	20.42	0.584	0.82	0.46
10/18/01 8:07	0.983	20.42	0.558		
10/18/01 8:07	1.0413	20.42	0.535		

10/18/01 8:07	1.103	20.42	0.512	1.0	0.41
10/18/01 8:08	1.168	20.42	0.484		
10/18/01 8:08	1.238	20.42	0.461		
10/18/01 8:08	1.3113	20.42	0.438		
10/18/01 8:08	1.3897	20.41	0.418		
10/18/01 8:08	1.473	20.41	0.39		
10/18/01 8:08	1.5613	20.41	0.371		
10/18/01 8:08	1.6547	20.41	0.344		
10/18/01 8:08	1.753	20.4	0.325		
10/18/01 8:08	1.858	20.4	0.302		
10/18/01 8:08	1.968	20.4	0.281		
10/18/01 8:08	2.0847	20.4	0.263		
10/18/01 8:09	2.2097	20.4	0.24	2.1	0.19
10/18/01 8:09	2.3413	20.4	0.221		
10/18/01 8:09	2.4813	20.4	0.203		
10/18/01 8:09	2.6297	20.4	0.18		
10/18/01 8:09	2.7863	20.4	0.166		
10/18/01 8:09	2.953	20.4	0.152		
10/18/01 8:09	3.1297	20.4	0.136		
10/18/01 8:10	3.3163	20.4	0.122		
10/18/01 8:10	3.5147	20.4	0.113		
10/18/01 8:10	3.7247	20.4	0.099		
10/18/01 8:10	3.9463	20.4	0.09		
10/18/01 8:11	4.1813	20.39	0.076		
10/18/01 8:11	4.4297	20.39	0.067		
10/18/01 8:11	4.693	20.39	0.062		
10/18/01 8:11	4.973	20.45	0.053		
10/18/01 8:12	5.2697	20.43	0.044		
10/18/01 8:12	5.583	20.42	0.039		
10/18/01 8:12	5.9147	20.41	0.035		
10/18/01 8:13	6.2663	20.4	0.03		
10/18/01 8:13	6.6397	20.39	0.025		
10/18/01 8:13	7.0347	20.38	0.021		
10/18/01 8:14	7.453	20.38	0.016		
10/18/01 8:14	7.8963	20.37	0.016		
10/18/01 8:15	8.3663	20.36	0.014		
10/18/01 8:15	8.8647	20.36	0.009		
10/18/01 8:16	9.3913	20.35	0.014		
10/18/01 8:16	9.9497	20.34	0.009		
10/18/01 8:17	10.5413	20.36	0.005		
10/18/01 8:18	11.168	20.34	0.005		
10/18/01 8:18	11.8313	20.33	0.005		
10/18/01 8:19	12.5347	20.32	0.005		
10/18/01 8:20	13.2797	20.31	0.005		
10/18/01 8:20	14.0697	20.3	0.005		
10/18/01 8:21	14.9063	20.31	0.005		

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT NWS CHARLESTON		JOB NUMBER 0528	
SUBJECT 17MW04S RISING HEAD SLUG TEST			
BASED ON HVORSLEV		DRAWING NUMBER	
BY FCW	CHECKED BY JWR 11-19-01	APPROVED BY	DATE 11-15-01

$$K = \frac{r^2 \ln(L/R)}{2L\,T_0}$$

K = HYDRAULIC CONDUCTIVITY

r = RADIUS OF WELL CASING — r = 0.083 Feet

R = RADIUS OF WELL SCREEN — R = 0.083 Feet

L = LENGTH OF WELL SCREEN — L = 10 Feet

T_0 = TIME FOR WATER LEVEL TO RISE OR FALL 37% OF INTIAL CHANGE — T_0 = 1.22 min

$$\frac{(0.083)^2 \ln(10/0.083)}{2(10)(1.22)} = \frac{0.033}{24.4} = 1.35 \times 10^{-3} \text{ Ft/min}$$

$$1.35 \times 10^{-3} \text{ Ft/min} \times 1440 \text{ min/day} = 1.95 \text{ Ft/day}$$

$$1.95 \text{ Ft/day} \times 3.528 \times 10^{-4} \text{ cm/sec} = 6.87 \times 10^{-4}$$

NOTE: R = r SANDPACK + AQUIFER ARE SIMILAR

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: NWS CHARLESTON WELL/BORING NO.: 174W04

PROJECT NO.: 0528 GEOLOGIST: WUDKWYCH

WELL DIAMETER: 2 SCREEN LENGTH/DEPTH: 10 5'-15' TEST NO.: 3

STATIC WATER LEVEL (Depth/Elevation): 6.88' DATE: 10-18-01

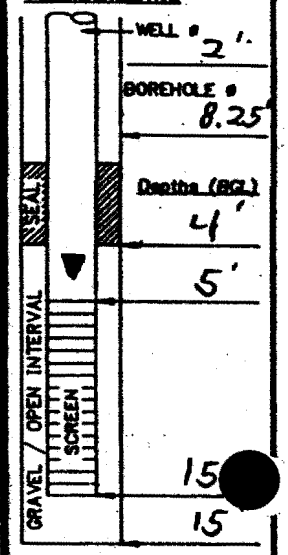
TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: SLUG PAGE ..... OF .....

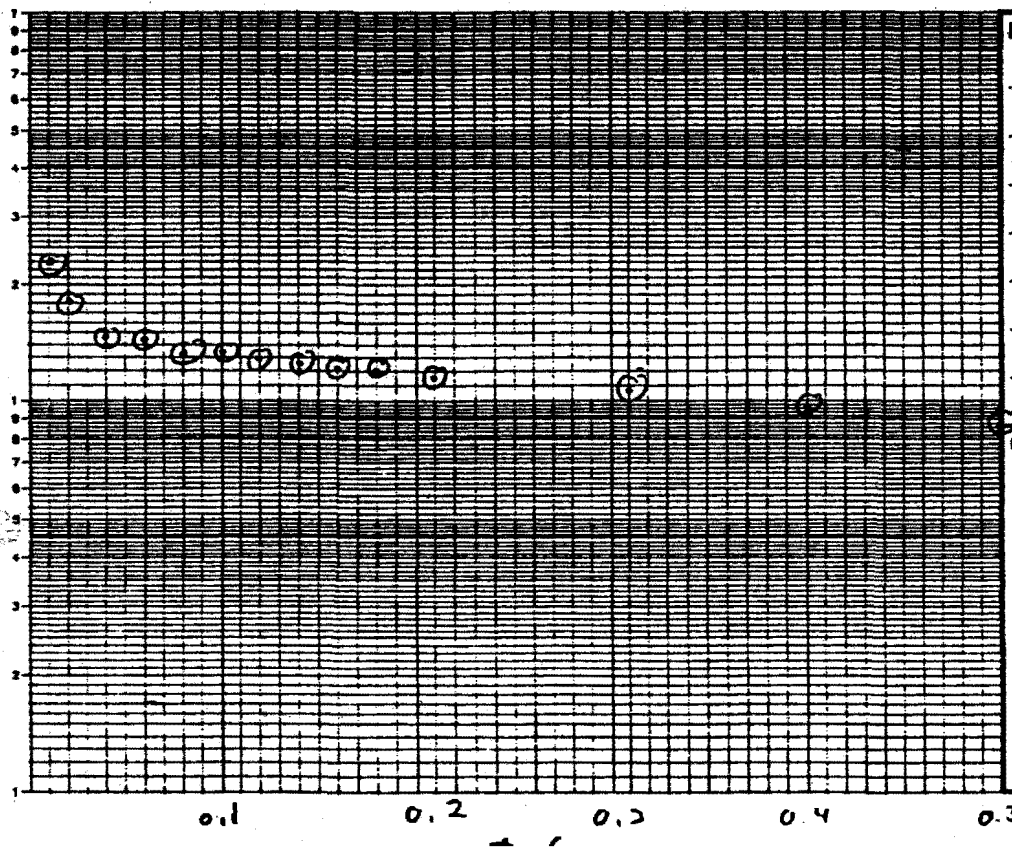
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TROLL 4000

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.01	2.30		0.41	0.96	
0.02	1.83		0.52	0.87	
0.04	1.48		0.62	0.81	
0.06	1.46		0.82	0.68	
0.08	1.39		1.0	0.57	
0.10	1.35		2.0	0.28	
0.12	1.30		3.1	0.15	
0.14	1.26		4.1	0.092	
0.16	1.24				
0.18	1.21				
0.21	1.18				
0.31	1.05				

WELL SCHEMATIC



Indicate SWL Depth on Drawing



REMARKS:

TD = 14.05

10.88

CALCS, SKETCH MAPS, ETC.:

In-Situ Inc. Troll

Report generated: 11/14/01 9:57:28
Report from file: A:\SN12974 2001-10-18 082657 test317mw04-r.bin
DataMgr Version 3.68

Serial number: 12974
Firmware Version 7.1
Unit name: 16mw03

Test name: test317mw04/r

Test defined on: 10/18/01 8:24:59
Test started on: 10/18/01 8:26:57
Test stopped on: N/A N/A
Test extracted on: 10/18/01 8:31:30

Data gathered using Logarithmic testing
Maximum time between data points:10 Minutes.
Number of data samples: 109

TOTAL DATA SAMPLES 109

Channel number [1]
Measurement type: Temperature
Channel name: OnBoard Temp

Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 30 PSI.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 10.89 Feet H2O

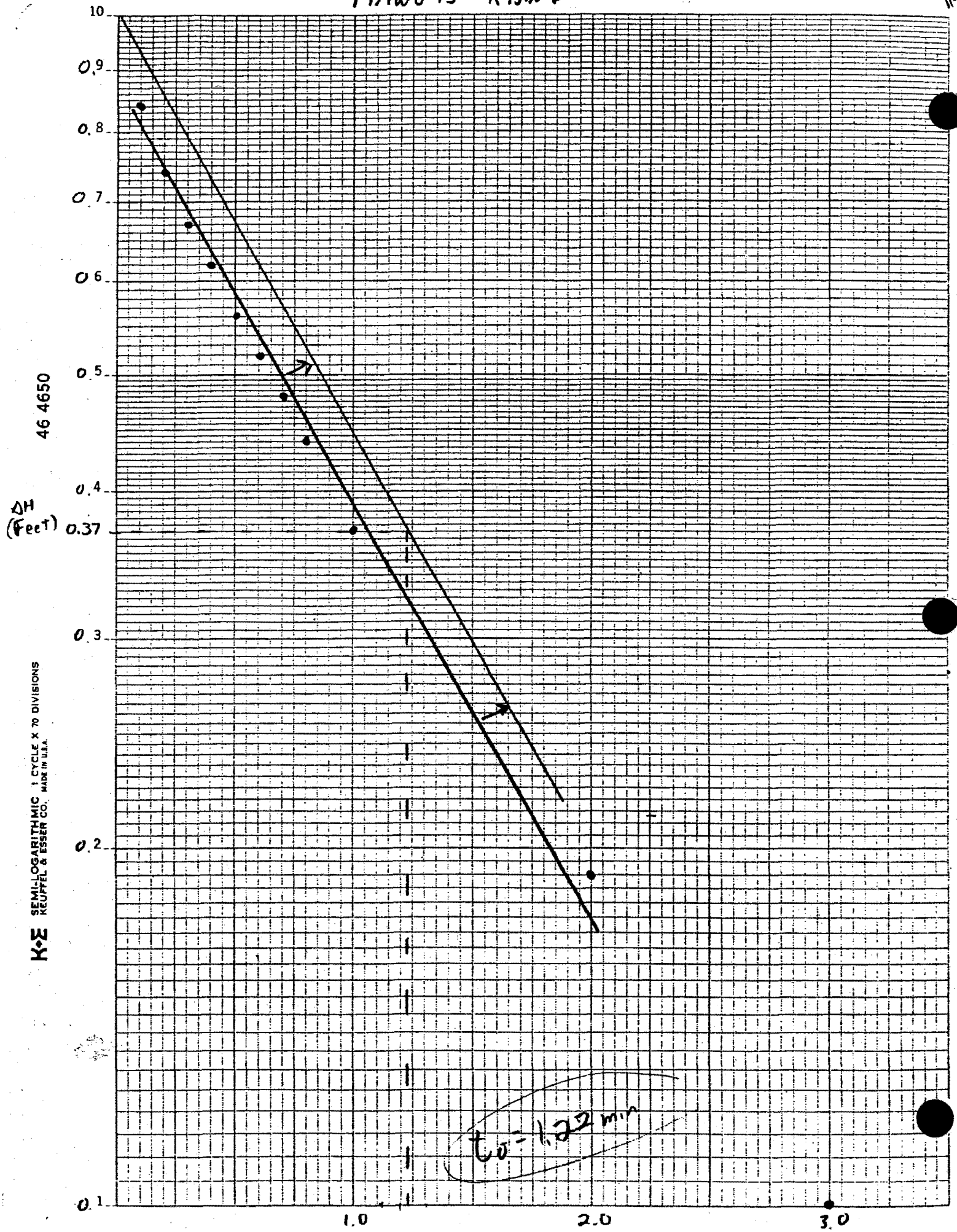
Date	Time	ET (min)	Chan[1] Celsius	Chan[2] Feet H2O
10/18/01	8:26	0	20.33	0
10/18/01	8:26	0.005	20.33	-0.023
10/18/01	8:26	0.01	20.33	3.465
10/18/01	8:26	0.015	20.34	2.302
10/18/01	8:26	0.02	20.34	1.312
10/18/01	8:26	0.025	20.35	1.836
10/18/01	8:26	0.03	20.35	1.518
10/18/01	8:26	0.035	20.35	1.518
10/18/01	8:26	0.04	20.36	1.594
10/18/01	8:26	0.045	20.36	1.481

10/18/01 8:27	0.05	20.36	1.449			
10/18/01 8:27	0.055	20.37	1.589			
10/18/01 8:27	0.06	20.37	1.49	-	0	100
10/18/01 8:27	0.065	20.37	1.462			
10/18/01 8:27	0.07	20.37	1.449			
10/18/01 8:27	0.075	20.38	1.432			
10/18/01 8:27	0.08	20.38	1.409			
10/18/01 8:27	0.085	20.38	1.396			
10/18/01 8:27	0.09	20.39	1.382			
10/18/01 8:27	0.095	20.39	1.368			
10/18/01 8:27	0.1	20.39	1.354			
10/18/01 8:27	0.1058	20.39	1.34			
10/18/01 8:27	0.112	20.4	1.326			
10/18/01 8:27	0.1185	20.4	1.317			
10/18/01 8:27	0.1255	20.4	1.303			
10/18/01 8:27	0.1328	20.4	1.296			
10/18/01 8:27	0.1407	20.41	1.283			
10/18/01 8:27	0.149	20.41	1.269			
10/18/01 8:27	0.1578	20.42	1.259			
10/18/01 8:27	0.1672	20.42	1.246	-	0.1	0.84
10/18/01 8:27	0.177	20.43	1.232			
10/18/01 8:27	0.1875	20.44	1.213			
10/18/01 8:27	0.1985	20.44	1.199			
10/18/01 8:27	0.2102	20.45	1.181			
10/18/01 8:27	0.2227	20.45	1.169			
10/18/01 8:27	0.2358	20.46	1.151			
10/18/01 8:27	0.2498	20.46	1.128			
10/18/01 8:27	0.2647	20.46	1.11	-	0.2	0.74
10/18/01 8:27	0.2803	20.46	1.091			
10/18/01 8:27	0.297	20.46	1.073			
10/18/01 8:27	0.3147	20.46	1.059			
10/18/01 8:27	0.3333	20.47	1.04			
10/18/01 8:27	0.3532	20.47	1.024			
10/18/01 8:27	0.3742	20.48	1.006	-	0.3	0.67
10/18/01 8:27	0.3963	20.48	0.983			
10/18/01 8:27	0.4198	20.48	0.96			
10/18/01 8:27	0.4447	20.49	0.946			
10/18/01 8:27	0.4697	20.49	0.918	-	0.4	0.62
10/18/01 8:27	0.4963	20.49	0.9			
10/18/01 8:27	0.5247	20.49	0.879			
10/18/01 8:27	0.5547	20.49	0.856			
10/18/01 8:27	0.5863	20.48	0.833	-	0.52	0.56
10/18/01 8:27	0.6213	20.47	0.81			
10/18/01 8:27	0.658	20.48	0.782	-	0.6	0.52
10/18/01 8:27	0.6963	20.48	0.759			
10/18/01 8:27	0.738	20.47	0.734			
10/18/01 8:27	0.7813	20.47	0.71	-	0.72	0.48
10/18/01 8:27	0.828	20.47	0.683			
10/18/01 8:27	0.8763	20.47	0.66	-	0.81	0.44
10/18/01 8:27	0.928	20.47	0.632			
10/18/01 8:27	0.983	20.46	0.604			
10/18/01 8:27	1.0413	20.46	0.579			

10/18/01 8:28	1.103	20.46	0.551	-1.0	0.37
10/18/01 8:28	1.168	20.46	0.528		
10/18/01 8:28	1.238	20.46	0.501		
10/18/01 8:28	1.3113	20.46	0.473		
10/18/01 8:28	1.3897	20.46	0.452		
10/18/01 8:28	1.473	20.45	0.424		
10/18/01 8:28	1.5613	20.45	0.397		
10/18/01 8:28	1.6547	20.45	0.369		
10/18/01 8:28	1.753	20.45	0.351		
10/18/01 8:28	1.858	20.45	0.328		
10/18/01 8:28	1.968	20.45	0.307		
10/18/01 8:29	2.0847	20.45	0.284	-2.0	0.19
10/18/01 8:29	2.2097	20.45	0.261		
10/18/01 8:29	2.3413	20.45	0.242		
10/18/01 8:29	2.4813	20.45	0.224		
10/18/01 8:29	2.6297	20.45	0.21		
10/18/01 8:29	2.7863	20.45	0.187		
10/18/01 8:29	2.953	20.45	0.168		
10/18/01 8:30	3.1297	20.45	0.157	-3.0	0.10
10/18/01 8:30	3.3163	20.45	0.138		
10/18/01 8:30	3.5147	20.45	0.129		
10/18/01 8:30	3.7247	20.45	0.115		
10/18/01 8:30	3.9463	20.44	0.106		
10/18/01 8:31	4.1813	20.44	0.092		
10/18/01 8:31	4.4297	20.44	0.088		
10/18/01 8:31	4.693	20.5	0.078		
10/18/01 8:31	4.973	20.48	0.069		
10/18/01 8:32	5.2697	20.47	0.06		
10/18/01 8:32	5.583	20.46	0.055		
10/18/01 8:32	5.9147	20.45	0.051		
10/18/01 8:33	6.2663	20.47	0.042		
10/18/01 8:33	6.6397	20.46	0.042		
10/18/01 8:33	7.0347	20.45	0.037		
10/18/01 8:34	7.453	20.44	0.032		
10/18/01 8:34	7.8963	20.43	0.032		
10/18/01 8:35	8.3663	20.42	0.028		
10/18/01 8:35	8.8647	20.42	0.028		
10/18/01 8:36	9.3913	20.41	0.028		
10/18/01 8:36	9.9497	20.4	0.023		
10/18/01 8:37	10.5413	20.39	0.023		
10/18/01 8:38	11.168	20.39	0.023		
10/18/01 8:38	11.8313	20.38	0.018		
10/18/01 8:39	12.5347	20.37	0.018		
10/18/01 8:40	13.2797	20.37	0.018		
10/18/01 8:41	14.0697	20.36	0.018		
10/18/01 8:41	14.9063	20.36	0.018		
10/18/01 8:42	15.7913	20.35	0.014		

17MW04S RISING

FM 11-19



TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE ____ OF ____

CLIENT: CHARLESTON NWS SOUTH DIV	JOB NUMBER: 05280000.6B0090110
SUBJECT: SLUG TEST, HVORSLEV METHOD	
BASED ON:	DRAWING NUMBER:
BY: FLRAMSER / CHECKED BY: C. Doolan	APPROVED BY: / DATE: 3/22/05

WELL 17MW06D RISING HEAD

1) EQ. $K = \frac{r^2 \cdot \ln(L/R)}{2LT_0}$

where: r = Radius Wellcasing (ft)

R = Effective Radius well screen (ft)

L = Well screen length (ft)

T_0 = 37% DH (min)

2) $L = 5'$, $r = 1'' = 1/12'$, $R = 1'' = 1/12'$

$T_0 = 52$ min

[SANDY AQUIFER $K_{FORM} \sim K_{sandpack}$]

3) SUB. $K = \frac{(1/12)^2 \cdot \ln\left(\frac{5}{1/12}\right)}{2 \cdot 5 \cdot 52}$

$= 5.47 \times 10^{-5}$ ft/min

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW06D
Project No.:	N0528	**Aquifer Type:**	Clayey sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By:
Checked By: CD

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	5 = L
Time for 37% head change (min.) :	52.00 = To

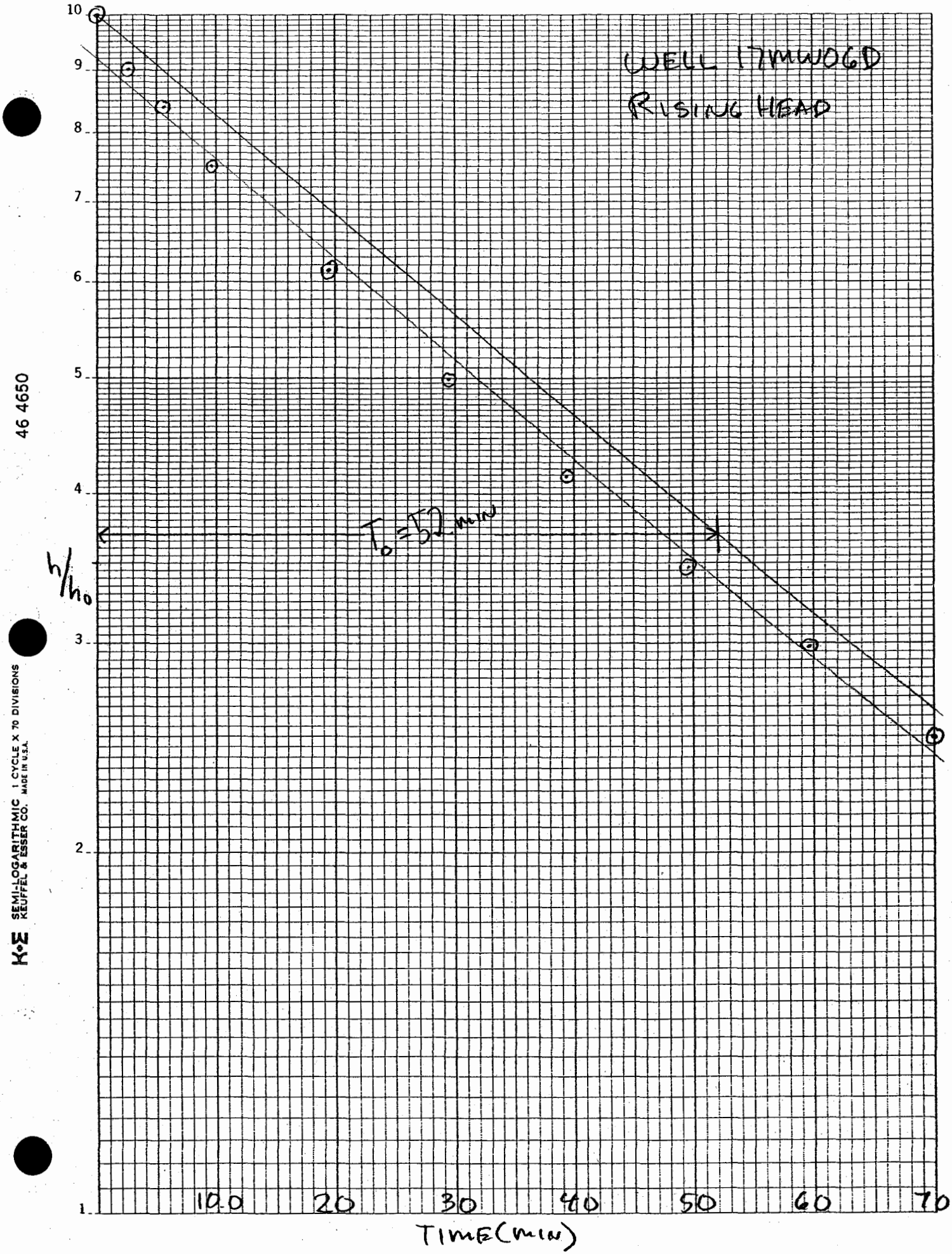
Hydraulic Conductivity (K) :

5.47E-05	ft./min.
9.11E-07	ft./sec.
7.87E-02	ft./day
2.78E-05	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW06D
RISING HEAD
$T_0 = 52$ min
h/h0
10
9
8
7
6
5
4
3
2
1
10.0
20
30
40
50
60
70
TIME (min)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW06D
Project No.:	N0528	**Aquifer Type:**	Clayey sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By:
Checked By: CD

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	5 = L
Time for 37% head change (min.) :	23.60 = To

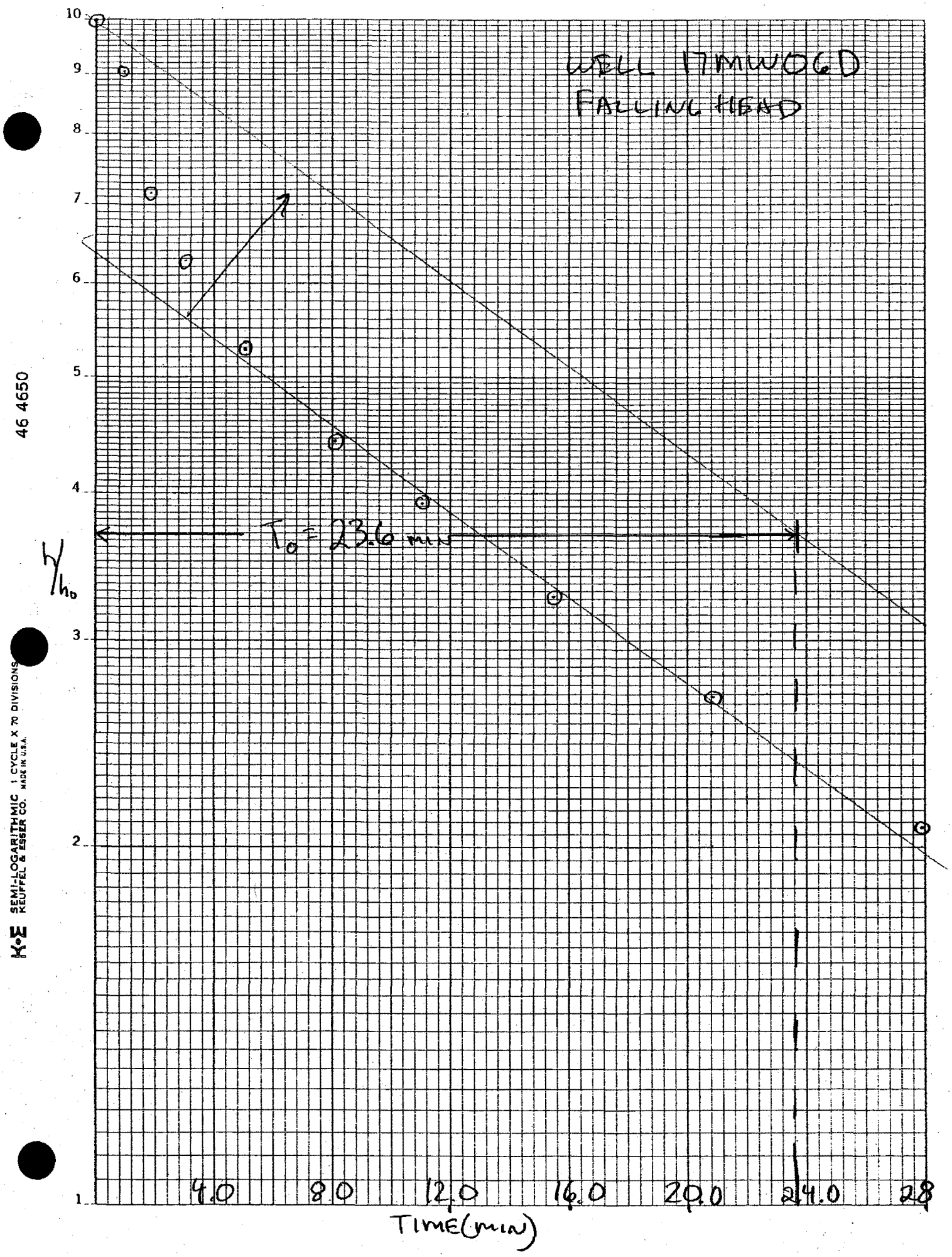
Hydraulic Conductivity (K) :

1.20E-04	ft./min.
2.01E-06	ft./sec.
1.73E-01	ft./day
6.12E-05	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW06D
FALLING HEAD
$T_0 = 23.6$ min
h/h_0
10
9
8
7
6
5
4
3
2
1
4.0
8.0
12.0
16.0
20.0
24.0
28
TIME (min)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: CHARLESTON SWMU 16/17 WELL/BORING NO.: 17MW06D

PROJECT NO.: 0528 GEOLOGIST: FRED WRAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 5', 18-23 TEST NO.: 1+2

STATIC WATER LEVEL (Depth/Elevation): 3.91 DATE: 2-27-05

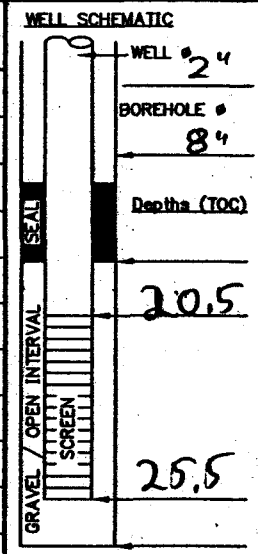
TEST TYPE (Rising/Falling/Constant Head): FALLING + RISING CHECKED: C. Doolan

METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG PAGE ..... OF .....

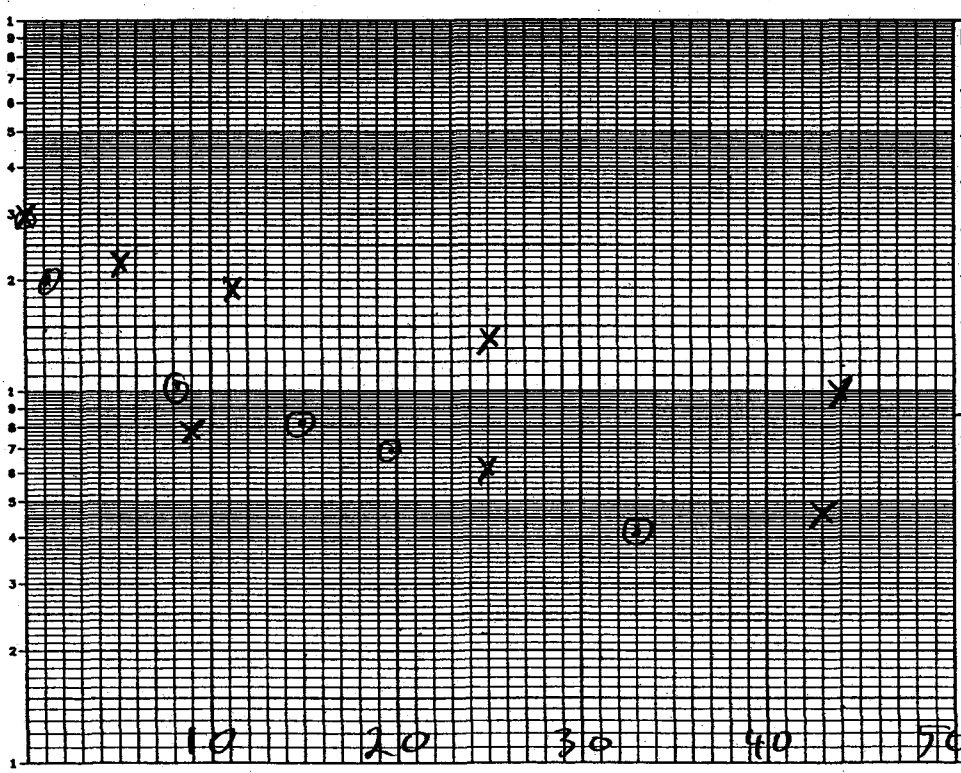
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): .....

← FALLING HEAD →			← RISING HEAD →		
ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.1329		2.919	0.1185		2.918
1.3897		2.047	0.3333		2.599
4.1813		1.396	5.2697		2.229
8.3663		1.068	11.1680		1.937
14.9063		0.814	25.0547		1.452
19.8913		0.676	44.5963		1.009
33.428		0.415	59.4913		0.790
53.0147		0.194	74.9113		0.622
63.0197		0.118	94.3263		0.478
84.0613		0.003			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS: FALLING HEAD:
START: 0842
STOPPED: 1016
RISING HEAD:
START: 1018
STOPPED: 1202
FALLING = ⊙
RISING = X

CALCS, SKETCH MAPS, ETC.:

ACAD: FORM_HYDCONTST.dwg 07/06/99 INL

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 18:02:31
Report from file: ...\SN11262 2005-02-27 101818 17mw06dr.bin
Win-Situ Version 4.5

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw06dr

Test defined on: 2/27/2005 8:41:10
Test started on: 2/27/2005 10:18:18
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data pc Minutes.
Number of data samples: 140

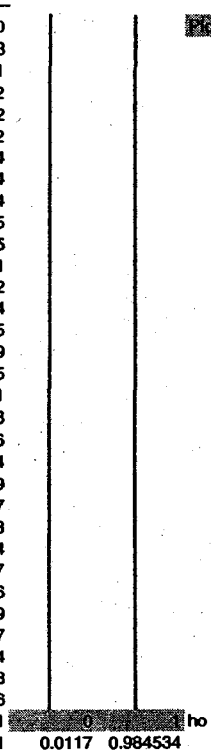
TOTAL DATA SAMPLES 140

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 12.517 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho
2/27/2005	10:18:18	0	64.04	0		
2/27/2005	10:18:19	0.005	64.09	-0.008		
2/27/2005	10:18:19	0.01	64.11	-0.01		
2/27/2005	10:18:19	0.015	64.11	-0.012		
2/27/2005	10:18:20	0.02	64.13	-0.012		
2/27/2005	10:18:20	0.025	64.13	-0.012		
2/27/2005	10:18:20	0.03	64.13	-0.014		
2/27/2005	10:18:20	0.035	64.13	-0.014		
2/27/2005	10:18:21	0.04	64.13	-0.014		
2/27/2005	10:18:21	0.045	64.13	-0.015		
2/27/2005	10:18:21	0.05	64.13	-0.015		
2/27/2005	10:18:22	0.055	64.13	-0.011		
2/27/2005	10:18:22	0.06	64.13	-0.012		
2/27/2005	10:18:22	0.065	64.13	-0.014		
2/27/2005	10:18:23	0.07	64.15	-0.015		
2/27/2005	10:18:23	0.075	64.13	-0.019		
2/27/2005	10:18:23	0.08	64.13	-0.015		
2/27/2005	10:18:23	0.085	64.15	-0.01		
2/27/2005	10:18:24	0.09	64.15	-0.023		
2/27/2005	10:18:24	0.095	64.15	-0.006		
2/27/2005	10:18:24	0.1	64.15	0.274		
2/27/2005	10:18:25	0.1058	64.15	2.449		
2/27/2005	10:18:25	0.112	64.15	4.367		
2/27/2005	10:18:25	0.1185	64.13	2.918		
2/27/2005	10:18:26	0.1255	64.15	2.004		
2/27/2005	10:18:26	0.1328	64.15	3.087		
2/27/2005	10:18:27	0.1407	64.15	2.746		
2/27/2005	10:18:27	0.149	64.15	2.439		
2/27/2005	10:18:28	0.1578	64.15	2.817		
2/27/2005	10:18:28	0.1672	64.13	2.544		
2/27/2005	10:18:29	0.177	64.13	2.688		
2/27/2005	10:18:30	0.1875	64.13	2.6		
2/27/2005	10:18:30	0.1985	64.13	2.651		
2/27/2005	10:18:31	0.2102	64.11	2.61	0.0117	0.984534
2/27/2005	10:18:32	0.2227	64.11	2.627	0.0242	0.990947
2/27/2005	10:18:32	0.2358	64.13	2.619	0.0373	0.987929

Plotted Data



2/27/2005	10:18:33	0.2498	64.13	2.614	0.0513	0.986043
2/27/2005	10:18:34	0.2647	64.13	2.612	0.0662	0.985289
2/27/2005	10:18:35	0.2803	64.13	2.609	0.0818	0.984157
2/27/2005	10:18:36	0.297	64.13	2.606	0.0985	0.983025
2/27/2005	10:18:37	0.3147	64.13	2.602	0.1162	0.981516
2/27/2005	10:18:38	0.3333	64.13	2.599	0.1348	0.980385
2/27/2005	10:18:40	0.3532	64.15	2.596	0.1547	0.979253
2/27/2005	10:18:41	0.3742	64.15	2.594	0.1757	0.978499
2/27/2005	10:18:42	0.3963	64.15	2.591	0.1978	0.977367
2/27/2005	10:18:44	0.4198	64.15	2.588	0.2213	0.976235
2/27/2005	10:18:45	0.4447	64.18	2.586	0.2462	0.975481
2/27/2005	10:18:46	0.4697	64.18	2.582	0.2712	0.973972
2/27/2005	10:18:48	0.4963	64.2	2.577	0.2978	0.972086
2/27/2005	10:18:50	0.5247	64.2	2.575	0.3262	0.971332
2/27/2005	10:18:52	0.5547	64.2	2.571	0.3562	0.969823
2/27/2005	10:18:53	0.5863	64.22	2.566	0.3878	0.967937
2/27/2005	10:18:56	0.6213	64.22	2.562	0.4228	0.966428
2/27/2005	10:18:58	0.658	64.24	2.559	0.4595	0.965296
2/27/2005	10:19:00	0.6963	64.24	2.554	0.4978	0.96341
2/27/2005	10:19:03	0.738	64.27	2.551	0.5395	0.962278
2/27/2005	10:19:05	0.7813	64.27	2.546	0.5828	0.960392
2/27/2005	10:19:08	0.828	64.29	2.542	0.6295	0.958883
2/27/2005	10:19:11	0.8763	64.29	2.536	0.6778	0.95662
2/27/2005	10:19:14	0.928	64.31	2.53	0.7295	0.954357
2/27/2005	10:19:17	0.983	64.31	2.526	0.7845	0.952848
2/27/2005	10:19:21	1.0413	64.33	2.52	0.8428	0.950585
2/27/2005	10:19:24	1.103	64.33	2.515	0.9045	0.948699
2/27/2005	10:19:28	1.168	64.33	2.509	0.9695	0.946435
2/27/2005	10:19:33	1.238	64.36	2.502	1.0395	0.943795
2/27/2005	10:19:37	1.3113	64.36	2.496	1.1128	0.941531
2/27/2005	10:19:42	1.3897	64.38	2.489	1.1912	0.938891
2/27/2005	10:19:47	1.473	64.38	2.482	1.2745	0.93625
2/27/2005	10:19:52	1.5613	64.38	2.475	1.3628	0.93361
2/27/2005	10:19:58	1.6547	64.4	2.466	1.4562	0.930215
2/27/2005	10:20:03	1.753	64.4	2.459	1.5545	0.927575
2/27/2005	10:20:10	1.858	64.42	2.452	1.6595	0.924934
2/27/2005	10:20:16	1.968	64.42	2.443	1.7695	0.921539
2/27/2005	10:20:23	2.0847	64.45	2.435	1.8862	0.918521
2/27/2005	10:20:31	2.2097	64.45	2.425	2.0112	0.914749
2/27/2005	10:20:39	2.3413	64.47	2.415	2.1428	0.910977
2/27/2005	10:20:47	2.4813	64.47	2.406	2.2828	0.907582
2/27/2005	10:20:56	2.6297	64.47	2.395	2.4312	0.903433
2/27/2005	10:21:05	2.7863	64.47	2.384	2.5878	0.899283
2/27/2005	10:21:15	2.953	64.47	2.372	2.7545	0.894757
2/27/2005	10:21:26	3.1297	64.45	2.361	2.9312	0.890607
2/27/2005	10:21:37	3.3163	64.42	2.349	3.1178	0.886081
2/27/2005	10:21:49	3.5147	64.4	2.337	3.3162	0.881554
2/27/2005	10:22:02	3.7247	64.36	2.323	3.5262	0.876273
2/27/2005	10:22:15	3.9463	64.33	2.309	3.7478	0.870992
2/27/2005	10:22:29	4.1813	64.31	2.294	3.9828	0.865334
2/27/2005	10:22:44	4.4297	64.29	2.279	4.2312	0.859676
2/27/2005	10:23:00	4.693	64.29	2.263	4.4945	0.85364
2/27/2005	10:23:17	4.973	64.29	2.246	4.7745	0.847227
2/27/2005	10:23:34	5.2697	64.31	2.229	5.0712	0.840815
2/27/2005	10:23:53	5.583	64.33	2.21	5.3845	0.833648
2/27/2005	10:24:13	5.9147	64.38	2.191	5.7162	0.826481
2/27/2005	10:24:34	6.2663	64.38	2.171	6.0678	0.818936
2/27/2005	10:24:57	6.6397	64.38	2.153	6.4412	0.812146
2/27/2005	10:25:20	7.0347	64.36	2.131	6.8362	0.803848
2/27/2005	10:25:45	7.453	64.31	2.109	7.2545	0.795549
2/27/2005	10:26:12	7.8963	64.29	2.088	7.6978	0.787627
2/27/2005	10:26:40	8.3663	64.33	2.065	8.1678	0.778951
2/27/2005	10:27:10	8.8647	64.4	2.041	8.6662	0.769898
2/27/2005	10:27:42	9.3913	64.4	2.016	9.1928	0.760468
2/27/2005	10:28:15	9.9497	64.42	1.991	9.7512	0.751037
2/27/2005	10:28:51	10.5413	64.4	1.963	10.3428	0.740475
2/27/2005	10:29:28	11.168	64.38	1.937	10.9695	0.730668
2/27/2005	10:30:08	11.8313	64.45	1.909	11.6328	0.720106
2/27/2005	10:30:50	12.5347	64.45	1.879	12.3362	0.708789
2/27/2005	10:31:35	13.2797	64.4	1.849	13.0812	0.697473
2/27/2005	10:32:22	14.0697	64.38	1.818	13.8712	0.685779
2/27/2005	10:33:13	14.9063	64.4	1.786	14.7078	0.673708
2/27/2005	10:34:06	15.7913	64.45	1.753	15.5928	0.66126
2/27/2005	10:35:02	16.7297	64.49	1.717	16.5312	0.64768
2/27/2005	10:36:02	17.723	64.51	1.682	17.5245	0.634478
2/27/2005	10:37:05	18.7763	64.6	1.645	18.5778	0.620521
2/27/2005	10:38:12	19.8913	64.65	1.609	19.6928	0.606941
2/27/2005	10:39:23	21.073	64.63	1.572	20.8745	0.592984
2/27/2005	10:40:38	22.3247	64.58	1.533	22.1262	0.578272

2/27/2005	10:41:57	23.6497	64.6	1.491	23.4512	0.562429
2/27/2005	10:43:22	25.0547	64.58	1.452	24.8562	0.547718
2/27/2005	10:44:51	26.543	64.65	1.409	26.3445	0.531498
2/27/2005	10:46:25	28.118	64.69	1.365	27.9195	0.5149
2/27/2005	10:48:05	29.7863	64.67	1.323	29.5878	0.499057
2/27/2005	10:49:52	31.5547	64.67	1.278	31.3562	0.482082
2/27/2005	10:51:44	33.428	64.69	1.234	33.2295	0.465485
2/27/2005	10:53:43	35.4113	64.65	1.189	35.2128	0.44851
2/27/2005	10:55:49	37.513	64.65	1.143	37.3145	0.431158
2/27/2005	10:58:03	39.7397	64.56	1.099	39.5412	0.414561
2/27/2005	11:00:24	42.098	64.56	1.054	41.8995	0.397586
2/27/2005	11:02:54	44.5963	64.6	1.009	44.3978	0.380611
2/27/2005	11:05:33	47.243	64.51	0.964	47.0445	0.363636
2/27/2005	11:08:21	50.0463	64.42	0.919	49.8478	0.346662
2/27/2005	11:11:19	53.0147	64.42	0.875	52.8162	0.330064
2/27/2005	11:14:28	56.1597	64.42	0.83	55.9612	0.313089
2/27/2005	11:17:48	59.4913	64.45	0.79	59.2928	0.296601
2/27/2005	11:21:19	63.0197	64.6	0.744	62.8212	0.280649
2/27/2005	11:25:04	66.758	64.65	0.701	66.5595	0.264429
2/27/2005	11:29:01	70.718	64.63	0.661	70.5195	0.24934
2/27/2005	11:33:13	74.9113	64.58	0.622	74.7128	0.234628
2/27/2005	11:37:40	79.3547	64.56	0.581	79.1562	0.219163
2/27/2005	11:42:22	84.0613	64.58	0.546	83.8628	0.20596
2/27/2005	11:47:21	89.0463	64.42	0.511	88.8478	0.192757
2/27/2005	11:52:38	94.3263	64.51	0.478	94.1278	0.180309

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 18:00:50
Report from file: ...\SN11262 2005-02-27 084257 17mw06df.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw06df

Test defined on: 2/27/2005 8:37:11
Test started on: 2/27/2005 8:42:57
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data | Minutes.
Number of data samples: 139

TOTAL DATA SAMPLES 139

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 12.549 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/27/2005	8:42:57	0	64.49	0			Protect data
2/27/2005	8:42:58	0.005	64.54	-0.008			
2/27/2005	8:42:58	0.01	64.56	-0.01			
2/27/2005	8:42:58	0.015	64.56	-0.013			
2/27/2005	8:42:59	0.02	64.58	-0.015			
2/27/2005	8:42:59	0.025	64.58	-0.015			
2/27/2005	8:42:59	0.03	64.58	-0.015			
2/27/2005	8:43:00	0.035	64.58	-0.016			
2/27/2005	8:43:00	0.04	64.58	-0.016			
2/27/2005	8:43:00	0.045	64.58	-0.016			
2/27/2005	8:43:00	0.05	64.58	-0.019			
2/27/2005	8:43:01	0.055	64.6	-0.022			
2/27/2005	8:43:01	0.06	64.58	-0.021			
2/27/2005	8:43:01	0.065	64.6	-0.02			
2/27/2005	8:43:02	0.07	64.6	-0.017			
2/27/2005	8:43:02	0.075	64.6	-0.018			
2/27/2005	8:43:02	0.08	64.6	-0.036			
2/27/2005	8:43:03	0.085	64.6	-0.099			
2/27/2005	8:43:03	0.09	64.6	-0.189			
2/27/2005	8:43:03	0.095	64.6	-0.485			
2/27/2005	8:43:03	0.1	64.6	-2.756			
2/27/2005	8:43:04	0.1058	64.6	-4.284			
2/27/2005	8:43:04	0.112	64.6	-4.912			
2/27/2005	8:43:05	0.1185	64.6	-4.004			
2/27/2005	8:43:05	0.1255	64.6	-2.669			
2/27/2005	8:43:05	0.1328	64.6	-2.919			
2/27/2005	8:43:06	0.1407	64.6	-2.273			
2/27/2005	8:43:06	0.149	64.6	-2.029			
2/27/2005	8:43:07	0.1578	64.6	-2.554			
2/27/2005	8:43:08	0.1672	64.56	-2.555			
2/27/2005	8:43:08	0.177	64.56	-2.331			
2/27/2005	8:43:09	0.1875	64.56	-2.411			
2/27/2005	8:43:09	0.1985	64.56	-2.439			
2/27/2005	8:43:10	0.2102	64.56	-2.395			
2/27/2005	8:43:11	0.2227	64.56	-2.411	0		
2/27/2005	8:43:12	0.2358	64.56	-2.403	0.0131	0.996682	

2/27/2005	8:43:12	0.2498	64.54	-2.4	0.0271	0.995438
2/27/2005	8:43:13	0.2647	64.54	-2.395	0.042	0.993364
2/27/2005	8:43:14	0.2803	64.54	-2.393	0.0576	0.992534
2/27/2005	8:43:15	0.297	64.54	-2.389	0.0743	0.990875
2/27/2005	8:43:16	0.3147	64.54	-2.385	0.092	0.989216
2/27/2005	8:43:17	0.3333	64.51	-2.381	0.1106	0.987557
2/27/2005	8:43:19	0.3532	64.51	-2.377	0.1305	0.985898
2/27/2005	8:43:20	0.3742	64.51	-2.37	0.1515	0.982995
2/27/2005	8:43:21	0.3963	64.51	-2.366	0.1736	0.981336
2/27/2005	8:43:23	0.4198	64.49	-2.36	0.1971	0.978847
2/27/2005	8:43:24	0.4447	64.49	-2.355	0.222	0.976773
2/27/2005	8:43:26	0.4697	64.49	-2.35	0.247	0.974699
2/27/2005	8:43:27	0.4963	64.49	-2.345	0.2736	0.972625
2/27/2005	8:43:29	0.5247	64.47	-2.341	0.302	0.970966
2/27/2005	8:43:31	0.5547	64.47	-2.335	0.332	0.968478
2/27/2005	8:43:33	0.5863	64.47	-2.332	0.3636	0.967234
2/27/2005	8:43:35	0.6213	64.47	-2.325	0.3986	0.96433
2/27/2005	8:43:37	0.658	64.45	-2.319	0.4353	0.961842
2/27/2005	8:43:39	0.6963	64.45	-2.311	0.4736	0.958523
2/27/2005	8:43:42	0.738	64.45	-2.302	0.5153	0.954791
2/27/2005	8:43:44	0.7813	64.45	-2.293	0.5586	0.951058
2/27/2005	8:43:47	0.828	64.42	-2.282	0.6053	0.946495
2/27/2005	8:43:50	0.8763	64.42	-2.271	0.6536	0.941933
2/27/2005	8:43:53	0.928	64.42	-2.261	0.7053	0.937785
2/27/2005	8:43:56	0.983	64.4	-2.251	0.7603	0.933637
2/27/2005	8:44:00	1.0413	64.4	-2.239	0.8186	0.92866
2/27/2005	8:44:04	1.103	64.4	-2.218	0.8803	0.91995
2/27/2005	8:44:08	1.168	64.38	-2.184	0.9453	0.905848
2/27/2005	8:44:12	1.238	64.38	-2.143	1.0153	0.888843
2/27/2005	8:44:16	1.3113	64.38	-2.097	1.0886	0.869764
2/27/2005	8:44:21	1.3897	64.38	-2.047	1.167	0.849025
2/27/2005	8:44:26	1.473	64.38	-1.996	1.2503	0.827872
2/27/2005	8:44:31	1.5613	64.36	-1.946	1.3386	0.807134
2/27/2005	8:44:37	1.6547	64.36	-1.905	1.432	0.790129
2/27/2005	8:44:43	1.753	64.33	-1.867	1.5303	0.774367
2/27/2005	8:44:49	1.858	64.33	-1.827	1.6353	0.757777
2/27/2005	8:44:56	1.968	64.33	-1.791	1.7453	0.742845
2/27/2005	8:45:03	2.0847	64.33	-1.757	1.862	0.728743
2/27/2005	8:45:10	2.2097	64.31	-1.726	1.9867	0.715896
2/27/2005	8:45:18	2.3413	64.31	-1.697	2.1186	0.703857
2/27/2005	8:45:26	2.4813	64.31	-1.667	2.2586	0.691414
2/27/2005	8:45:35	2.6297	64.31	-1.637	2.407	0.678971
2/27/2005	8:45:45	2.7863	64.31	-1.61	2.5636	0.667773
2/27/2005	8:45:55	2.953	64.31	-1.58	2.7303	0.65533
2/27/2005	8:46:05	3.1297	64.31	-1.548	2.907	0.642057
2/27/2005	8:46:16	3.3163	64.29	-1.518	3.0936	0.629614
2/27/2005	8:46:28	3.5147	64.27	-1.487	3.292	0.616757
2/27/2005	8:46:41	3.7247	64.24	-1.459	3.502	0.605143
2/27/2005	8:46:54	3.9463	64.22	-1.427	3.7236	0.591871
2/27/2005	8:47:08	4.1813	64.2	-1.396	3.9586	0.579013
2/27/2005	8:47:23	4.4297	64.18	-1.364	4.207	0.56574
2/27/2005	8:47:39	4.693	64.13	-1.332	4.4703	0.552468
2/27/2005	8:47:56	4.973	64.09	-1.302	4.7503	0.540025
2/27/2005	8:48:14	5.2697	64.06	-1.274	5.047	0.528411
2/27/2005	8:48:32	5.583	64.02	-1.247	5.3603	0.517213
2/27/2005	8:48:52	5.9147	64	-1.221	5.692	0.506429
2/27/2005	8:49:13	6.2663	63.95	-1.196	6.0436	0.49606
2/27/2005	8:49:36	6.6397	63.93	-1.17	6.417	0.485276
2/27/2005	8:50:00	7.0347	63.86	-1.146	6.812	0.475321
2/27/2005	8:50:25	7.453	63.84	-1.121	7.2303	0.464952
2/27/2005	8:50:51	7.8963	63.82	-1.094	7.6736	0.453754
2/27/2005	8:51:19	8.3663	63.79	-1.068	8.1436	0.44297
2/27/2005	8:51:49	8.8647	63.77	-1.045	8.642	0.43343
2/27/2005	8:52:21	9.3913	63.77	-1.021	9.1686	0.423476
2/27/2005	8:52:54	9.9497	63.75	-0.995	9.727	0.412692
2/27/2005	8:53:30	10.5413	63.73	-0.969	10.3186	0.401908
2/27/2005	8:54:08	11.168	63.66	-0.944	10.9453	0.391539
2/27/2005	8:54:47	11.8313	63.59	-0.919	11.6086	0.38117
2/27/2005	8:55:30	12.5347	63.59	-0.891	12.312	0.369556
2/27/2005	8:56:14	13.2797	63.52	-0.865	13.057	0.358772
2/27/2005	8:57:02	14.0697	63.52	-0.84	13.847	0.348403
2/27/2005	8:57:52	14.9063	63.59	-0.814	14.6836	0.337619
2/27/2005	8:58:45	15.7913	63.59	-0.788	15.5686	0.326835
2/27/2005	8:59:41	16.7297	63.66	-0.759	16.507	0.314807
2/27/2005	9:00:41	17.723	63.68	-0.732	17.5003	0.303608
2/27/2005	9:01:44	18.7763	63.59	-0.704	18.5536	0.291995
2/27/2005	9:02:51	19.8913	63.61	-0.676	19.6686	0.280382
2/27/2005	9:04:02	21.073	63.63	-0.649	20.8503	0.269183
2/27/2005	9:05:17	22.3247	63.57	-0.62	22.102	0.257155

2/27/2005	9:06:36	23.6497	63.63	-0.59	23.427	0.244712
2/27/2005	9:08:01	25.0547	63.7	-0.562	24.832	0.233098
2/27/2005	9:09:30	26.543	63.68	-0.533	26.3203	0.22107
2/27/2005	9:11:05	28.118	63.7	-0.503	27.8953	0.208627
2/27/2005	9:12:45	29.7863	63.66	-0.474	29.5636	0.196599
2/27/2005	9:14:31	31.5547	63.66	-0.445	31.332	0.184571
2/27/2005	9:16:23	33.428	63.59	-0.415	33.2053	0.172128
2/27/2005	9:18:22	35.4113	63.63	-0.387	35.1886	0.160514
2/27/2005	9:20:28	37.513	63.77	-0.357	37.2903	0.148071
2/27/2005	9:22:42	39.7397	63.79	-0.328	39.517	0.136043
2/27/2005	9:25:03	42.098	63.79	-0.301	41.8753	0.124844
2/27/2005	9:27:33	44.5963	63.93	-0.275	44.3736	0.114061
2/27/2005	9:30:12	47.243	63.86	-0.247	47.0203	0.102447
2/27/2005	9:33:00	50.0463	63.73	-0.219	49.8236	0.090834
2/27/2005	9:35:58	53.0147	63.86	-0.194	52.792	0.080465
2/27/2005	9:39:07	56.1597	63.93	-0.168	55.937	0.069681
2/27/2005	9:42:27	59.4913	63.95	-0.141	59.2686	0.058482
2/27/2005	9:45:59	63.0197	64.11	-0.118	62.797	0.048942
2/27/2005	9:49:43	66.758	64.02	-0.094	66.5353	0.038988
2/27/2005	9:53:41	70.718	64.09	-0.071	70.4953	0.029448
2/27/2005	9:57:52	74.9113	64.11	-0.049	74.6886	0.020324
2/27/2005	10:02:19	79.3547	64.02	-0.025	79.132	0.010369
2/27/2005	10:07:01	84.0613	64.02	-0.003	83.8386	0.001244
2/27/2005	10:12:00	89.0463	64.15	0.015	88.8236	-0.00622

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW11S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By: SWR
Checked By: CD

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	0.93 = To

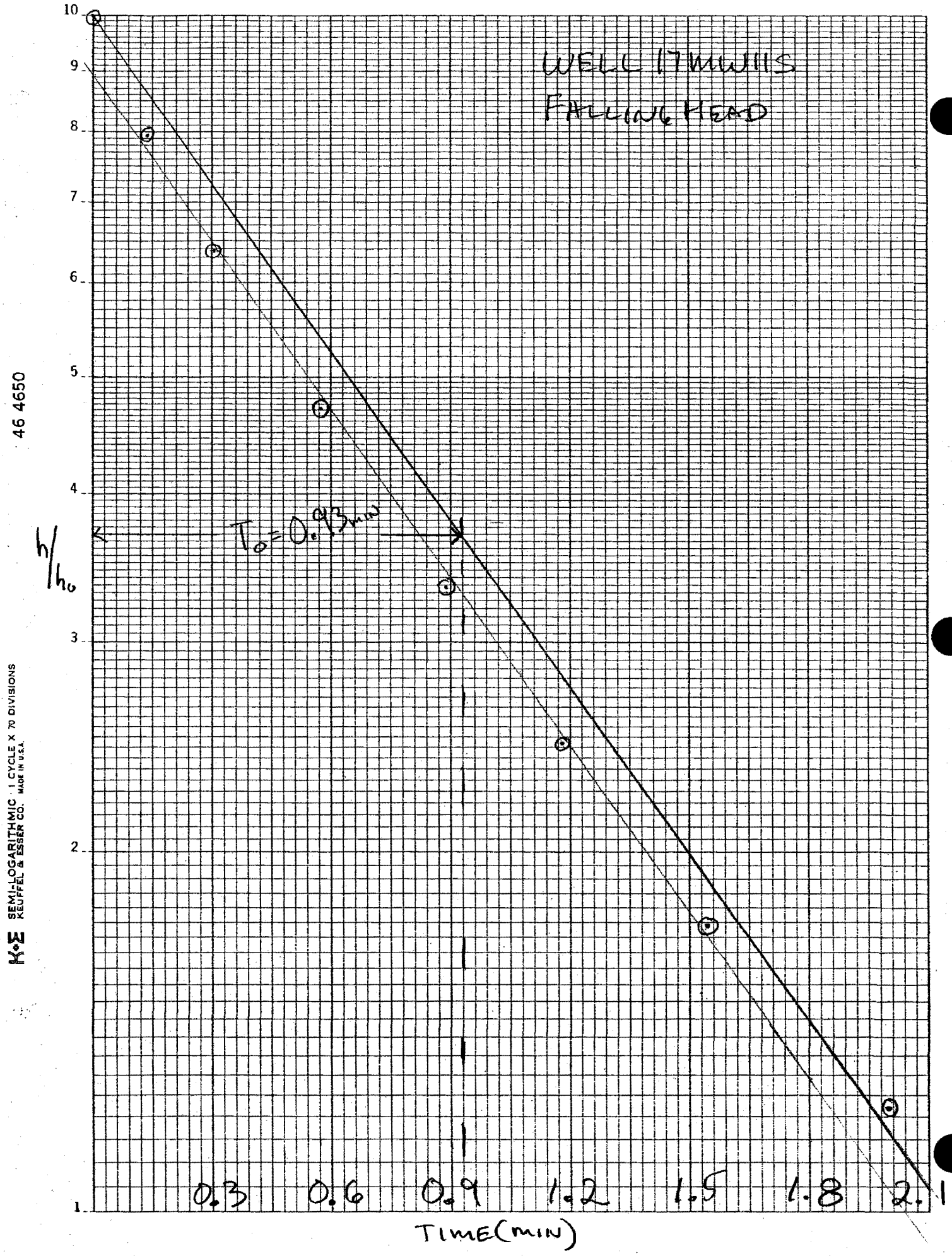
Hydraulic Conductivity (K) :

1.79E-03	ft./min.
2.98E-05	ft./sec.
2.57E+00	ft./day
9.08E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW115
FALLING HEAD
$T_0 = 0.93$ min
h/h_0
10
9
8
7
6
5
4
3
2
1
0.3
0.6
0.9
1.2
1.5
1.8
2.1
TIME (MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW11S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By: SWR
Checked By: CD

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	0.96 = To

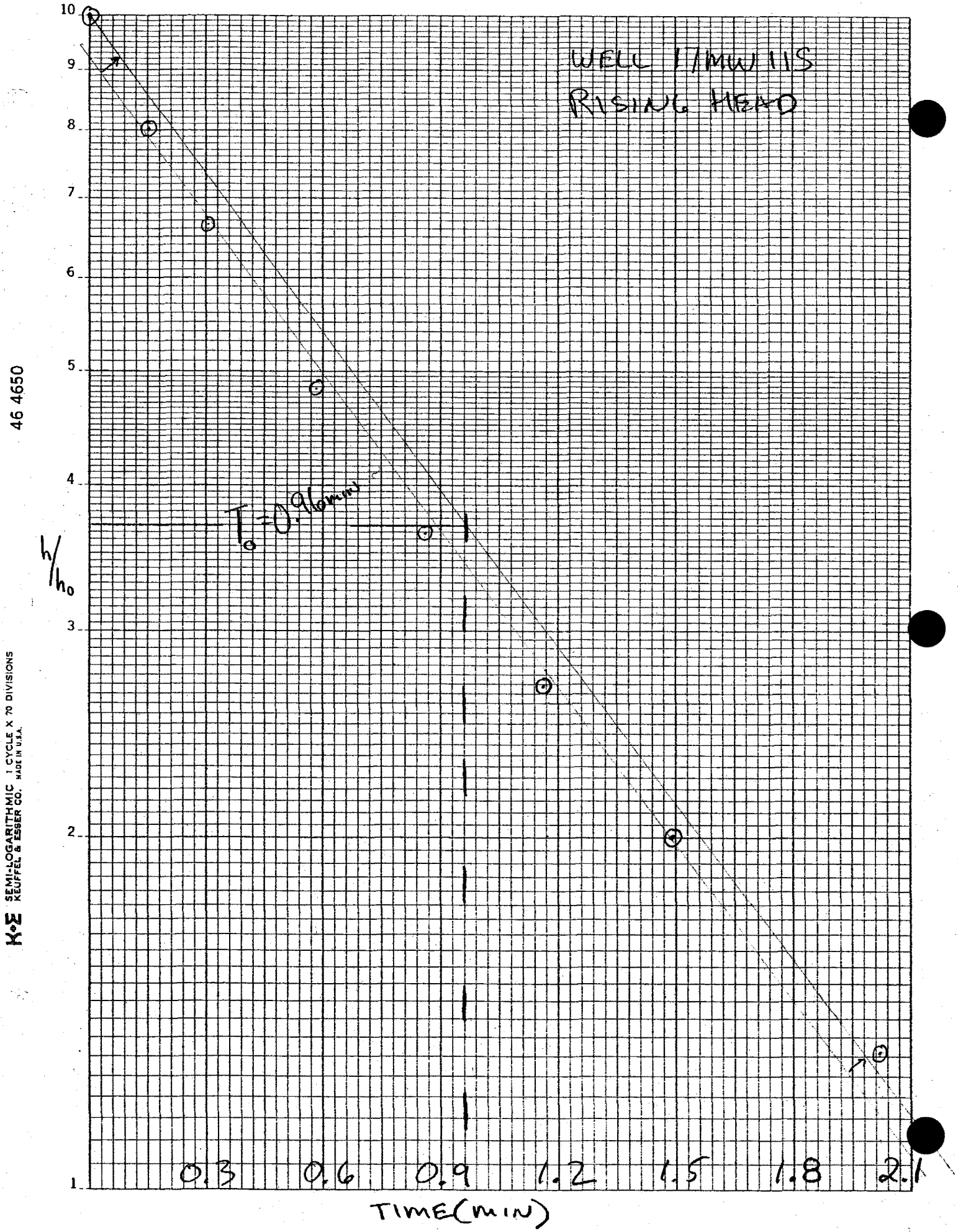
Hydraulic Conductivity (K) :

1.73E-03	ft./min.
2.89E-05	ft./sec.
2.49E+00	ft./day
8.80E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17/MW 115
RISING HEAD
$T_0 = 0.96$ (min)
h/h_0
10
9
8
7
6
5
4
3
2
1
0.3
0.6
0.9
1.2
1.5
1.8
2.1
TIME (MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: SWMU 16/17 CHARLESTON WELL/BORING NO.: 17MW115

PROJECT NO.: 0528 GEOLOGIST: FRED WRAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10', 10-20 TEST NO.: 2

STATIC WATER LEVEL (Depth/Elevation): 5.49 DATE: 2-23-05

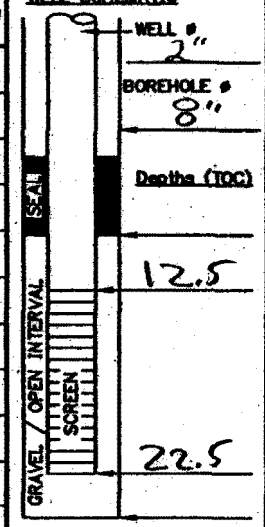
TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED: C Doolan

METHOD OF INDUCING WATER LEVEL CHANGE: 4.9 x 0.13 SOLID SLUG PAGE ___ OF ___

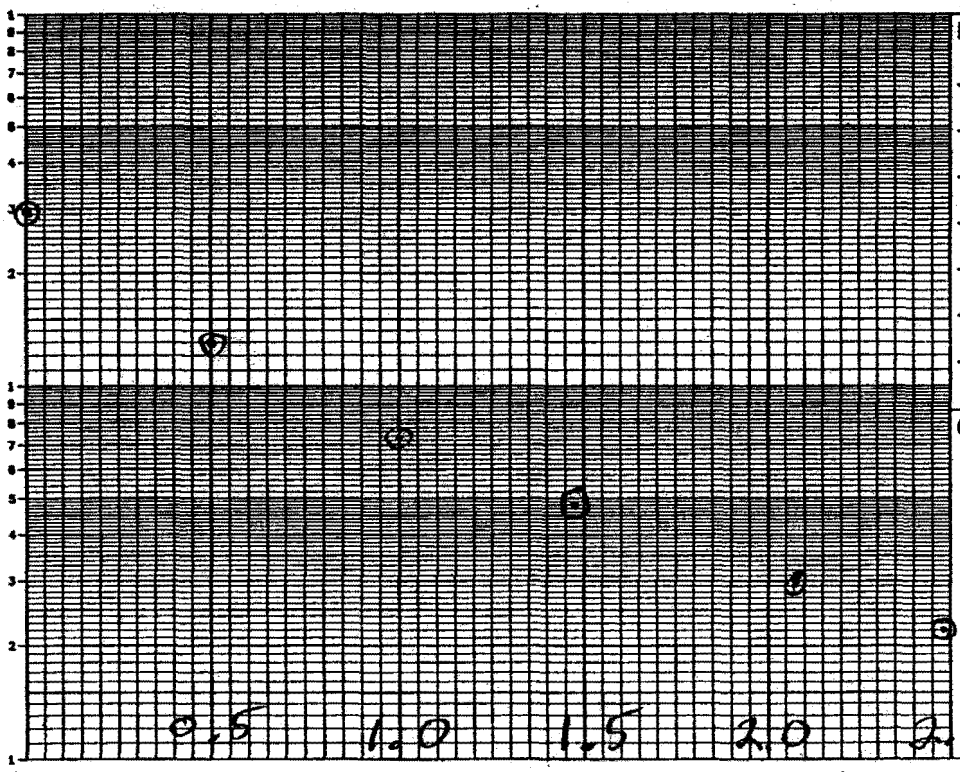
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.05		2.897	5.2697		0.058
0.10		2.123	6.2663		0.052
0.2498		1.745	7.8963		0.042
0.5247		1.263	8.8647		0.042
0.7380		1.001			
1.0413		0.733			
1.3113		0.565			
1.6547		0.417			
2.0847		0.295			
2.6297		0.198			
3.3163		0.127			
4.4297		0.076			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

CALCS, SKETCH MAPS, ETC.:

ACAD: FORM_HYDCONTST.dwg 07/06/99 INL

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: SWMU 16/17 CHARLESTON NWS WELL/BORING NO.: 17MW11S

PROJECT NO.: 0528 GEOLOGIST: FRED W RAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10', 10-20 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 5.49 DATE: 2-23-05

TEST TYPE (Rising/Falling/Constant Head): FALLING CHECKED: C Doolan

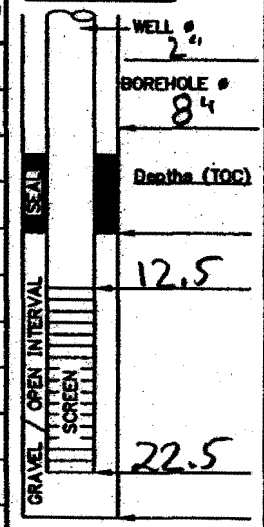
METHOD OF INDUCING WATER LEVEL CHANGE: 4.9' x 0.13 SOLID SLUG PAGE 1 OF

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

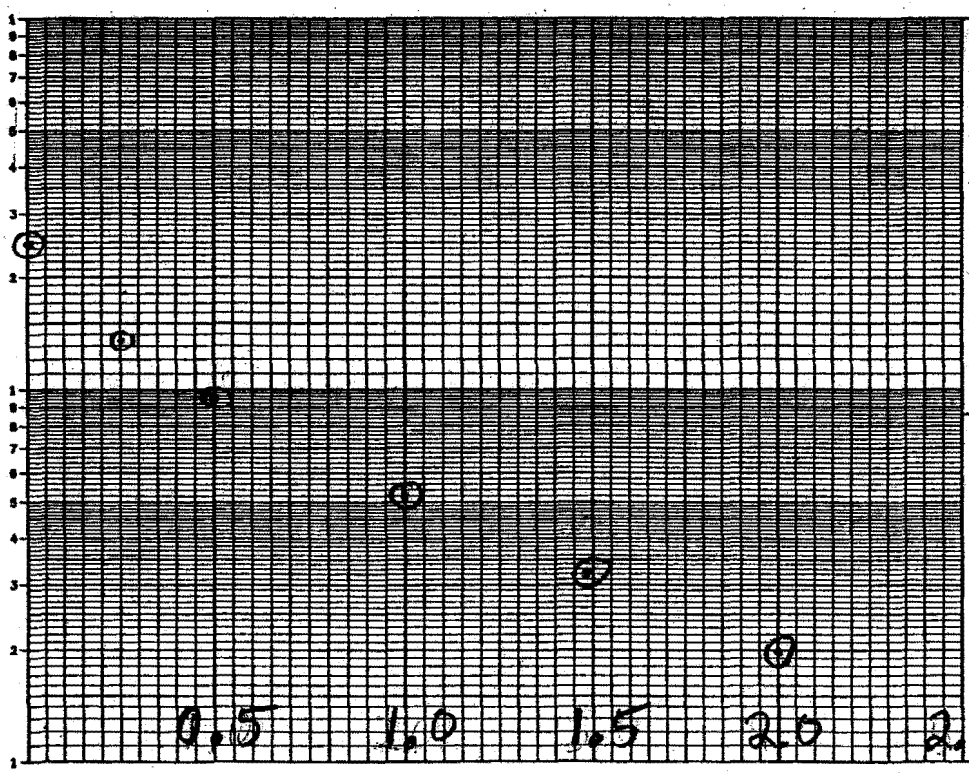
ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.045		2.871	3.9463		0.068
0.1328		2.647			
0.2102		1.459			
0.3147		1.230			
0.4198		1.064			
0.5547		0.898			
0.7813		0.687			
1.0413		0.515			
1.3113		0.390			
1.7530		0.255			
2.4813		0.146			
2.9530		0.111			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

CALCS,SKETCH MAPS, ETC.:

In-Situ Inc. MiniTroll Pro

Report generated: 2/24/2005 9:48:56
Report from file: ...\SN11262 2005-02-23 151045 17mw11fh.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw11fh

Test defined on: 2/23/2005 15:06:49
Test started on: 2/23/2005 15:10:45
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data poi Minutes.
Number of data samples: 100

TOTAL DATA SAMPLES 100

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 12.421 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/23/2005	15:10:45	0	66.63	0			Plotted data
2/23/2005	15:10:45	0.005	66.68	-0.008			
2/23/2005	15:10:46	0.01	66.7	-0.012			
2/23/2005	15:10:46	0.015	66.7	-0.014			
2/23/2005	15:10:46	0.02	66.7	-0.014			
2/23/2005	15:10:47	0.025	66.7	-0.014			
2/23/2005	15:10:47	0.03	66.72	-0.171			
2/23/2005	15:10:47	0.035	66.72	-1.445			
2/23/2005	15:10:48	0.04	66.72	-2.716			
2/23/2005	15:10:48	0.045	66.72	-2.871			
2/23/2005	15:10:48	0.05	66.72	-2.296			
2/23/2005	15:10:48	0.055	66.72	-1.934			
2/23/2005	15:10:49	0.06	66.72	-1.688			
2/23/2005	15:10:49	0.065	66.72	-1.711			
2/23/2005	15:10:49	0.07	66.72	-1.821			
2/23/2005	15:10:50	0.075	66.72	-1.163			
2/23/2005	15:10:50	0.08	66.72	-1.68			
2/23/2005	15:10:50	0.085	66.72	-1.645			
2/23/2005	15:10:51	0.09	66.74	-1.475			
2/23/2005	15:10:51	0.095	66.72	-0.963			
2/23/2005	15:10:51	0.1	66.72	-0.012			
2/23/2005	15:10:51	0.1058	66.72	-1.096			
2/23/2005	15:10:52	0.112	66.72	-1.9			
2/23/2005	15:10:52	0.1185	66.72	-2.419			
2/23/2005	15:10:53	0.1255	66.72	-2.554			
2/23/2005	15:10:53	0.1328	66.72	-2.647			
2/23/2005	15:10:54	0.1407	66.72	-1.276			
2/23/2005	15:10:54	0.149	66.72	-1.281			
2/23/2005	15:10:55	0.1578	66.72	-1.509			
2/23/2005	15:10:55	0.1672	66.7	-1.679			
2/23/2005	15:10:56	0.177	66.7	-1.589			
2/23/2005	15:10:56	0.1875	66.7	-1.448			
2/23/2005	15:10:57	0.1985	66.68	-1.473			
2/23/2005	15:10:58	0.2102	66.68	-1.459	0	1	ho
2/23/2005	15:10:58	0.2227	66.68	-1.411	0.0125	0.967101	
2/23/2005	15:10:59	0.2358	66.68	-1.384	0.0256	0.948595	

2/23/2005	15:11:00	0.2498	66.68	-1.356	0.0396	0.929404
2/23/2005	15:11:01	0.2647	66.65	-1.324	0.0545	0.907471
2/23/2005	15:11:02	0.2803	66.65	-1.294	0.0701	0.886909
2/23/2005	15:11:03	0.297	66.65	-1.261	0.0868	0.864291
2/23/2005	15:11:04	0.3147	66.65	-1.23	0.1045	0.843043
2/23/2005	15:11:05	0.3333	66.65	-1.196	0.1231	0.81974
2/23/2005	15:11:06	0.3532	66.65	-1.165	0.143	0.798492
2/23/2005	15:11:08	0.3742	66.63	-1.132	0.164	0.775874
2/23/2005	15:11:09	0.3963	66.63	-1.098	0.1861	0.75257
2/23/2005	15:11:10	0.4198	66.63	-1.064	0.2096	0.729267
2/23/2005	15:11:12	0.4447	66.63	-1.031	0.2345	0.706648
2/23/2005	15:11:13	0.4697	66.63	-0.998	0.2595	0.68403
2/23/2005	15:11:15	0.4963	66.63	-0.965	0.2861	0.661412
2/23/2005	15:11:17	0.5247	66.63	-0.931	0.3145	0.638108
2/23/2005	15:11:18	0.5547	66.61	-0.898	0.3445	0.61549
2/23/2005	15:11:20	0.5863	66.61	-0.863	0.3761	0.591501
2/23/2005	15:11:22	0.6213	66.61	-0.826	0.4111	0.566141
2/23/2005	15:11:25	0.658	66.59	-0.792	0.4478	0.542838
2/23/2005	15:11:27	0.6963	66.59	-0.757	0.4861	0.518849
2/23/2005	15:11:29	0.738	66.59	-0.722	0.5278	0.494859
2/23/2005	15:11:32	0.7813	66.59	-0.687	0.5711	0.47687
2/23/2005	15:11:35	0.828	66.59	-0.651	0.6178	0.446196
2/23/2005	15:11:38	0.8763	66.56	-0.617	0.6661	0.422892
2/23/2005	15:11:41	0.928	66.56	-0.584	0.7178	0.400274
2/23/2005	15:11:44	0.983	66.56	-0.549	0.7728	0.376285
2/23/2005	15:11:48	1.0413	66.54	-0.515	0.8311	0.352981
2/23/2005	15:11:51	1.103	66.54	-0.483	0.8928	0.331049
2/23/2005	15:11:55	1.168	66.54	-0.451	0.9578	0.309116
2/23/2005	15:11:59	1.238	66.52	-0.421	1.0278	0.288554
2/23/2005	15:12:04	1.3113	66.52	-0.39	1.1011	0.267306
2/23/2005	15:12:08	1.3897	66.52	-0.36	1.1795	0.246744
2/23/2005	15:12:13	1.473	66.52	-0.331	1.2628	0.226868
2/23/2005	15:12:19	1.5613	66.52	-0.304	1.3511	0.208362
2/23/2005	15:12:24	1.6547	66.52	-0.279	1.4445	0.191227
2/23/2005	15:12:30	1.753	66.5	-0.255	1.5428	0.174773
2/23/2005	15:12:37	1.858	66.5	-0.234	1.6478	0.160384
2/23/2005	15:12:43	1.968	66.5	-0.213	1.7578	0.14599
2/23/2005	15:12:50	2.0847	66.5	-0.193	1.8745	0.132282
2/23/2005	15:12:58	2.2097	66.5	-0.177	1.9995	0.121316
2/23/2005	15:13:06	2.3413	66.47	-0.161	2.1311	0.11035
2/23/2005	15:13:14	2.4813	66.45	-0.146	2.2711	0.100069
2/23/2005	15:13:23	2.6297	66.45	-0.132	2.4195	0.090473
2/23/2005	15:13:32	2.7863	66.43	-0.121	2.5761	0.082934
2/23/2005	15:13:42	2.953	66.43	-0.111	2.7428	0.07608
2/23/2005	15:13:53	3.1297	66.43	-0.101	2.9195	0.069225
2/23/2005	15:14:04	3.3163	66.41	-0.094	3.1061	0.064428
2/23/2005	15:14:16	3.5147	66.38	-0.086	3.3045	0.058944
2/23/2005	15:14:29	3.7247	66.36	-0.077	3.5145	0.052778
2/23/2005	15:14:42	3.9463	66.34	-0.068	3.7361	0.046607
2/23/2005	15:14:56	4.1813	66.29	-0.061	3.9711	0.041809
2/23/2005	15:15:11	4.4297	66.27	-0.055	4.2195	0.037697
2/23/2005	15:15:27	4.693	66.23	-0.051	4.4828	0.034955
2/23/2005	15:15:43	4.973	66.2	-0.042	4.7628	0.028787
2/23/2005	15:16:01	5.2697	66.2	-0.036	5.0595	0.024674
2/23/2005	15:16:20	5.583	66.2	-0.034	5.3728	0.023304
2/23/2005	15:16:40	5.9147	66.23	-0.031	5.7045	0.021247
2/23/2005	15:17:01	6.2663	66.23	-0.027	6.0561	0.018506
2/23/2005	15:17:23	6.6397	66.2	-0.026	6.4295	0.01782
2/23/2005	15:17:47	7.0347	66.18	-0.028	6.8245	0.019191
2/23/2005	15:18:12	7.453	66.18	-0.03	7.2428	0.020562
2/23/2005	15:18:39	7.8963	66.18	-0.029	7.6861	0.019877
2/23/2005	15:19:07	8.3663	66.18	-0.028	8.1561	0.019191
2/23/2005	15:19:37	8.8647	66.16	-0.024	8.6545	0.01645
2/23/2005	15:20:09	9.3913	66.11	-0.027	9.1811	0.018506

In-Situ Inc. MiniTroll Pro

Report generated: 2/24/2005 9:55:48
Report from file: ...\SN11262 2005-02-23 152303 17mw11rh.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw11rh

Test defined on: 2/23/2005 15:08:20
Test started on: 2/23/2005 15:23:03
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data po Minutes.
Number of data samples: 103

TOTAL DATA SAMPLES 103

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 12.445 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho
2/23/2005	15:23:03	0	66.45	0		
2/23/2005	15:23:03	0.005	66.5	-0.008		
2/23/2005	15:23:03	0.01	66.5	-0.012		
2/23/2005	15:23:04	0.015	66.52	-0.013		
2/23/2005	15:23:04	0.02	66.52	-0.014		
2/23/2005	15:23:04	0.025	66.52	-0.014		
2/23/2005	15:23:05	0.03	66.52	-0.002		
2/23/2005	15:23:05	0.035	66.52	3.917		
2/23/2005	15:23:05	0.04	66.52	2.934		
2/23/2005	15:23:05	0.045	66.54	1.609		
2/23/2005	15:23:06	0.05	66.54	2.897		
2/23/2005	15:23:06	0.055	66.54	2.038		
2/23/2005	15:23:06	0.06	66.54	2.404		
2/23/2005	15:23:07	0.065	66.54	2.183		
2/23/2005	15:23:07	0.07	66.54	2.254	0	ho
2/23/2005	15:23:07	0.075	66.54	2.193	0.005	0.972937
2/23/2005	15:23:08	0.08	66.54	2.195	0.01	0.973824
2/23/2005	15:23:08	0.085	66.54	2.169	0.015	0.962289
2/23/2005	15:23:08	0.09	66.54	2.157	0.02	0.956965
2/23/2005	15:23:08	0.095	66.56	2.139	0.025	0.94898
2/23/2005	15:23:09	0.1	66.54	2.123	0.03	0.941881
2/23/2005	15:23:09	0.1058	66.56	2.106	0.0358	0.934339
2/23/2005	15:23:09	0.112	66.54	2.087	0.042	0.925909
2/23/2005	15:23:10	0.1185	66.56	2.067	0.0485	0.917036
2/23/2005	15:23:10	0.1255	66.56	2.047	0.0555	0.908163
2/23/2005	15:23:11	0.1328	66.56	2.025	0.0628	0.898403
2/23/2005	15:23:11	0.1407	66.56	2.003	0.0707	0.888642
2/23/2005	15:23:12	0.149	66.56	1.981	0.079	0.878882
2/23/2005	15:23:12	0.1578	66.56	1.956	0.0878	0.867791
2/23/2005	15:23:13	0.1672	66.54	1.937	0.0972	0.859361
2/23/2005	15:23:13	0.177	66.54	1.912	0.107	0.84827

Plotted data

2/23/2005	15:23:14	0.1875	66.54	1.887	0.1175	0.837178
2/23/2005	15:23:15	0.1985	66.54	1.861	0.1285	0.825643
2/23/2005	15:23:15	0.2102	66.54	1.833	0.1402	0.813221
2/23/2005	15:23:16	0.2227	66.52	1.804	0.1527	0.800355
2/23/2005	15:23:17	0.2358	66.54	1.776	0.1658	0.787933
2/23/2005	15:23:18	0.2498	66.54	1.745	0.1798	0.774179
2/23/2005	15:23:19	0.2647	66.54	1.712	0.1947	0.759539
2/23/2005	15:23:20	0.2803	66.52	1.679	0.2103	0.744898
2/23/2005	15:23:21	0.297	66.54	1.646	0.227	0.730257
2/23/2005	15:23:22	0.3147	66.54	1.612	0.2447	0.715173
2/23/2005	15:23:23	0.3333	66.54	1.576	0.2633	0.699201
2/23/2005	15:23:24	0.3532	66.54	1.54	0.2832	0.68323
2/23/2005	15:23:25	0.3742	66.54	1.501	0.3042	0.665927
2/23/2005	15:23:27	0.3963	66.54	1.463	0.3263	0.649068
2/23/2005	15:23:28	0.4198	66.54	1.423	0.3498	0.631322
2/23/2005	15:23:29	0.4447	66.54	1.383	0.3747	0.613576
2/23/2005	15:23:31	0.4697	66.54	1.343	0.3997	0.59583
2/23/2005	15:23:33	0.4963	66.54	1.304	0.4263	0.578527
2/23/2005	15:23:34	0.5247	66.56	1.263	0.4547	0.560337
2/23/2005	15:23:36	0.5547	66.56	1.222	0.4847	0.542147
2/23/2005	15:23:38	0.5863	66.56	1.18	0.5163	0.523514
2/23/2005	15:23:40	0.6213	66.56	1.136	0.5513	0.503993
2/23/2005	15:23:42	0.658	66.56	1.091	0.588	0.484028
2/23/2005	15:23:45	0.6963	66.56	1.047	0.6263	0.464508
2/23/2005	15:23:47	0.738	66.56	1.001	0.668	0.444099
2/23/2005	15:23:50	0.7813	66.56	0.956	0.7113	0.424135
2/23/2005	15:23:52	0.828	66.56	0.91	0.758	0.403727
2/23/2005	15:23:55	0.8763	66.56	0.865	0.8063	0.383762
2/23/2005	15:23:58	0.928	66.59	0.822	0.858	0.364685
2/23/2005	15:24:02	0.983	66.59	0.777	0.913	0.34472
2/23/2005	15:24:05	1.0413	66.59	0.733	0.9713	0.3252
2/23/2005	15:24:09	1.103	66.59	0.69	1.033	0.306122
2/23/2005	15:24:13	1.168	66.59	0.647	1.098	0.287045
2/23/2005	15:24:17	1.238	66.61	0.605	1.168	0.268412
2/23/2005	15:24:21	1.3113	66.61	0.565	1.2413	0.250665
2/23/2005	15:24:26	1.3897	66.61	0.526	1.3197	0.233363
2/23/2005	15:24:31	1.473	66.63	0.488	1.403	0.216504
2/23/2005	15:24:36	1.5613	66.63	0.451	1.4913	0.200089
2/23/2005	15:24:42	1.6547	66.65	0.417	1.5847	0.185004
2/23/2005	15:24:48	1.753	66.68	0.384	1.683	0.170364
2/23/2005	15:24:54	1.858	66.7	0.353	1.788	0.15661
2/23/2005	15:25:01	1.968	66.7	0.322	1.898	0.142857
2/23/2005	15:25:08	2.0847	66.72	0.295	2.0147	0.130878
2/23/2005	15:25:15	2.2097	66.74	0.269	2.1397	0.119343
2/23/2005	15:25:23	2.3413	66.74	0.244	2.2713	0.108252
2/23/2005	15:25:32	2.4813	66.77	0.22	2.4113	0.097604
2/23/2005	15:25:41	2.6297	66.77	0.198	2.5597	0.087844
2/23/2005	15:25:50	2.7863	66.77	0.179	2.7163	0.079414
2/23/2005	15:26:00	2.953	66.79	0.161	2.883	0.071429
2/23/2005	15:26:11	3.1297	66.79	0.143	3.0597	0.063443
2/23/2005	15:26:22	3.3163	66.79	0.127	3.2463	0.056344
2/23/2005	15:26:34	3.5147	66.81	0.114	3.4447	0.050577
2/23/2005	15:26:46	3.7247	66.83	0.102	3.6547	0.045253
2/23/2005	15:27:00	3.9463	66.86	0.092	3.8763	0.040816
2/23/2005	15:27:14	4.1813	66.86	0.084	4.1113	0.037267
2/23/2005	15:27:29	4.4297	66.88	0.076	4.3597	0.033718
2/23/2005	15:27:44	4.693	66.88	0.067	4.623	0.029725
2/23/2005	15:28:01	4.973	66.9	0.063	4.903	0.02795
2/23/2005	15:28:19	5.2697	66.92	0.058	5.1997	0.025732
2/23/2005	15:28:38	5.583	66.97	0.055	5.513	0.024401
2/23/2005	15:28:58	5.9147	66.99	0.053	5.8447	0.023514
2/23/2005	15:29:19	6.2663	67.01	0.052	6.1963	0.02307
2/23/2005	15:29:41	6.6397	67.01	0.052	6.5697	0.02307
2/23/2005	15:30:05	7.0347	66.99	0.049	6.9647	0.021739
2/23/2005	15:30:30	7.453	66.97	0.046	7.383	0.020408
2/23/2005	15:30:57	7.8963	66.95	0.042	7.8263	0.018634
2/23/2005	15:31:25	8.3663	66.92	0.043	8.2963	0.019077
2/23/2005	15:31:55	8.8647	66.88	0.042	8.7947	0.018634
2/23/2005	15:32:26	9.3913	66.86	0.039	9.3213	0.017303
2/23/2005	15:33:00	9.9497	66.88	0.032	9.8797	0.014197
2/23/2005	15:33:35	10.5413	66.88	0.027	10.4713	0.011979
2/23/2005	15:34:13	11.168	66.9	0.025	11.098	0.011091

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW12S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By: FWR
Checked By: CD

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	1.23 = To

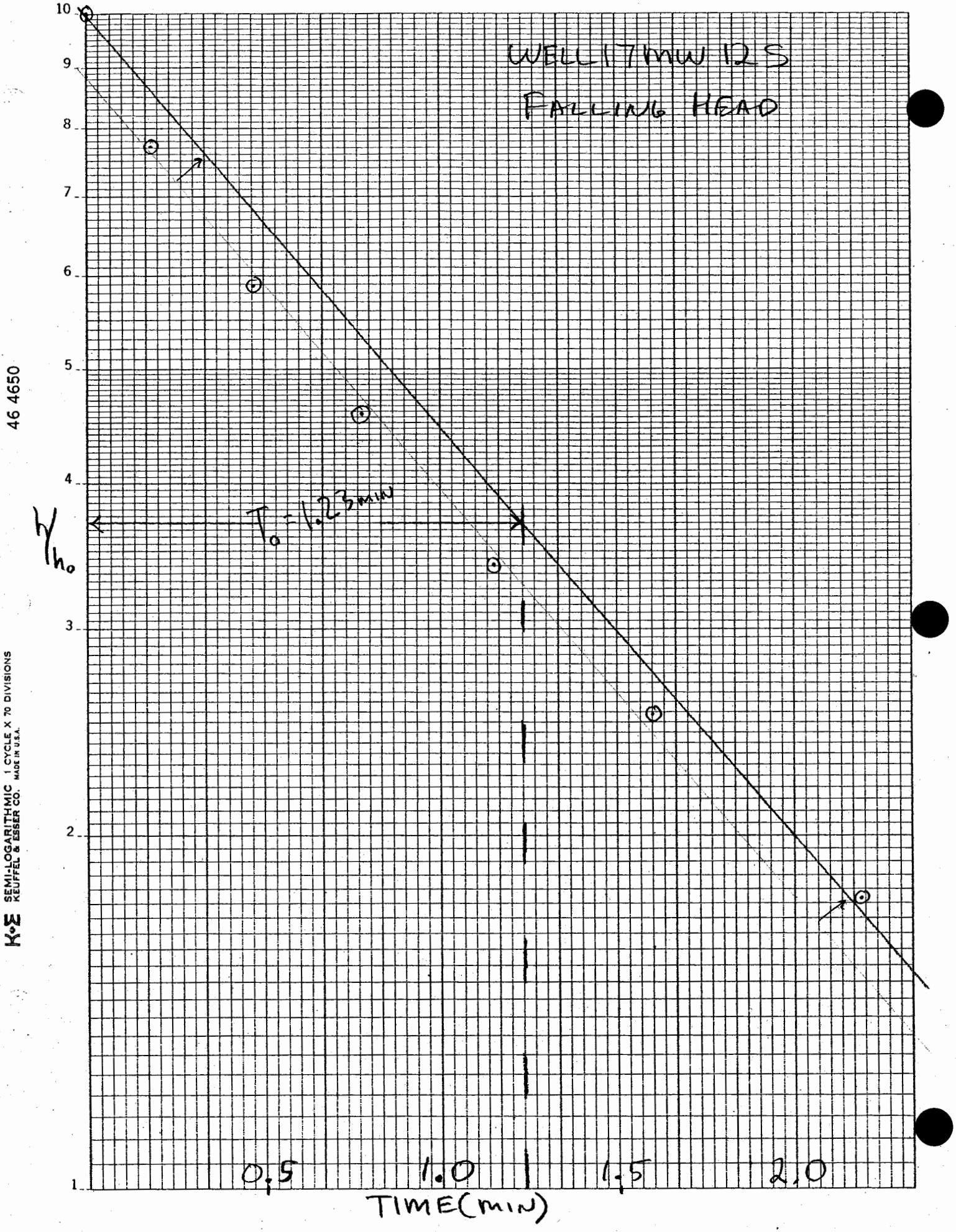
Hydraulic Conductivity (K) :

1.35E-03	ft./min.
2.25E-05	ft./sec.
1.95E+00	ft./day
6.87E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW 12S
FALLING HEAD
10
9
8
7
6
5
4
3
2
1
h/h_0
$T_0 = 1.23$ MIN
0.5
1.0
1.5
2.0
TIME (MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW12S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By: FWR
Checked By: CD

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	1.17 = To

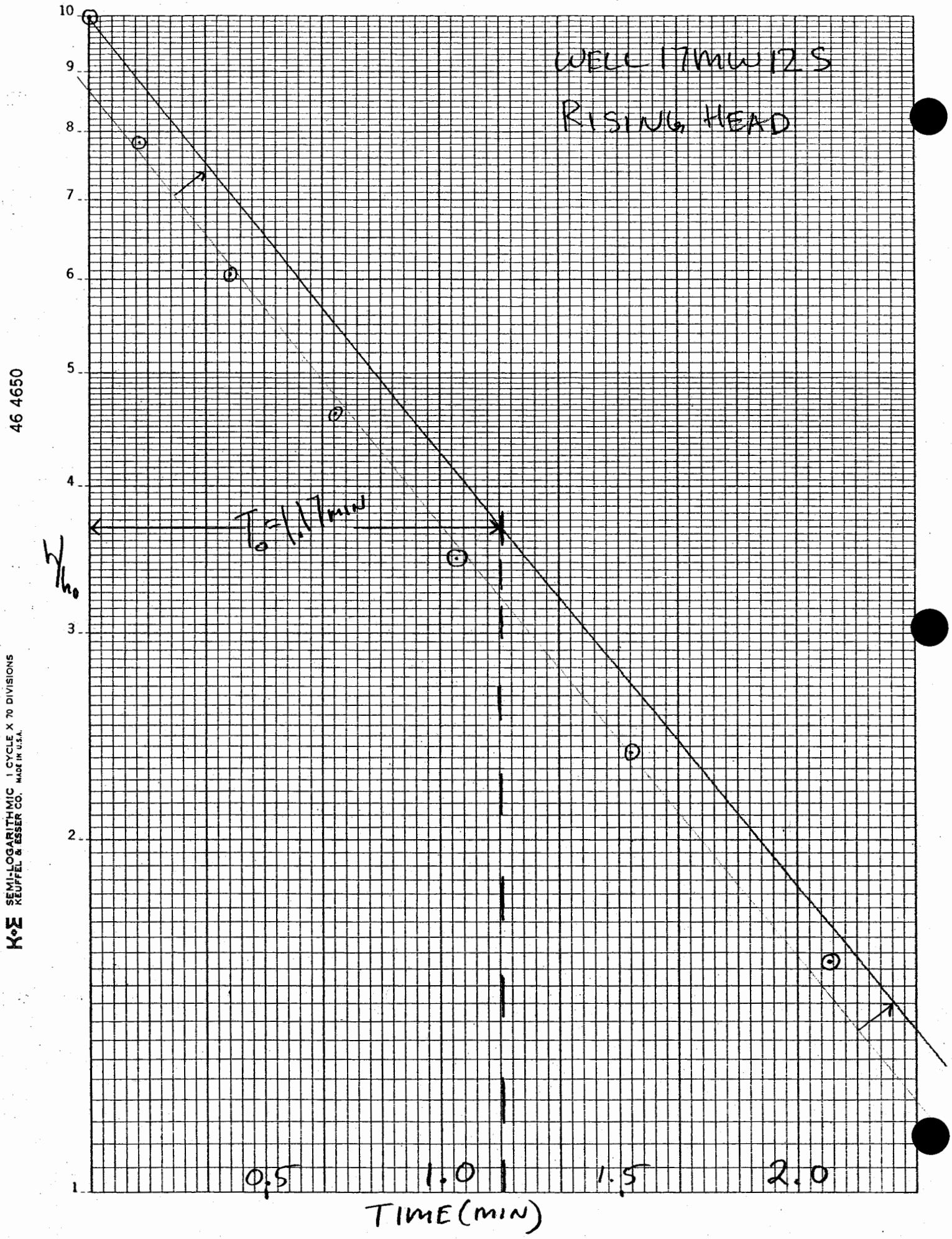
Hydraulic Conductivity (K) :

1.42E-03	ft./min.
2.37E-05	ft./sec.
2.05E+00	ft./day
7.22E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW12S
RISING HEAD
$T_0 = 1.17$ min
h/h_0
10
9
8
7
6
5
4
3
2
1
0.5
1.0
1.5
2.0
TIME (MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: CHARLESTON NWS WELL/BORING NO.: 17MW12S

PROJECT NO.: 0528 GEOLOGIST: FRED KRAMER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10, 4-14 TEST NO.:

STATIC WATER LEVEL (Depth/Elevation): 3.41, DATE: 2/26/05

TEST TYPE (Rising/Falling/Constant Head): FALLING + RISING CHECKED: C Doolan

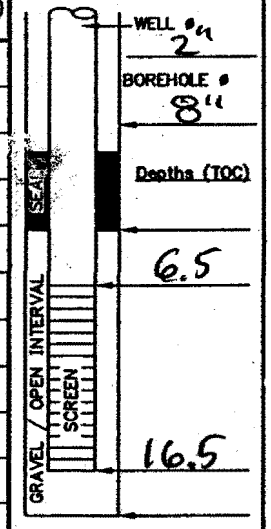
METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG PAGE ..... OF .....

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

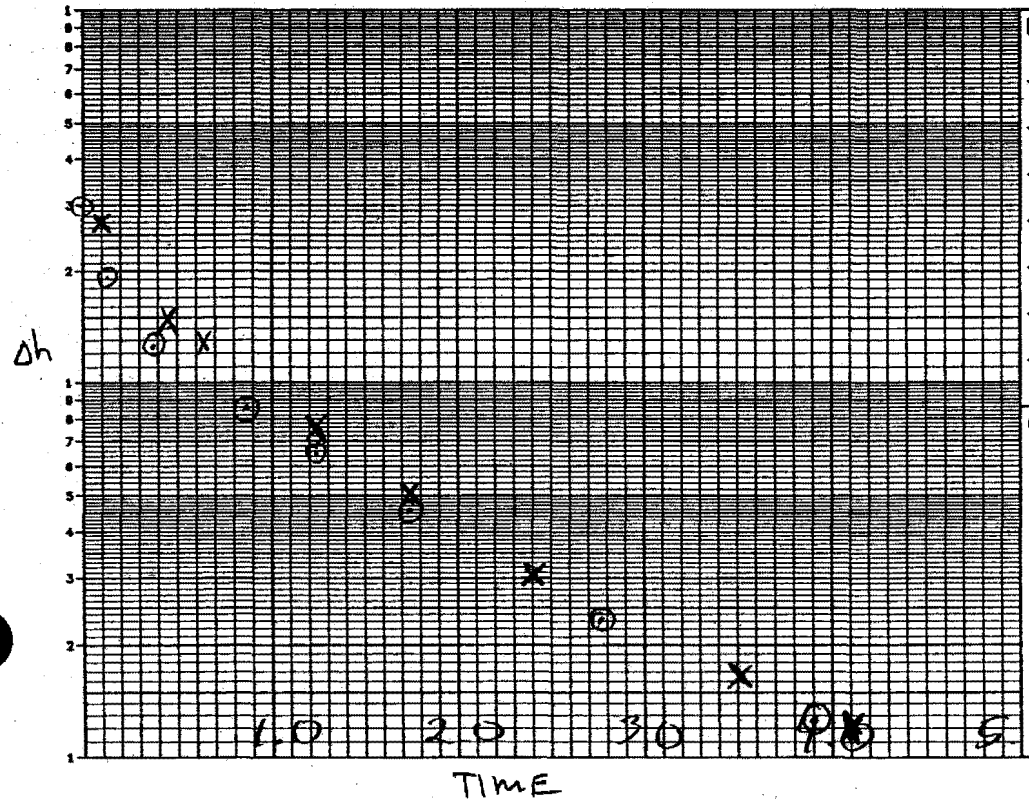
ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

← FALLING →			← RISING HEAD →		
ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.085		2.75	0.100		2.77
0.1255		1.903	0.2102		1.942
0.1985		1.609	0.3147		1.732
0.3963		1.284	0.4697		1.487
0.6213		1.048	0.6213		1.298
0.8763		0.853	0.8763		1.037
1.2380		0.651	1.2380		0.768
1.7530		0.455	1.7530		0.514
2.7863		0.339	2.4813		0.308
3.9463		0.128	3.5147		0.166
4.9730		0.081	4.1813		0.120
6.2663		0.050	5.2697		0.076

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS: FALLING HEAD
START 1625
STOPPED 1634
RISING HEAD
STARTED: 1636
STOP: 1646
⊙ FALLING HEAD
X RISING HEAD

CALCS, SKETCH MAPS, ETC.:

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 17:38:27
Report from file: ...\SN11262 2005-02-26 162552 17mw12sf.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw12sf

Test defined on: 2/26/2005 16:16:35
Test started on: 2/26/2005 16:25:52
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data poin Minutes.
Number of data samples: 97

TOTAL DATA SAMPLES 97

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 12.83 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho
2/26/2005	16:25:52	0	63.45	0		
2/26/2005	16:25:52	0.005	63.5	-0.007		
2/26/2005	16:25:52	0.01	63.52	-0.01		
2/26/2005	16:25:53	0.015	63.52	-0.012		
2/26/2005	16:25:53	0.02	63.52	-0.013		
2/26/2005	16:25:53	0.025	63.52	-0.013		
2/26/2005	16:25:54	0.03	63.52	-0.014		
2/26/2005	16:25:54	0.035	63.54	-0.016		
2/26/2005	16:25:54	0.04	63.54	-0.019		
2/26/2005	16:25:55	0.045	63.54	-0.017		
2/26/2005	16:25:55	0.05	63.54	-0.025		
2/26/2005	16:25:55	0.055	63.54	-0.019		
2/26/2005	16:25:55	0.06	63.54	-0.014		
2/26/2005	16:25:56	0.065	63.54	-0.679		
2/26/2005	16:25:56	0.07	63.54	-3.224		
2/26/2005	16:25:56	0.075	63.54	-4.809		
2/26/2005	16:25:57	0.08	63.57	-4.601		
2/26/2005	16:25:57	0.085	63.57	-2.753		
2/26/2005	16:25:57	0.09	63.57	-2.07		
2/26/2005	16:25:58	0.095	63.57	-2.142		
2/26/2005	16:25:58	0.1	63.54	-1.188		
2/26/2005	16:25:58	0.1058	63.57	-1.397		
2/26/2005	16:25:59	0.112	63.57	-1.929		
2/26/2005	16:25:59	0.1185	63.57	-2.128		
2/26/2005	16:25:59	0.1255	63.57	-1.903		
2/26/2005	16:26:00	0.1328	63.57	-1.679		
2/26/2005	16:26:00	0.1407	63.57	-1.734		
2/26/2005	16:26:01	0.149	63.57	-1.794	0	1 ho
2/26/2005	16:26:01	0.1578	63.57	-1.733	0.0088	0.965998
2/26/2005	16:26:02	0.1672	63.52	-1.674	0.0182	0.93311
2/26/2005	16:26:02	0.177	63.52	-1.669	0.028	0.930323

Plotted data

2/26/2005	16:26:03	0.1875	63.52	-1.643	0.0385	0.915831
2/26/2005	16:26:04	0.1985	63.52	-1.609	0.0495	0.896878
2/26/2005	16:26:04	0.2102	63.52	-1.588	0.0612	0.885173
2/26/2005	16:26:05	0.2227	63.52	-1.553	0.0737	0.865663
2/26/2005	16:26:06	0.2358	63.52	-1.53	0.0868	0.852843
2/26/2005	16:26:07	0.2498	63.52	-1.505	0.1008	0.838907
2/26/2005	16:26:08	0.2647	63.52	-1.477	0.1157	0.8233
2/26/2005	16:26:09	0.2803	63.5	-1.451	0.1313	0.808807
2/26/2005	16:26:10	0.297	63.5	-1.423	0.148	0.7932
2/26/2005	16:26:11	0.3147	63.5	-1.373	0.1657	0.765329
2/26/2005	16:26:12	0.3333	63.5	-1.382	0.1843	0.770346
2/26/2005	16:26:13	0.3532	63.5	-1.338	0.2042	0.745819
2/26/2005	16:26:14	0.3742	63.5	-1.312	0.2252	0.731327
2/26/2005	16:26:16	0.3963	63.5	-1.284	0.2473	0.715719
2/26/2005	16:26:17	0.4198	63.5	-1.255	0.2708	0.699554
2/26/2005	16:26:19	0.4447	63.5	-1.222	0.2957	0.681159
2/26/2005	16:26:20	0.4697	63.48	-1.194	0.3207	0.665552
2/26/2005	16:26:22	0.4963	63.48	-1.169	0.3473	0.651616
2/26/2005	16:26:23	0.5247	63.48	-1.142	0.3757	0.636566
2/26/2005	16:26:25	0.5547	63.48	-1.11	0.4057	0.618729
2/26/2005	16:26:27	0.5863	63.45	-1.08	0.4373	0.602007
2/26/2005	16:26:29	0.6213	63.45	-1.048	0.4723	0.584169
2/26/2005	16:26:31	0.658	63.43	-1.016	0.509	0.566332
2/26/2005	16:26:34	0.6963	63.43	-0.985	0.5473	0.549052
2/26/2005	16:26:36	0.738	63.41	-0.952	0.589	0.530658
2/26/2005	16:26:39	0.7813	63.41	-0.92	0.6323	0.512821
2/26/2005	16:26:42	0.828	63.39	-0.885	0.679	0.493311
2/26/2005	16:26:44	0.8763	63.39	-0.853	0.7273	0.475474
2/26/2005	16:26:48	0.928	63.36	-0.819	0.779	0.456522
2/26/2005	16:26:51	0.983	63.36	-0.785	0.834	0.43757
2/26/2005	16:26:54	1.0413	63.34	-0.752	0.8923	0.419175
2/26/2005	16:26:58	1.103	63.34	-0.718	0.954	0.400223
2/26/2005	16:27:02	1.168	63.32	-0.685	1.019	0.381828
2/26/2005	16:27:06	1.238	63.32	-0.651	1.089	0.362876
2/26/2005	16:27:11	1.3113	63.32	-0.617	1.1623	0.343924
2/26/2005	16:27:15	1.3897	63.3	-0.584	1.2407	0.32553
2/26/2005	16:27:20	1.473	63.3	-0.551	1.324	0.307135
2/26/2005	16:27:26	1.5613	63.3	-0.518	1.4123	0.28874
2/26/2005	16:27:31	1.6547	63.3	-0.486	1.5057	0.270903
2/26/2005	16:27:37	1.753	63.3	-0.455	1.604	0.259623
2/26/2005	16:27:43	1.858	63.27	-0.426	1.709	0.237458
2/26/2005	16:27:50	1.968	63.27	-0.396	1.819	0.220736
2/26/2005	16:27:57	2.0847	63.27	-0.367	1.9357	0.204571
2/26/2005	16:28:04	2.2097	63.25	-0.34	2.0607	0.189521
2/26/2005	16:28:12	2.3413	63.25	-0.316	2.1923	0.176143
2/26/2005	16:28:21	2.4813	63.23	-0.287	2.3323	0.159978
2/26/2005	16:28:30	2.6297	63.23	-0.262	2.4807	0.146042
2/26/2005	16:28:39	2.7863	63.21	-0.239	2.6373	0.133222
2/26/2005	16:28:49	2.953	63.21	-0.217	2.804	0.120959
2/26/2005	16:29:00	3.1297	63.18	-0.196	2.9807	0.109253
2/26/2005	16:29:11	3.3163	63.18	-0.175	3.1673	0.097547
2/26/2005	16:29:23	3.5147	63.16	-0.159	3.3657	0.088629
2/26/2005	16:29:35	3.7247	63.16	-0.144	3.5757	0.080268
2/26/2005	16:29:49	3.9463	63.16	-0.128	3.7973	0.071349
2/26/2005	16:30:03	4.1813	63.16	-0.113	4.0323	0.062988
2/26/2005	16:30:18	4.4297	63.14	-0.102	4.2807	0.056856
2/26/2005	16:30:33	4.693	63.14	-0.091	4.544	0.050725
2/26/2005	16:30:50	4.973	63.14	-0.081	4.824	0.045151
2/26/2005	16:31:08	5.2697	63.14	-0.072	5.1207	0.040134
2/26/2005	16:31:27	5.583	63.12	-0.062	5.434	0.03456
2/26/2005	16:31:47	5.9147	63.12	-0.055	5.7657	0.030658
2/26/2005	16:32:08	6.2663	63.12	-0.05	6.1173	0.027871
2/26/2005	16:32:30	6.6397	63.12	-0.043	6.4907	0.023969
2/26/2005	16:32:54	7.0347	63.12	-0.039	6.8857	0.021739
2/26/2005	16:33:19	7.453	63.12	-0.035	7.304	0.019509
2/26/2005	16:33:46	7.8963	63.14	-0.031	7.7473	0.01728

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 17:40:33
Report from file: ...\SN11262 2005-02-26 163634 17mw12sr.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw12sr

Test defined on: 2/26/2005 16:17:33
Test started on: 2/26/2005 16:36:34
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: Minutes.
Number of data samples: 99

TOTAL DATA SAMPLES 99

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 12.851 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/26/2005	16:36:34	0	63.18	0			Pollied data
2/26/2005	16:36:34	0.005	63.23	-0.007			
2/26/2005	16:36:35	0.01	63.23	-0.011			
2/26/2005	16:36:35	0.015	63.25	-0.009			
2/26/2005	16:36:35	0.02	63.25	-0.014			
2/26/2005	16:36:36	0.025	63.25	-0.014			
2/26/2005	16:36:36	0.03	63.25	-0.01			
2/26/2005	16:36:36	0.035	63.25	-0.013			
2/26/2005	16:36:37	0.04	63.27	-0.015			
2/26/2005	16:36:37	0.045	63.27	-0.015			
2/26/2005	16:36:37	0.05	63.27	-0.014			
2/26/2005	16:36:37	0.055	63.27	-0.014			
2/26/2005	16:36:38	0.06	63.27	-0.014			
2/26/2005	16:36:38	0.065	63.27	-0.014			
2/26/2005	16:36:38	0.07	63.27	-0.027			
2/26/2005	16:36:39	0.075	63.27	0.01			
2/26/2005	16:36:39	0.08	63.27	0.622			
2/26/2005	16:36:39	0.085	63.27	5.126			
2/26/2005	16:36:40	0.09	63.27	2.229			
2/26/2005	16:36:40	0.095	63.27	2.223			
2/26/2005	16:36:40	0.1	63.27	2.771			
2/26/2005	16:36:41	0.1058	63.27	2.315			
2/26/2005	16:36:41	0.112	63.27	2.124			
2/26/2005	16:36:41	0.1185	63.27	2.337	0	1	ho
2/26/2005	16:36:42	0.1255	63.27	2.217	0.007	0.948652	
2/26/2005	16:36:42	0.1328	63.27	2.147	0.0143	0.918699	
2/26/2005	16:36:43	0.1407	63.27	2.124	0.0222	0.908858	
2/26/2005	16:36:43	0.149	63.27	2.102	0.0305	0.899444	
2/26/2005	16:36:44	0.1578	63.27	2.074	0.0393	0.887463	
2/26/2005	16:36:44	0.1672	63.25	2.05	0.0487	0.677193	
2/26/2005	16:36:45	0.177	63.25	2.023	0.0585	0.86564	

2/26/2005	16:36:45	0.1875	63.25	1.997	0.069	0.854514
2/26/2005	16:36:46	0.1985	63.25	1.969	0.08	0.842533
2/26/2005	16:36:47	0.2102	63.25	1.942	0.0917	0.83098
2/26/2005	16:36:48	0.2227	63.25	1.914	0.1042	0.818999
2/26/2005	16:36:48	0.2358	63.25	1.887	0.1173	0.807445
2/26/2005	16:36:49	0.2498	63.25	1.856	0.1313	0.794181
2/26/2005	16:36:50	0.2647	63.25	1.827	0.1462	0.781772
2/26/2005	16:36:51	0.2803	63.25	1.796	0.1618	0.768507
2/26/2005	16:36:52	0.297	63.25	1.765	0.1785	0.755242
2/26/2005	16:36:53	0.3147	63.25	1.732	0.1962	0.741121
2/26/2005	16:36:54	0.3333	63.23	1.699	0.2148	0.727
2/26/2005	16:36:55	0.3532	63.23	1.666	0.2347	0.71288
2/26/2005	16:36:57	0.3742	63.25	1.632	0.2557	0.698331
2/26/2005	16:36:58	0.3963	63.25	1.596	0.2778	0.682927
2/26/2005	16:36:59	0.4198	63.23	1.559	0.3013	0.667095
2/26/2005	16:37:01	0.4447	63.25	1.524	0.3262	0.652118
2/26/2005	16:37:02	0.4697	63.25	1.487	0.3512	0.636286
2/26/2005	16:37:04	0.4963	63.25	1.451	0.3778	0.620681
2/26/2005	16:37:06	0.5247	63.25	1.414	0.4062	0.605049
2/26/2005	16:37:07	0.5547	63.25	1.375	0.4362	0.588361
2/26/2005	16:37:09	0.5863	63.25	1.336	0.4678	0.571673
2/26/2005	16:37:11	0.6213	63.25	1.295	0.5028	0.554129
2/26/2005	16:37:14	0.658	63.25	1.253	0.5395	0.536157
2/26/2005	16:37:16	0.6963	63.25	1.212	0.5778	0.518614
2/26/2005	16:37:18	0.738	63.25	1.168	0.6195	0.499786
2/26/2005	16:37:21	0.7813	63.25	1.125	0.6628	0.481386
2/26/2005	16:37:24	0.828	63.25	1.081	0.7095	0.462569
2/26/2005	16:37:27	0.8763	63.27	1.037	0.7578	0.443731
2/26/2005	16:37:30	0.928	63.27	0.992	0.8095	0.424476
2/26/2005	16:37:33	0.983	63.27	0.947	0.8645	0.40522
2/26/2005	16:37:37	1.0413	63.27	0.901	0.9228	0.385537
2/26/2005	16:37:40	1.103	63.27	0.856	0.9845	0.366282
2/26/2005	16:37:44	1.168	63.27	0.814	1.0495	0.348031
2/26/2005	16:37:48	1.238	63.27	0.768	1.1195	0.328626
2/26/2005	16:37:53	1.3113	63.27	0.724	1.1928	0.309799
2/26/2005	16:37:58	1.3897	63.27	0.679	1.2712	0.290543
2/26/2005	16:38:03	1.473	63.27	0.637	1.3545	0.272572
2/26/2005	16:38:08	1.5613	63.27	0.594	1.4428	0.254172
2/26/2005	16:38:13	1.6547	63.27	0.554	1.5362	0.237056
2/26/2005	16:38:19	1.753	63.27	0.514	1.6345	0.21994
2/26/2005	16:38:26	1.858	63.3	0.476	1.7395	0.20368
2/26/2005	16:38:32	1.968	63.3	0.44	1.8495	0.188276
2/26/2005	16:38:39	2.0847	63.27	0.403	1.9662	0.172443
2/26/2005	16:38:47	2.2097	63.27	0.368	2.0912	0.157467
2/26/2005	16:38:55	2.3413	63.27	0.338	2.2228	0.14463
2/26/2005	16:39:03	2.4813	63.27	0.308	2.3628	0.131793
2/26/2005	16:39:12	2.6297	63.27	0.28	2.5112	0.119812
2/26/2005	16:39:21	2.7863	63.27	0.253	2.6678	0.108258
2/26/2005	16:39:31	2.953	63.25	0.229	2.8345	0.097989
2/26/2005	16:39:42	3.1297	63.23	0.207	3.0112	0.088575
2/26/2005	16:39:53	3.3163	63.23	0.187	3.1978	0.080017
2/26/2005	16:40:05	3.5147	63.21	0.166	3.3962	0.071031
2/26/2005	16:40:18	3.7247	63.21	0.15	3.6062	0.064185
2/26/2005	16:40:31	3.9463	63.18	0.134	3.8278	0.057338
2/26/2005	16:40:45	4.1813	63.18	0.12	4.0628	0.051348
2/26/2005	16:41:00	4.4297	63.18	0.107	4.3112	0.045785
2/26/2005	16:41:16	4.693	63.18	0.095	4.5745	0.04065
2/26/2005	16:41:33	4.973	63.18	0.085	4.8545	0.036371
2/26/2005	16:41:50	5.2697	63.18	0.076	5.1512	0.03252
2/26/2005	16:42:09	5.583	63.18	0.07	5.4645	0.029953
2/26/2005	16:42:29	5.9147	63.18	0.064	5.7962	0.027386
2/26/2005	16:42:50	6.2663	63.18	0.057	6.1478	0.02439
2/26/2005	16:43:13	6.6397	63.21	0.053	6.5212	0.022679
2/26/2005	16:43:36	7.0347	63.21	0.048	6.9162	0.020539
2/26/2005	16:44:01	7.453	63.21	0.044	7.3345	0.018828
2/26/2005	16:44:28	7.8963	63.23	0.042	7.7778	0.017972
2/26/2005	16:44:56	8.3663	63.23	0.038	8.2478	0.01626
2/26/2005	16:45:26	8.8647	63.23	0.037	8.7462	0.015832

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW12D
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By: FRanser
Checked By: CD

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	0.31 = To

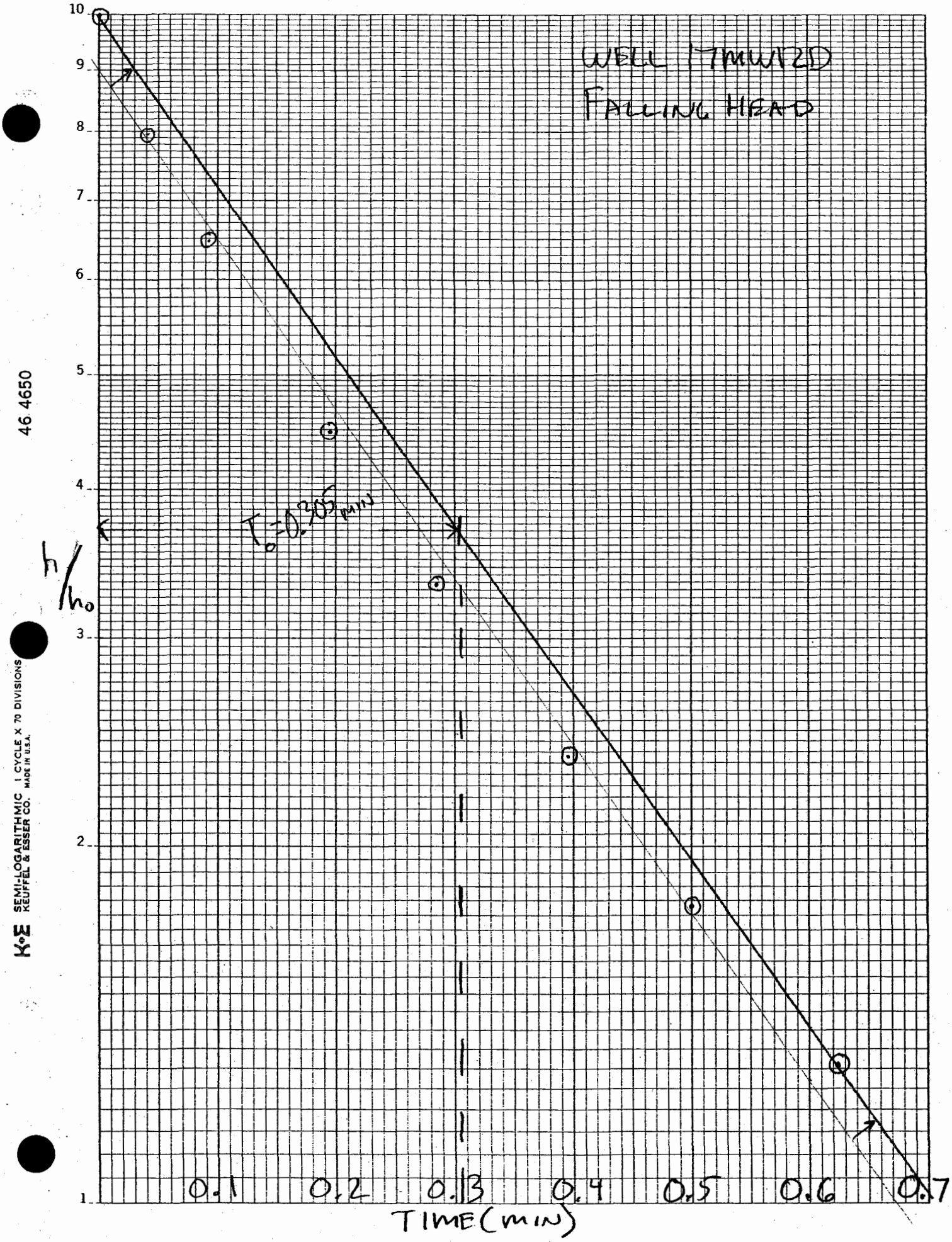
Hydraulic Conductivity (K) :

5.45E-03	ft./min.
9.08E-05	ft./sec.
7.85E+00	ft./day
2.77E-03	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW12D
FALLING HEAD
$T_0 = 0.285$ min
h/h₀
10
9
8
7
6
5
4
3
2
1
0.1
0.2
0.3
0.4
0.5
0.6
0.7
TIME (MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW12D
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By:
Checked By: CD

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	0.28 = To

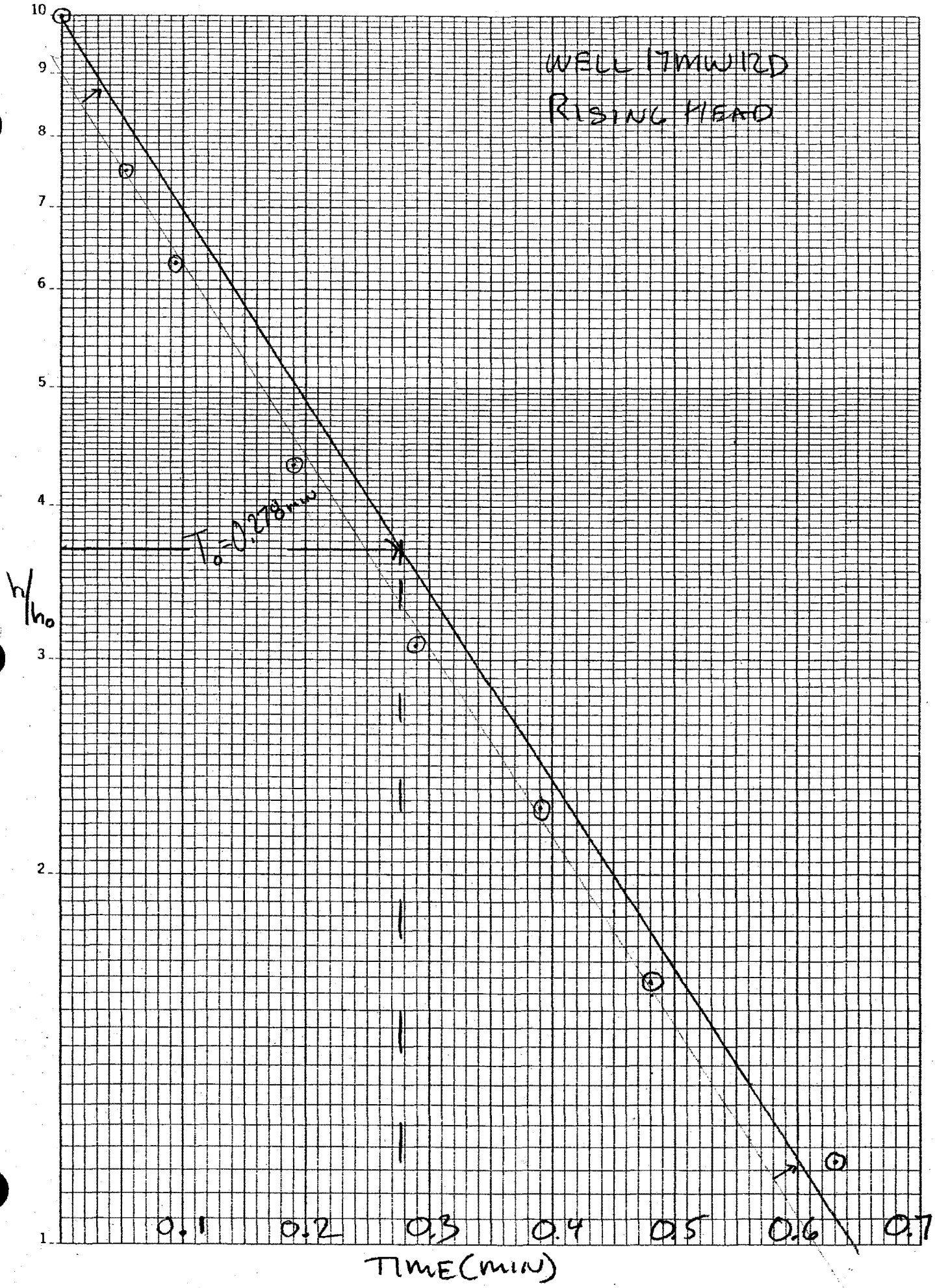
Hydraulic Conductivity (K) :

5.98E-03	ft./min.
9.97E-05	ft./sec.
8.61E+00	ft./day
3.04E-03	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******



K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS KEUFFEL & ESSER CO. MADE IN U.S.A. 46 4650

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: CHARLESTON NWS SWMU 16/17 WELL/BORING NO.: 17MW12D

PROJECT NO.: 0528 GEOLOGIST: FRED W RAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10, 18-28 TEST NO.: 1+2

STATIC WATER LEVEL (Depth/Elevation): 4.10 DATE: 2/26/05

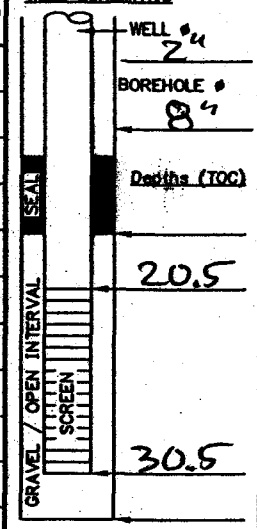
TEST TYPE (Rising/Falling/Constant Head): FALLING + RISING CHECKED: C Doolan

METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG 0.13'x4.9' PAGE ..... OF .....

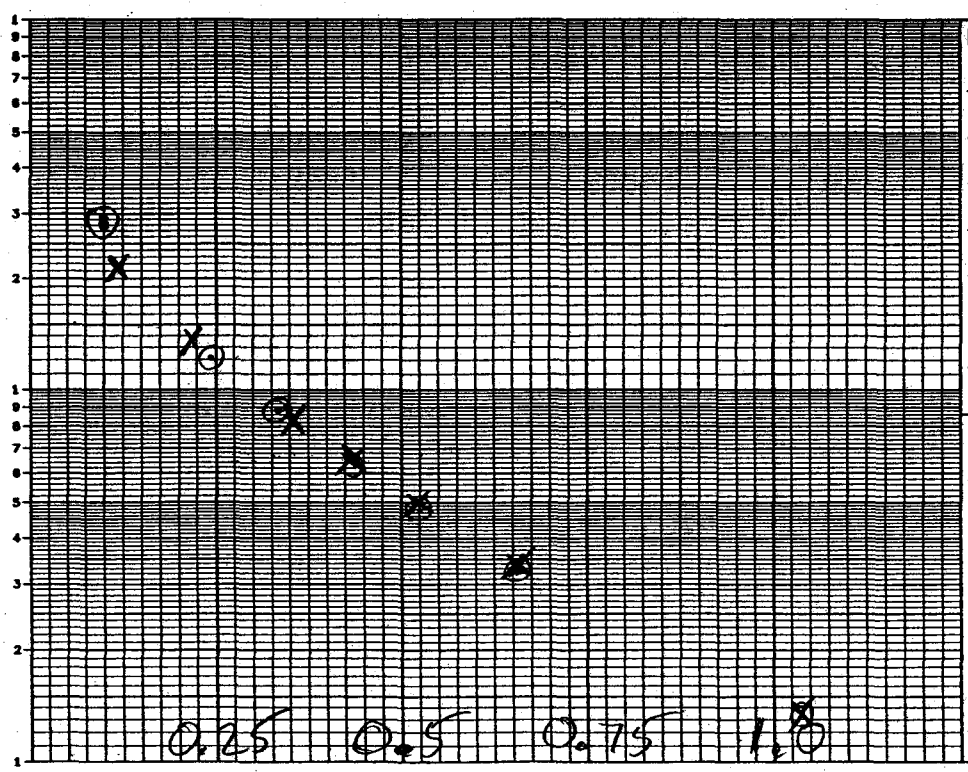
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): .....

← FALLING HEAD →			← RISING HEAD →		
ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.1185		3.097	0.090		3.138
0.1578		1.869	0.1185		2.155
0.1985		1.489	0.1407		1.921
0.2498		1.211	0.1672		1.701
0.2970		1.018	0.2227		1.35
0.3333		0.895	0.2803		1.085
0.3742		0.778	0.3532		0.841
0.4447		0.621	0.4447		0.626
0.5247		0.487	0.5247		0.492
0.6580		0.334	0.6580		0.340
1.0413		0.138	1.0413		0.138
1.4730		0.070	1.4730		0.066

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

FALLINGHEAD

START: 1700

STOP: 1707

RISING START: 1709

STOP 1718

⊙ - FALLINGHEAD

X - RISINGHEAD

CALCS, SKETCH MAPS, ETC.:

ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 17:46:49
Report from file: ...\SN11262 2005-02-26 170001 17mw12df.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw12df

Test defined on: 2/26/2005 16:20:22
Test started on: 2/26/2005 17:00:01
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data po Minutes.
Number of data samples: 95

TOTAL DATA SAMPLES 95

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 12.178 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/26/2005	17:00:01	0	65.19	0			Plotted data
2/26/2005	17:00:02	0.005	65.23	-0.008			
2/26/2005	17:00:02	0.01	65.23	-0.011			
2/26/2005	17:00:02	0.015	65.23	-0.013			
2/26/2005	17:00:03	0.02	65.26	-0.013			
2/26/2005	17:00:03	0.025	65.26	-0.013			
2/26/2005	17:00:03	0.03	65.26	-0.014			
2/26/2005	17:00:04	0.035	65.26	-0.014			
2/26/2005	17:00:04	0.04	65.26	-0.017			
2/26/2005	17:00:04	0.045	65.26	-0.019			
2/26/2005	17:00:04	0.05	65.28	-0.02			
2/26/2005	17:00:05	0.055	65.28	-0.025			
2/26/2005	17:00:05	0.06	65.28	-0.025			
2/26/2005	17:00:05	0.065	65.28	-0.019			
2/26/2005	17:00:06	0.07	65.28	-0.015			
2/26/2005	17:00:06	0.075	65.28	-0.015			
2/26/2005	17:00:06	0.08	65.28	-0.025			
2/26/2005	17:00:07	0.085	65.28	-1.111			
2/26/2005	17:00:07	0.09	65.28	-2.482			
2/26/2005	17:00:07	0.095	65.28	-3.002			
2/26/2005	17:00:07	0.1	65.28	-3.157			
2/26/2005	17:00:08	0.1058	65.28	-3.092			
2/26/2005	17:00:08	0.112	65.3	-3.102			
2/26/2005	17:00:09	0.1185	65.28	-3.097			
2/26/2005	17:00:09	0.1255	65.3	-2.599			
2/26/2005	17:00:09	0.1328	65.28	-1.614			
2/26/2005	17:00:10	0.1407	65.3	-1.437			
2/26/2005	17:00:10	0.149	65.3	-1.778			
2/26/2005	17:00:11	0.1578	65.3	-1.869			ho
2/26/2005	17:00:12	0.1672	65.26	-1.717	0.0094	0.918673	
2/26/2005	17:00:12	0.177	65.26	-1.618	0.0192	0.865704	

2/26/2005	17:00:13	0.1875	65.26	-1.559	0.0297	0.834136
2/26/2005	17:00:13	0.1985	65.23	-1.489	0.0407	0.796683
2/26/2005	17:00:14	0.2102	65.23	-1.418	0.0524	0.758694
2/26/2005	17:00:15	0.2227	65.23	-1.347	0.0649	0.720706
2/26/2005	17:00:16	0.2358	65.23	-1.278	0.078	0.683788
2/26/2005	17:00:16	0.2498	65.21	-1.211	0.092	0.64794
2/26/2005	17:00:17	0.2647	65.21	-1.139	0.1069	0.609417
2/26/2005	17:00:18	0.2803	65.21	-1.08	0.1225	0.577849
2/26/2005	17:00:19	0.297	65.19	-1.018	0.1392	0.544676
2/26/2005	17:00:20	0.3147	65.19	-0.955	0.1569	0.510968
2/26/2005	17:00:21	0.3333	65.17	-0.895	0.1755	0.478866
2/26/2005	17:00:23	0.3532	65.14	-0.838	0.1954	0.448368
2/26/2005	17:00:24	0.3742	65.14	-0.778	0.2164	0.416265
2/26/2005	17:00:25	0.3963	65.12	-0.725	0.2385	0.387908
2/26/2005	17:00:27	0.4198	65.1	-0.671	0.262	0.359016
2/26/2005	17:00:28	0.4447	65.08	-0.621	0.28691	0.332263
2/26/2005	17:00:30	0.4697	65.05	-0.573	0.3119	0.306581
2/26/2005	17:00:31	0.4963	65.03	-0.53	0.3385	0.283574
2/26/2005	17:00:33	0.5247	65.01	-0.487	0.3669	0.260567
2/26/2005	17:00:35	0.5547	64.96	-0.446	0.3969	0.238663
2/26/2005	17:00:37	0.5863	64.94	-0.407	0.4285	0.217764
2/26/2005	17:00:39	0.6213	64.9	-0.37	0.4635	0.197967
2/26/2005	17:00:41	0.658	64.87	-0.334	0.5002	0.178705
2/26/2005	17:00:43	0.6963	64.83	-0.302	0.5385	0.161584
2/26/2005	17:00:46	0.738	64.81	-0.271	0.5802	0.144997
2/26/2005	17:00:48	0.7813	64.76	-0.246	0.6235	0.131621
2/26/2005	17:00:51	0.828	64.74	-0.219	0.6702	0.117175
2/26/2005	17:00:54	0.8763	64.72	-0.195	0.7185	0.104334
2/26/2005	17:00:57	0.928	64.67	-0.175	0.7702	0.093633
2/26/2005	17:01:00	0.983	64.65	-0.156	0.8252	0.083467
2/26/2005	17:01:04	1.0413	64.63	-0.138	0.8835	0.073836
2/26/2005	17:01:08	1.103	64.6	-0.123	0.9452	0.065811
2/26/2005	17:01:12	1.168	64.6	-0.109	1.0102	0.05832
2/26/2005	17:01:16	1.238	64.58	-0.098	1.0802	0.052434
2/26/2005	17:01:20	1.3113	64.56	-0.086	1.1535	0.046014
2/26/2005	17:01:25	1.3897	64.54	-0.078	1.2319	0.041734
2/26/2005	17:01:30	1.473	64.51	-0.07	1.3152	0.037453
2/26/2005	17:01:35	1.5613	64.49	-0.062	1.4035	0.033173
2/26/2005	17:01:41	1.6547	64.47	-0.056	1.4969	0.029963
2/26/2005	17:01:47	1.753	64.42	-0.051	1.5952	0.027287
2/26/2005	17:01:53	1.858	64.4	-0.047	1.7002	0.025147
2/26/2005	17:02:00	1.968	64.36	-0.043	1.8102	0.023007
2/26/2005	17:02:07	2.0847	64.31	-0.04	1.9269	0.021402
2/26/2005	17:02:14	2.2097	64.27	-0.037	2.0519	0.019797
2/26/2005	17:02:22	2.3413	64.2	-0.034	2.1835	0.018192
2/26/2005	17:02:30	2.4813	64.15	-0.032	2.3235	0.017121
2/26/2005	17:02:39	2.6297	64.09	-0.029	2.4719	0.015516
2/26/2005	17:02:49	2.7863	64.04	-0.028	2.6285	0.014981
2/26/2005	17:02:59	2.953	64	-0.026	2.7952	0.013911
2/26/2005	17:03:09	3.1297	63.95	-0.024	2.9719	0.012841
2/26/2005	17:03:20	3.3163	63.91	-0.023	3.1585	0.012306
2/26/2005	17:03:32	3.5147	63.86	-0.021	3.3569	0.011236
2/26/2005	17:03:45	3.7247	63.82	-0.021	3.5669	0.011236
2/26/2005	17:03:58	3.9463	63.79	-0.021	3.7885	0.011236
2/26/2005	17:04:12	4.1813	63.79	-0.02	4.0235	0.010701
2/26/2005	17:04:27	4.4297	63.79	-0.02	4.2719	0.010701
2/26/2005	17:04:43	4.693	63.82	-0.02	4.5352	0.010701
2/26/2005	17:05:00	4.973	63.82	-0.018	4.8152	0.009631
2/26/2005	17:05:18	5.2697	63.82	-0.017	5.1119	0.009096
2/26/2005	17:05:36	5.583	63.79	-0.017	5.4252	0.009096
2/26/2005	17:05:56	5.9147	63.77	-0.018	5.7569	0.009631
2/26/2005	17:06:17	6.2663	63.75	-0.018	6.1085	0.009631
2/26/2005	17:06:40	6.6397	63.66	-0.018	6.4819	0.009631
2/26/2005	17:07:04	7.0347	63.57	-0.017	6.8769	0.009096

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 17:50:53
Report from file: ...\SN11262 2005-02-26 170905 17mw12dr.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw12dr

Test defined on: 2/26/2005 16:21:47
Test started on: 2/26/2005 17:09:05
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data point: Minutes.
Number of data samples: 89

TOTAL DATA SAMPLES 89

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 12.192 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho
2/26/2005	17:09:05	0	63.88	0		
2/26/2005	17:09:05	0.005	63.93	-0.007		
2/26/2005	17:09:06	0.01	63.95	-0.01		
2/26/2005	17:09:06	0.015	63.95	-0.012		
2/26/2005	17:09:06	0.02	63.95	-0.013		
2/26/2005	17:09:07	0.025	63.97	-0.012		
2/26/2005	17:09:07	0.03	63.97	-0.014		
2/26/2005	17:09:07	0.035	63.97	-0.014		
2/26/2005	17:09:08	0.04	63.97	-0.014		
2/26/2005	17:09:08	0.045	63.97	-0.014		
2/26/2005	17:09:08	0.05	63.97	-0.015		
2/26/2005	17:09:08	0.055	63.97	-0.015		
2/26/2005	17:09:09	0.06	63.97	-0.015		
2/26/2005	17:09:09	0.065	63.97	-0.015		
2/26/2005	17:09:09	0.07	63.97	-0.015		
2/26/2005	17:09:10	0.075	63.97	0.23		
2/26/2005	17:09:10	0.08	64	3.615		
2/26/2005	17:09:10	0.085	63.97	3.843		
2/26/2005	17:09:11	0.09	63.97	3.138		
2/26/2005	17:09:11	0.095	64	2.367		
2/26/2005	17:09:11	0.1	64	2.354		
2/26/2005	17:09:11	0.1058	64	2.359	0	1
2/26/2005	17:09:12	0.112	64	2.249	0.0062	0.95337
2/26/2005	17:09:12	0.1185	64	2.155	0.0127	0.913523
2/26/2005	17:09:13	0.1255	64	2.076	0.0197	0.880034

Plotted data

ho

2/26/2005	17:09:13	0.1328	64	2	0.027	0.847817
2/26/2005	17:09:14	0.1407	64	1.921	0.0349	0.814328
2/26/2005	17:09:14	0.149	64	1.845	0.0432	0.782111
2/26/2005	17:09:15	0.1578	64	1.771	0.052	0.750742
2/26/2005	17:09:15	0.1672	63.97	1.701	0.0614	0.721068
2/26/2005	17:09:16	0.177	63.97	1.629	0.0712	0.690547
2/26/2005	17:09:16	0.1875	63.97	1.558	0.0817	0.660449
2/26/2005	17:09:17	0.1985	63.97	1.488	0.0927	0.630776
2/26/2005	17:09:18	0.2102	63.97	1.419	0.1044	0.601526
2/26/2005	17:09:18	0.2227	63.97	1.35	0.1169	0.572276
2/26/2005	17:09:19	0.2358	63.97	1.282	0.13	0.543451
2/26/2005	17:09:20	0.2498	63.97	1.214	0.144	0.514625
2/26/2005	17:09:21	0.2647	64	1.15	0.1589	0.487495
2/26/2005	17:09:22	0.2803	64	1.085	0.1745	0.459941
2/26/2005	17:09:23	0.297	64	1.021	0.1912	0.432811
2/26/2005	17:09:24	0.3147	64.02	0.959	0.2089	0.406528
2/26/2005	17:09:25	0.3333	64.02	0.899	0.2275	0.381094
2/26/2005	17:09:26	0.3532	64.04	0.841	0.2474	0.356507
2/26/2005	17:09:28	0.3742	64.04	0.784	0.2684	0.332344
2/26/2005	17:09:29	0.3963	64.06	0.73	0.2905	0.309453
2/26/2005	17:09:30	0.4198	64.06	0.677	0.314	0.286986
2/26/2005	17:09:32	0.4447	64.09	0.626	0.3389	0.265367
2/26/2005	17:09:33	0.4697	64.11	0.579	0.3639	0.245443
2/26/2005	17:09:35	0.4963	64.13	0.534	0.3905	0.226367
2/26/2005	17:09:37	0.5247	64.15	0.492	0.4189	0.208563
2/26/2005	17:09:38	0.5547	64.18	0.451	0.4489	0.191183
2/26/2005	17:09:40	0.5863	64.2	0.411	0.4805	0.174226
2/26/2005	17:09:42	0.6213	64.22	0.374	0.5155	0.158542
2/26/2005	17:09:45	0.658	64.24	0.34	0.5522	0.144129
2/26/2005	17:09:47	0.6963	64.29	0.307	0.5905	0.13014
2/26/2005	17:09:49	0.738	64.31	0.276	0.6322	0.116999
2/26/2005	17:09:52	0.7813	64.33	0.247	0.6755	0.104705
2/26/2005	17:09:55	0.828	64.38	0.222	0.7222	0.094108
2/26/2005	17:09:58	0.8763	64.4	0.198	0.7705	0.083934
2/26/2005	17:10:01	0.928	64.42	0.176	0.8222	0.074608
2/26/2005	17:10:04	0.983	64.47	0.157	0.8772	0.066554
2/26/2005	17:10:08	1.0413	64.49	0.138	0.9355	0.058499
2/26/2005	17:10:11	1.103	64.54	0.123	0.9972	0.052141
2/26/2005	17:10:15	1.168	64.58	0.109	1.0622	0.046206
2/26/2005	17:10:19	1.238	64.6	0.096	1.1322	0.040695
2/26/2005	17:10:24	1.3113	64.65	0.085	1.2055	0.036032
2/26/2005	17:10:28	1.3897	64.69	0.074	1.2839	0.031369
2/26/2005	17:10:33	1.473	64.74	0.066	1.3672	0.027978
2/26/2005	17:10:39	1.5613	64.78	0.058	1.4555	0.024587
2/26/2005	17:10:44	1.6547	64.83	0.052	1.5489	0.022043
2/26/2005	17:10:50	1.753	64.87	0.047	1.6472	0.019924
2/26/2005	17:10:57	1.858	64.92	0.042	1.7522	0.017804
2/26/2005	17:11:03	1.968	64.96	0.038	1.8622	0.016109
2/26/2005	17:11:10	2.0847	65.01	0.035	1.9789	0.014837
2/26/2005	17:11:18	2.2097	65.05	0.032	2.1039	0.013565
2/26/2005	17:11:26	2.3413	65.12	0.03	2.2355	0.012717
2/26/2005	17:11:34	2.4813	65.17	0.028	2.3755	0.011869
2/26/2005	17:11:43	2.6297	65.23	0.025	2.5239	0.010598
2/26/2005	17:11:52	2.7863	65.3	0.024	2.6805	0.010174
2/26/2005	17:12:02	2.953	65.35	0.022	2.8472	0.009326
2/26/2005	17:12:13	3.1297	65.41	0.021	3.0239	0.008902
2/26/2005	17:12:24	3.3163	65.46	0.019	3.2105	0.008054
2/26/2005	17:12:36	3.5147	65.5	0.017	3.4089	0.007206
2/26/2005	17:12:49	3.7247	65.55	0.016	3.6189	0.006783
2/26/2005	17:13:02	3.9463	65.57	0.015	3.8405	0.006359
2/26/2005	17:13:16	4.1813	65.59	0.016	4.0755	0.006783
2/26/2005	17:13:31	4.4297	65.59	0.016	4.3239	0.006783
2/26/2005	17:13:47	4.693	65.57	0.014	4.5872	0.005935
2/26/2005	17:14:03	4.973	65.55	0.014	4.8672	0.005935

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW13S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By: RWR
Checked By: CD

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	1.40 = To

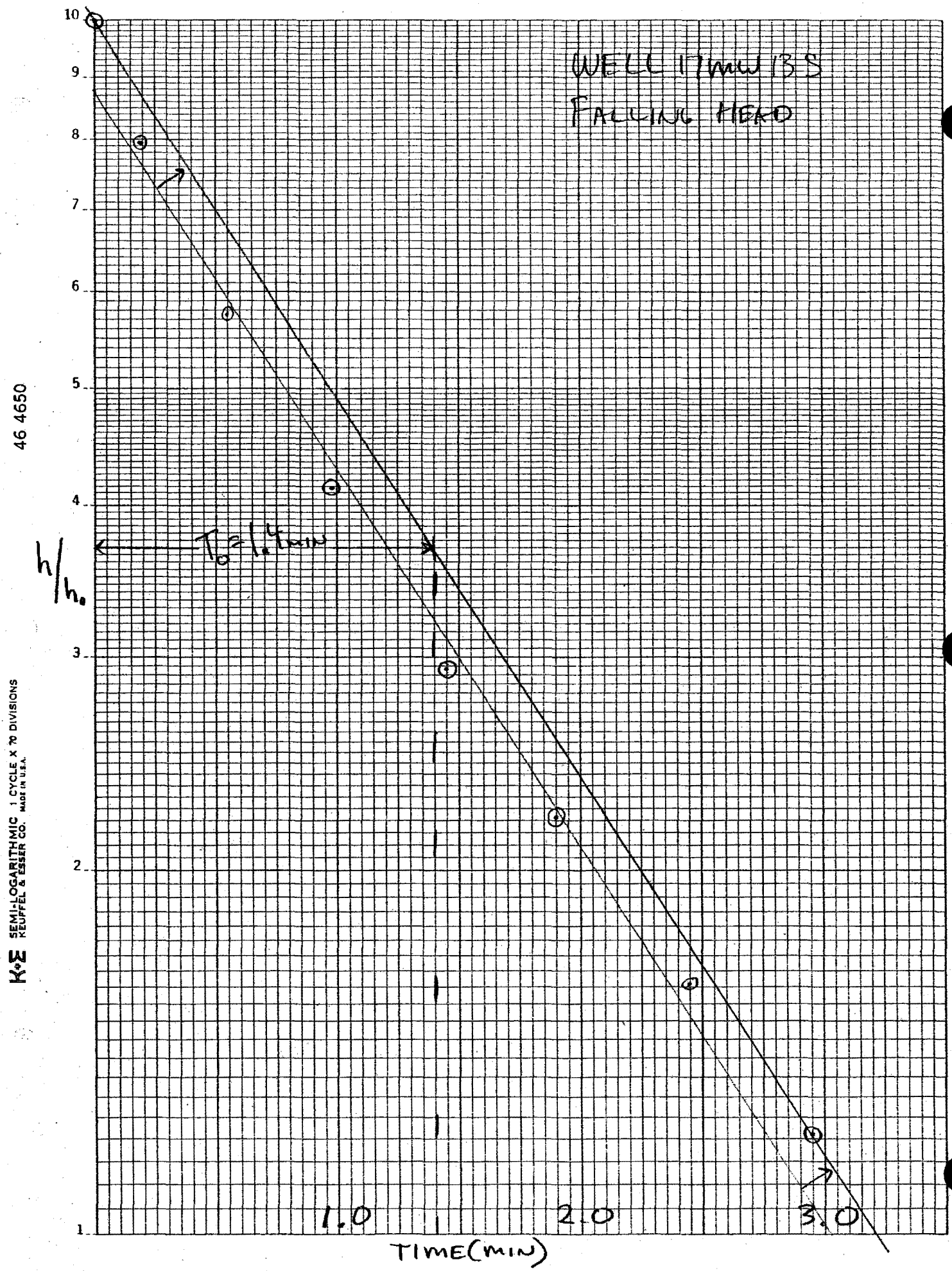
Hydraulic Conductivity (K) :

1.19E-03	ft./min.
1.98E-05	ft./sec.
1.71E+00	ft./day
6.03E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW13S
FALLING HEAD
$T_0 = 1.4$ min
h/h_0
10
9
8
7
6
5
4
3
2
1
1.0
2.0
3.0
TIME (MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW13S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By:
Checked By: CD

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	1.30 = To

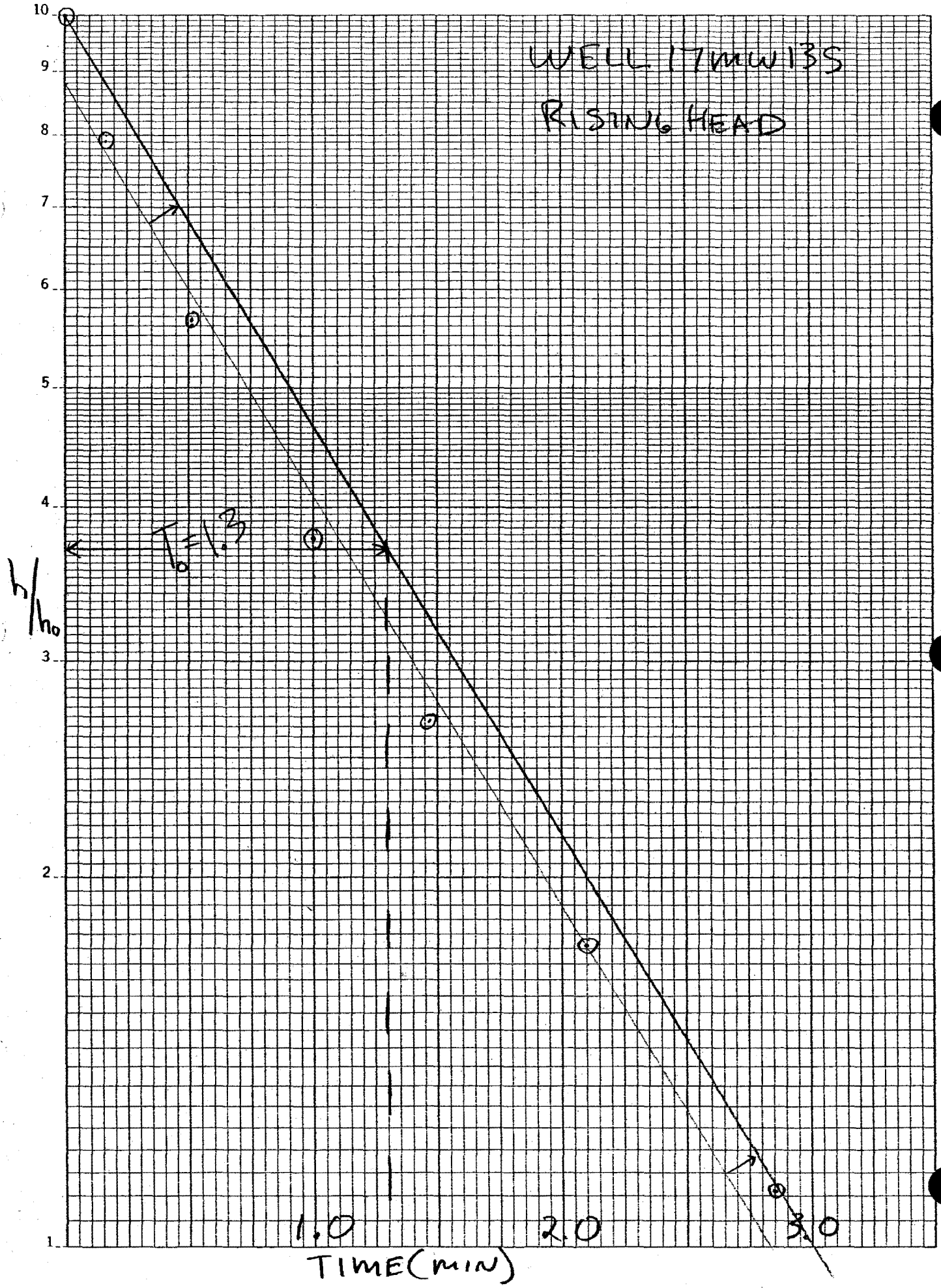
Hydraulic Conductivity (K) :

1.28E-03	ft./min.
2.13E-05	ft./sec.
1.84E+00	ft./day
6.50E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW13S
RISING HEAD
$T_0 = 1.3$
h/h_0
10
9
8
7
6
5
4
3
2
1
1.0
2.0
3.0
TIME (MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: CHARLESTON NWS SWMU 16/17 WELL/BORING NO.: 17MW13S

PROJECT NO.: 0528 GEOLOGIST: FRED W RAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10, 4'-14' TEST NO.: 1+2

STATIC WATER LEVEL (Depth/Elevation): 2.60 DATE: 2-28-05

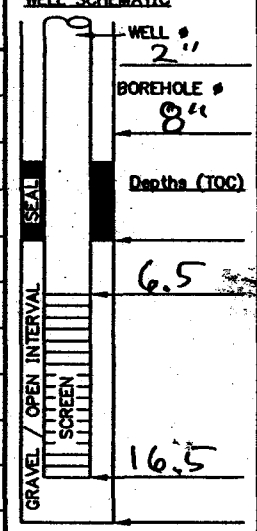
TEST TYPE (Rising/Falling/Constant Head): FALLING + RISING CHECKED: C Doolan

METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG: 0.13 x 4.9' PAGE 1 OF 1

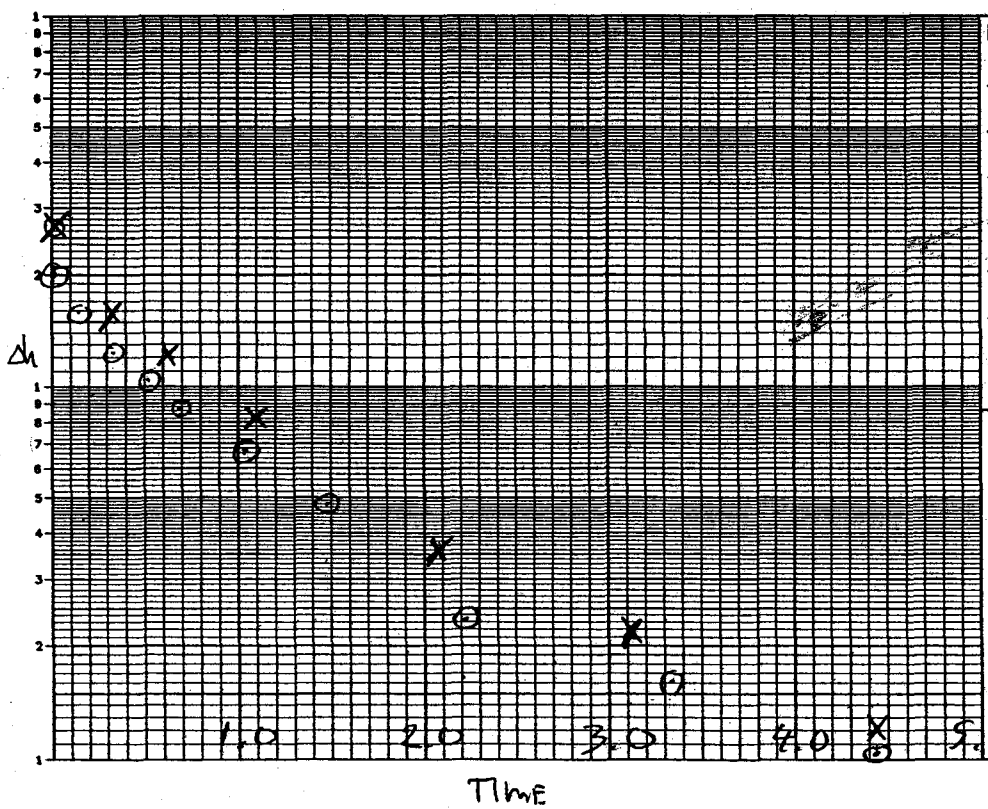
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

FALLING HEAD			RISING HEAD		
ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
.1490		1.658	0.075		2.635
.3333		1.214	0.1058		2.014
0.5247		1.015	0.1720		1.877
0.6963		0.878	0.3333		1.579
1.0413		0.667	0.6213		1.210
1.4730		0.486	0.8280		1.010
2.2097		0.236	1.1030		0.804
3.3163		0.161	1.5613		0.573
4.4297		0.104	2.0847		0.406
5.2697		0.075	3.1297		0.224
			4.4297		0.124
			5.5830		0.084

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS: FALLING HEAD: START: 1025 END: 1032. RISING HEAD: START: 1035 END: 1043

CALCS, SKETCH MAPS, ETC.:

⊙ = FALLING

X = RISING HEAD

ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

In-Situ Inc. MiniTroll Pro

Report generated: 3/1/2005 8:03:28
Report from file: ...\SN11262 2005-02-28 102542 17mw13sf.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw13sf

Test defined on: 2/28/2005 10:23:45
Test started on: 2/28/2005 10:25:42
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: Minutes.
Number of data samples: 90

TOTAL DATA SAMPLES 90

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.665 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho
2/28/2005	10:25:42	0	63.07	0		Plotted data
2/28/2005	10:25:42	0.005	63.12	-0.011		
2/28/2005	10:25:42	0.01	63.14	-0.014		
2/28/2005	10:25:43	0.015	63.14	-0.017		
2/28/2005	10:25:43	0.02	63.14	-0.017		
2/28/2005	10:25:43	0.025	63.14	-0.019		
2/28/2005	10:25:43	0.03	63.16	-0.019		
2/28/2005	10:25:44	0.035	63.16	-0.02		
2/28/2005	10:25:44	0.04	63.16	-0.019		
2/28/2005	10:25:44	0.045	63.16	-0.019		
2/28/2005	10:25:45	0.05	63.16	-0.02		
2/28/2005	10:25:45	0.055	63.16	-0.02		
2/28/2005	10:25:45	0.06	63.16	-0.022		
2/28/2005	10:25:46	0.065	63.16	-0.024		
2/28/2005	10:25:46	0.07	63.16	-0.022		
2/28/2005	10:25:46	0.075	63.16	-0.026		
2/28/2005	10:25:46	0.08	63.16	-0.017		
2/28/2005	10:25:47	0.085	63.16	-0.029		
2/28/2005	10:25:47	0.09	63.16	-0.054		
2/28/2005	10:25:47	0.095	63.16	-0.359		
2/28/2005	10:25:48	0.1	63.18	-2.683		
2/28/2005	10:25:48	0.1058	63.18	-4.376		
2/28/2005	10:25:48	0.112	63.18	-3.733		
2/28/2005	10:25:49	0.1185	63.18	-1.447		
2/28/2005	10:25:49	0.1255	63.18	-0.654		
2/28/2005	10:25:50	0.1328	63.18	-1.228		
2/28/2005	10:25:50	0.1407	63.18	-1.637		
2/28/2005	10:25:51	0.149	63.18	-1.658		
2/28/2005	10:25:51	0.1578	63.18	-1.465		
2/28/2005	10:25:52	0.1672	63.14	-1.429		
2/28/2005	10:25:52	0.177	63.14	-1.467	0	1 ho

2/28/2005	10:25:53	0.1875	63.14	-1.447	0.0105	0.986367
2/28/2005	10:25:54	0.1985	63.14	-1.409	0.0215	0.960464
2/28/2005	10:25:54	0.2102	63.12	-1.396	0.0332	0.951602
2/28/2005	10:25:55	0.2227	63.12	-1.378	0.0457	0.939332
2/28/2005	10:25:56	0.2358	63.12	-1.353	0.0588	0.92229
2/28/2005	10:25:57	0.2498	63.12	-1.331	0.0728	0.907294
2/28/2005	10:25:57	0.2647	63.12	-1.31	0.0877	0.892979
2/28/2005	10:25:58	0.2803	63.12	-1.286	0.1033	0.876619
2/28/2005	10:25:59	0.297	63.12	-1.264	0.12	0.861622
2/28/2005	10:26:00	0.3147	63.12	-1.239	0.1377	0.844581
2/28/2005	10:26:02	0.3333	63.12	-1.214	0.1563	0.827539
2/28/2005	10:26:03	0.3532	63.12	-1.19	0.1762	0.811179
2/28/2005	10:26:04	0.3742	63.12	-1.165	0.1972	0.794138
2/28/2005	10:26:05	0.3963	63.12	-1.14	0.2193	0.777096
2/28/2005	10:26:07	0.4198	63.12	-1.115	0.2428	0.760055
2/28/2005	10:26:08	0.4447	63.12	-1.089	0.2677	0.742331
2/28/2005	10:26:10	0.4697	63.12	-1.065	0.2927	0.725971
2/28/2005	10:26:11	0.4963	63.12	-1.041	0.3193	0.709611
2/28/2005	10:26:13	0.5247	63.12	-1.015	0.3477	0.691888
2/28/2005	10:26:15	0.5547	63.12	-0.989	0.3777	0.674165
2/28/2005	10:26:17	0.5863	63.12	-0.962	0.4093	0.65576
2/28/2005	10:26:19	0.6213	63.12	-0.934	0.4443	0.636673
2/28/2005	10:26:21	0.658	63.12	-0.907	0.481	0.618269
2/28/2005	10:26:23	0.6963	63.12	-0.878	0.5193	0.5985
2/28/2005	10:26:26	0.738	63.12	-0.848	0.561	0.578905
2/28/2005	10:26:28	0.7813	63.12	-0.819	0.6043	0.558282
2/28/2005	10:26:31	0.828	63.12	-0.789	0.651	0.537832
2/28/2005	10:26:34	0.8763	63.09	-0.76	0.6993	0.518064
2/28/2005	10:26:37	0.928	63.09	-0.73	0.751	0.497614
2/28/2005	10:26:41	0.983	63.09	-0.7	0.806	0.477164
2/28/2005	10:26:44	1.0413	63.09	-0.667	0.8643	0.454669
2/28/2005	10:26:48	1.103	63.09	-0.639	0.926	0.435583
2/28/2005	10:26:52	1.168	63.07	-0.608	0.991	0.414451
2/28/2005	10:26:56	1.238	63.07	-0.577	1.061	0.39332
2/28/2005	10:27:00	1.3113	63.07	-0.547	1.1343	0.37287
2/28/2005	10:27:05	1.3897	63.05	-0.517	1.2127	0.35242
2/28/2005	10:27:10	1.473	63.05	-0.486	1.296	0.331288
2/28/2005	10:27:15	1.5613	63.05	-0.457	1.3843	0.31152
2/28/2005	10:27:21	1.6547	63.03	-0.431	1.4777	0.293797
2/28/2005	10:27:27	1.753	63.03	-0.403	1.576	0.27471
2/28/2005	10:27:33	1.858	63	-0.377	1.681	0.256987
2/28/2005	10:27:40	1.968	63	-0.352	1.791	0.239945
2/28/2005	10:27:47	2.0847	63	-0.325	1.9077	0.223541
2/28/2005	10:27:54	2.2097	63	-0.302	2.0327	0.205862
2/28/2005	10:28:02	2.3413	63	-0.279	2.1643	0.190184
2/28/2005	10:28:10	2.4813	62.98	-0.257	2.3043	0.175187
2/28/2005	10:28:19	2.6297	62.98	-0.236	2.4527	0.160873
2/28/2005	10:28:29	2.7863	62.98	-0.216	2.6093	0.147239
2/28/2005	10:28:39	2.953	62.98	-0.197	2.776	0.134288
2/28/2005	10:28:49	3.1297	62.98	-0.179	2.9527	0.122018
2/28/2005	10:29:01	3.3163	62.96	-0.161	3.1393	0.109748
2/28/2005	10:29:12	3.5147	62.96	-0.149	3.3377	0.101568
2/28/2005	10:29:25	3.7247	62.96	-0.138	3.5477	0.09407
2/28/2005	10:29:38	3.9463	62.94	-0.125	3.7693	0.085208
2/28/2005	10:29:52	4.1813	62.94	-0.114	4.0043	0.07771
2/28/2005	10:30:07	4.4297	62.94	-0.104	4.2527	0.070893
2/28/2005	10:30:23	4.693	62.91	-0.093	4.516	0.063395
2/28/2005	10:30:40	4.973	62.91	-0.083	4.796	0.056578
2/28/2005	10:30:58	5.2697	62.91	-0.075	5.0927	0.051125

In-Situ Inc. MiniTroll Pro

Report generated: 3/1/2005 8:05:35
Report from file: ...\SN11262 2005-02-28 103511 17mw13sr.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw13sr

Test defined on: 2/28/2005 10:24:29
Test started on: 2/28/2005 10:35:11
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: Minutes.
Number of data samples: 92

TOTAL DATA SAMPLES 92

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.698 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho
2/28/2005	10:35:11	0	62.85	0		
2/28/2005	10:35:11	0.005	62.89	-0.009		
2/28/2005	10:35:11	0.01	62.89	-0.013		
2/28/2005	10:35:12	0.015	62.91	-0.015		
2/28/2005	10:35:12	0.02	62.91	-0.015		
2/28/2005	10:35:12	0.025	62.91	-0.017		
2/28/2005	10:35:13	0.03	62.94	-0.016		
2/28/2005	10:35:13	0.035	62.94	-0.017		
2/28/2005	10:35:13	0.04	62.94	-0.016		
2/28/2005	10:35:14	0.045	62.94	-0.016		
2/28/2005	10:35:14	0.05	62.94	-0.016		
2/28/2005	10:35:14	0.055	62.94	-0.017		
2/28/2005	10:35:14	0.06	62.94	1.605		
2/28/2005	10:35:15	0.065	62.94	4.862		
2/28/2005	10:35:15	0.07	62.94	0.824		
2/28/2005	10:35:15	0.075	62.94	2.635		
2/28/2005	10:35:16	0.08	62.94	2.411		
2/28/2005	10:35:16	0.085	62.94	1.709		
2/28/2005	10:35:16	0.09	62.94	2.453		
2/28/2005	10:35:17	0.095	62.94	1.88		
2/28/2005	10:35:17	0.1	62.94	2.14	0	1 ho
2/28/2005	10:35:17	0.1058	62.94	2.014	0.0058	0.941121
2/28/2005	10:35:18	0.112	62.94	2.051	0.012	0.958411
2/28/2005	10:35:18	0.1185	62.96	1.982	0.0185	0.926168
2/28/2005	10:35:18	0.1255	62.96	2.011	0.0255	0.93972

Plotted data

2/28/2005	10:35:19	0.1328	62.96	1.957	0.0328	0.914486
2/28/2005	10:35:19	0.1407	62.96	1.956	0.0407	0.914019
2/28/2005	10:35:20	0.149	62.96	1.935	0.049	0.904206
2/28/2005	10:35:20	0.1578	62.96	1.911	0.0578	0.892991
2/28/2005	10:35:21	0.1672	62.91	1.897	0.0672	0.886449
2/28/2005	10:35:21	0.177	62.91	1.877	0.077	0.877103
2/28/2005	10:35:22	0.1875	62.91	1.848	0.0875	0.863551
2/28/2005	10:35:23	0.1985	62.91	1.824	0.0985	0.852336
2/28/2005	10:35:23	0.2102	62.91	1.798	0.1102	0.840187
2/28/2005	10:35:24	0.2227	62.91	1.772	0.1227	0.828037
2/28/2005	10:35:25	0.2358	62.91	1.746	0.1358	0.815888
2/28/2005	10:35:26	0.2498	62.91	1.72	0.1498	0.803738
2/28/2005	10:35:27	0.2647	62.89	1.694	0.1647	0.791589
2/28/2005	10:35:28	0.2803	62.89	1.666	0.1803	0.778505
2/28/2005	10:35:29	0.297	62.89	1.638	0.197	0.765421
2/28/2005	10:35:30	0.3147	62.89	1.609	0.2147	0.751869
2/28/2005	10:35:31	0.3333	62.89	1.579	0.2333	0.73785
2/28/2005	10:35:32	0.3532	62.89	1.548	0.2532	0.723364
2/28/2005	10:35:33	0.3742	62.89	1.516	0.2742	0.708411
2/28/2005	10:35:35	0.3963	62.89	1.485	0.2963	0.693925
2/28/2005	10:35:36	0.4198	62.89	1.451	0.3198	0.678037
2/28/2005	10:35:37	0.4447	62.89	1.417	0.3447	0.66215
2/28/2005	10:35:39	0.4697	62.89	1.385	0.3697	0.647196
2/28/2005	10:35:41	0.4963	62.89	1.351	0.3963	0.631308
2/28/2005	10:35:42	0.5247	62.89	1.317	0.4247	0.615421
2/28/2005	10:35:44	0.5547	62.89	1.282	0.4547	0.599065
2/28/2005	10:35:46	0.5863	62.89	1.247	0.4863	0.58271
2/28/2005	10:35:48	0.6213	62.89	1.21	0.5213	0.565421
2/28/2005	10:35:50	0.658	62.89	1.17	0.558	0.546729
2/28/2005	10:35:53	0.6963	62.89	1.131	0.5963	0.528505
2/28/2005	10:35:55	0.738	62.89	1.089	0.638	0.508879
2/28/2005	10:35:58	0.7813	62.89	1.05	0.6813	0.490654
2/28/2005	10:36:00	0.828	62.89	1.01	0.728	0.471963
2/28/2005	10:36:03	0.8763	62.89	0.969	0.7763	0.452804
2/28/2005	10:36:06	0.928	62.89	0.928	0.828	0.433645
2/28/2005	10:36:10	0.983	62.89	0.886	0.883	0.414019
2/28/2005	10:36:13	1.0413	62.89	0.844	0.9413	0.394393
2/28/2005	10:36:17	1.103	62.89	0.804	1.003	0.375701
2/28/2005	10:36:21	1.168	62.89	0.764	1.068	0.357009
2/28/2005	10:36:25	1.238	62.91	0.726	1.138	0.339252
2/28/2005	10:36:29	1.3113	62.89	0.686	1.2113	0.320561
2/28/2005	10:36:34	1.3897	62.91	0.649	1.2897	0.303271
2/28/2005	10:36:39	1.473	62.91	0.61	1.373	0.285047
2/28/2005	10:36:44	1.5613	62.91	0.573	1.4613	0.267757
2/28/2005	10:36:50	1.6547	62.89	0.539	1.5547	0.251869
2/28/2005	10:36:56	1.753	62.89	0.504	1.653	0.235514
2/28/2005	10:37:02	1.858	62.89	0.469	1.758	0.219159
2/28/2005	10:37:09	1.968	62.89	0.437	1.868	0.204206
2/28/2005	10:37:16	2.0847	62.89	0.406	1.9847	0.18972
2/28/2005	10:37:23	2.2097	62.89	0.378	2.1097	0.176636
2/28/2005	10:37:31	2.3413	62.89	0.349	2.2413	0.163084
2/28/2005	10:37:40	2.4813	62.89	0.321	2.3813	0.15
2/28/2005	10:37:49	2.6297	62.89	0.295	2.5297	0.13785
2/28/2005	10:37:58	2.7863	62.89	0.27	2.6863	0.126168
2/28/2005	10:38:08	2.953	62.87	0.245	2.853	0.114486
2/28/2005	10:38:19	3.1297	62.87	0.224	3.0297	0.104673
2/28/2005	10:38:30	3.3163	62.87	0.203	3.2163	0.09486
2/28/2005	10:38:42	3.5147	62.87	0.184	3.4147	0.085981
2/28/2005	10:38:54	3.7247	62.87	0.166	3.6247	0.07757
2/28/2005	10:39:08	3.9463	62.87	0.153	3.8463	0.071495
2/28/2005	10:39:22	4.1813	62.85	0.136	4.0813	0.063551
2/28/2005	10:39:37	4.4297	62.85	0.124	4.3297	0.057944
2/28/2005	10:39:52	4.693	62.85	0.111	4.593	0.051869
2/28/2005	10:40:09	4.973	62.85	0.105	4.873	0.049065
2/28/2005	10:40:27	5.2697	62.85	0.089	5.1697	0.041589
2/28/2005	10:40:46	5.583	62.85	0.084	5.483	0.039252
2/28/2005	10:41:06	5.9147	62.85	0.081	5.8147	0.03785

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW14S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By: FVR
Checked By: SJC 5/17/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	4.08 = To

Hydraulic Conductivity (K) :

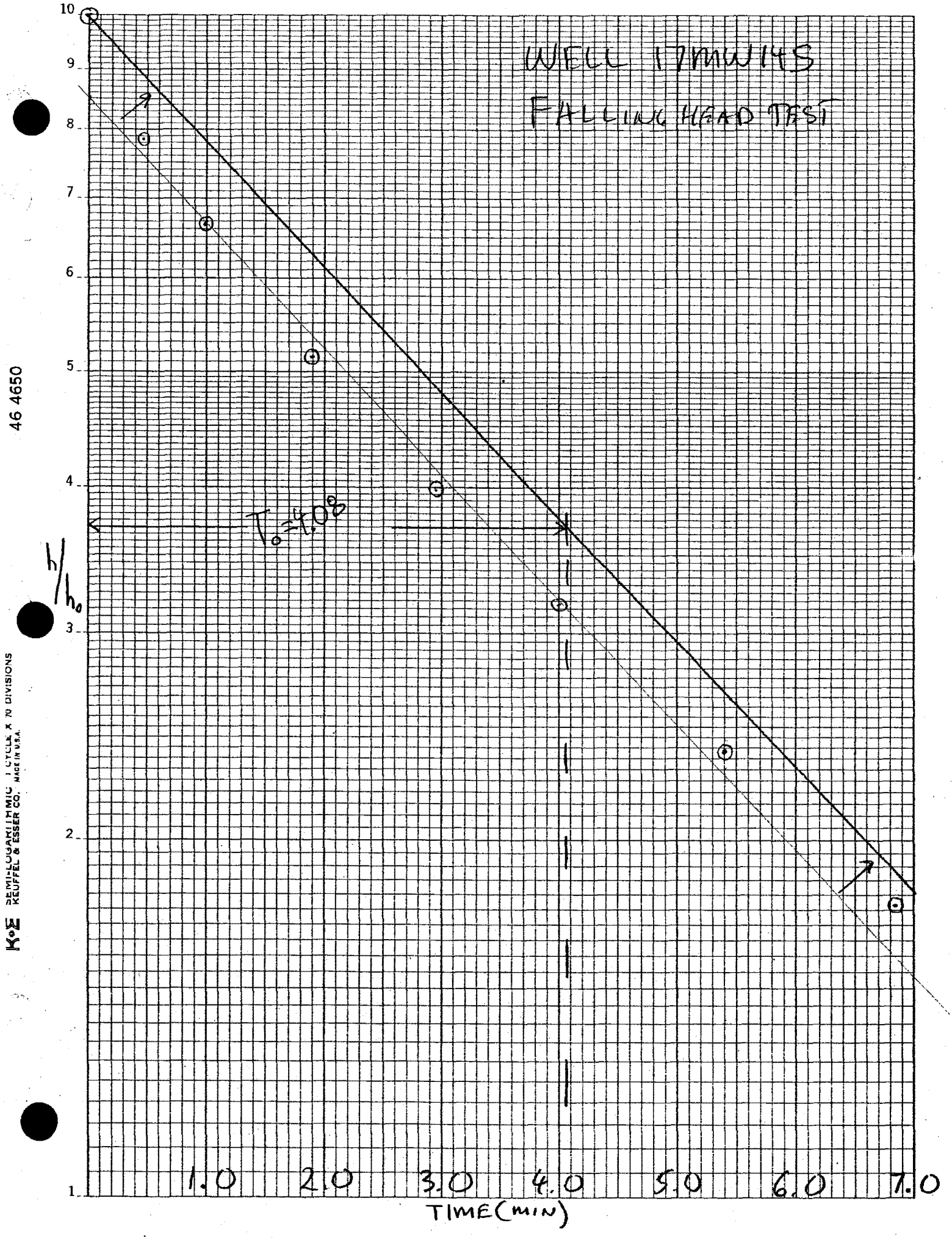
4.07E-04	ft./min.
6.79E-06	ft./sec.
5.87E-01	ft./day
2.07E-04	cm./sec.

= .6 ft/day

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW145
FALLING HEAD TEST
$T_0 = 4.0^s$
h/h₀
10
9
8
7
6
5
4
3
2
1
1.0
2.0
3.0
4.0
5.0
6.0
7.0
TIME (MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW14S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By:
Checked By: SJC 5/17/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	4.55 = To

Hydraulic Conductivity (K) :

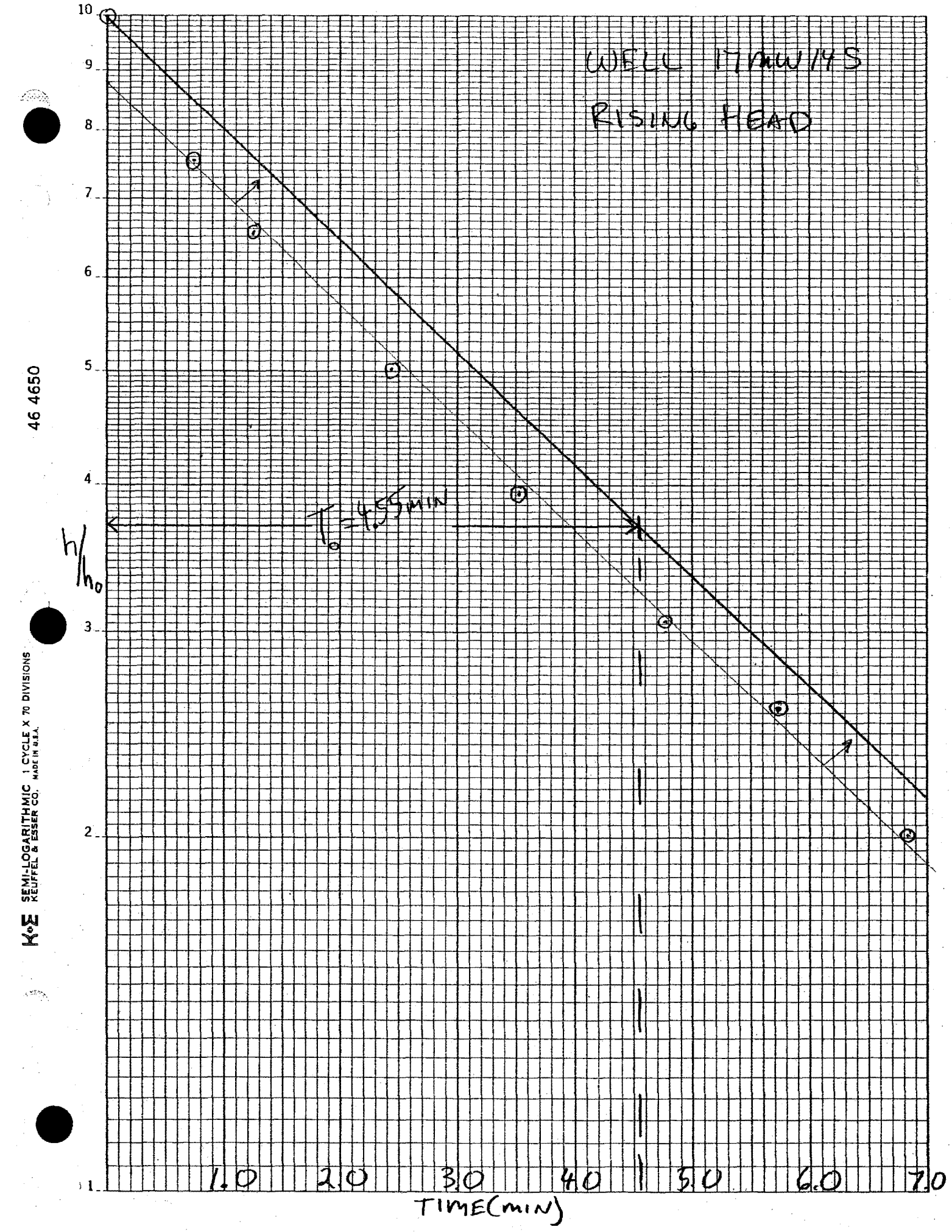
3.65E-04	ft./min.
6.09E-06	ft./sec.
5.26E-01	ft./day *
1.86E-04	cm./sec.

.5 ft/day

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW14S
RISING HEAD
T_0=4.55 MIN
h/h0
10
9
8
7
6
5
4
3
2
1
1.0
2.0
3.0
4.0
5.0
6.0
7.0
TIME(MIN)
46 4650
K&E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: CHARLESTON NWS SWMU 17 WELL/BORING NO.: 17MW14S

PROJECT NO.: 0528 GEOLOGIST: FRED WRAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10', 4-14 BGS TEST NO.: 1+2

STATIC WATER LEVEL (Depth/Elevation): 2.84 DATE: 2-26-05

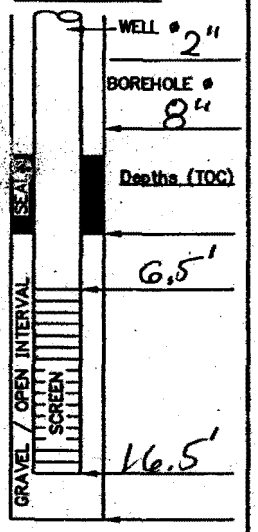
TEST TYPE (Rising/Falling/Constant Head): FALLING + RISING CHECKED: SJC 5/17/05

METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG PAGE 1 OF 1

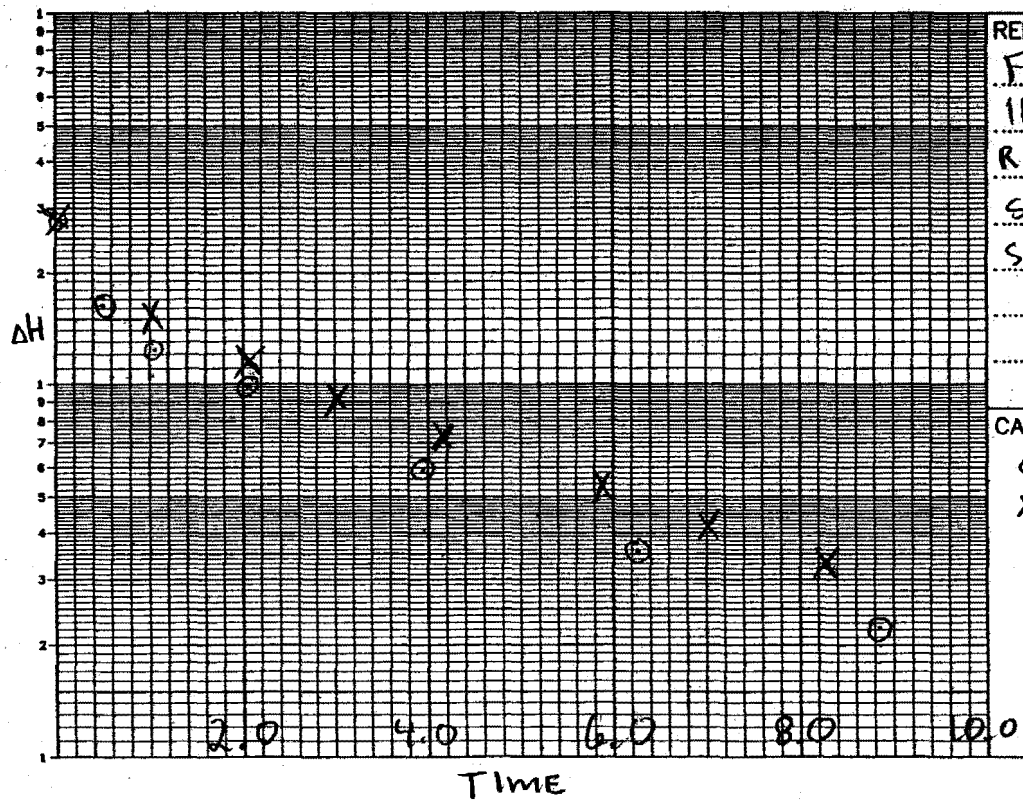
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.):

← FALLING HEAD →			← RISING HEAD →		
ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.1328		2.889	0.1328		2.898
0.1770		1.776	0.1672		1.904
0.4963		1.466	0.3147		1.85
1.0413		1.232	1.0413		1.511
2.08		0.916	2.08		1.171
3.1297		0.208	3.12		0.922
3.9463		0.593	4.18		0.737
5.2697		0.451	5.91		0.526
6.2663		0.367	7.03		0.428
7.8963		0.269	8.36		0.336
8.86		0.226	10.54		0.237
10.54		0.170	11.83		0.202

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:
FALLING HEAD STARTED: 1128 HRS, STOPPED: 1219
RISING HEAD
START: 1221
STOP: 1243

CALCS, SKETCH MAPS, ETC.:
⊙ = FALLING HEAD
X = RISING HEAD

ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 17:04:28
Report from file: ...\SN11262 2005-02-26 122120 17mw14sr.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw14sr

Test defined on: 2/26/2005 11:15:20
Test started on: 2/26/2005 12:21:20
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10.0000 Minutes.
Number of data samples: 115

TOTAL DATA SAMPLES 115

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.519 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/26/2005	12:21:20	0	62.6	0			Plotted data
2/26/2005	12:21:20	0.005	62.64	-0.007			
2/26/2005	12:21:20	0.01	62.64	-0.009			
2/26/2005	12:21:20	0.015	62.67	-0.01			
2/26/2005	12:21:21	0.02	62.67	-0.012			
2/26/2005	12:21:21	0.025	62.67	-0.012			
2/26/2005	12:21:21	0.03	62.67	-0.013			
2/26/2005	12:21:22	0.035	62.67	-0.013			
2/26/2005	12:21:22	0.04	62.67	-0.013			
2/26/2005	12:21:22	0.045	62.69	-0.012			
2/26/2005	12:21:23	0.05	62.69	-0.012			
2/26/2005	12:21:23	0.055	62.69	-0.012			
2/26/2005	12:21:23	0.06	62.69	-0.014			
2/26/2005	12:21:23	0.065	62.69	-0.014			
2/26/2005	12:21:24	0.07	62.69	-0.014			
2/26/2005	12:21:24	0.075	62.69	-0.014			
2/26/2005	12:21:24	0.08	62.69	-0.015			
2/26/2005	12:21:25	0.085	62.69	-0.014			
2/26/2005	12:21:25	0.09	62.69	-0.014			
2/26/2005	12:21:25	0.095	62.69	-0.014			
2/26/2005	12:21:26	0.1	62.69	-0.069			
2/26/2005	12:21:26	0.1058	62.71	0.256			
2/26/2005	12:21:26	0.112	62.71	3.344			
2/26/2005	12:21:27	0.1185	62.69	3.566			
2/26/2005	12:21:27	0.1255	62.69	0.559			
2/26/2005	12:21:27	0.1328	62.69	2.898			
2/26/2005	12:21:28	0.1407	62.69	1.82			
2/26/2005	12:21:28	0.149	62.69	1.862			
2/26/2005	12:21:29	0.1578	62.71	2.128			
2/26/2005	12:21:30	0.1672	62.67	1.904			
2/26/2005	12:21:30	0.177	62.67	1.889			
2/26/2005	12:21:31	0.1875	62.67	2.057	0	1	ho
2/26/2005	12:21:31	0.1985	62.67	1.859	0.011	0.903743	
2/26/2005	12:21:32	0.2102	62.67	1.897	0.0227	0.922217	
2/26/2005	12:21:33	0.2227	62.64	1.936	0.0352	0.941176	
2/26/2005	12:21:34	0.2358	62.64	1.916	0.0483	0.931454	

2/26/2005	12:21:34	0.2498	62.64	1.894	0.0623	0.920758
2/26/2005	12:21:35	0.2647	62.64	1.88	0.0772	0.913952
2/26/2005	12:21:36	0.2803	62.64	1.87	0.0928	0.909091
2/26/2005	12:21:37	0.297	62.67	1.861	0.1095	0.904716
2/26/2005	12:21:38	0.3147	62.64	1.85	0.1272	0.899368
2/26/2005	12:21:40	0.3333	62.64	1.839	0.1458	0.89402
2/26/2005	12:21:41	0.3532	62.64	1.828	0.1657	0.888673
2/26/2005	12:21:42	0.3742	62.67	1.816	0.1867	0.882839
2/26/2005	12:21:43	0.3963	62.67	1.803	0.2088	0.876519
2/26/2005	12:21:45	0.4198	62.67	1.791	0.2323	0.870685
2/26/2005	12:21:46	0.4447	62.67	1.778	0.2572	0.864366
2/26/2005	12:21:48	0.4697	62.67	1.766	0.2822	0.858532
2/26/2005	12:21:49	0.4963	62.67	1.752	0.3088	0.851726
2/26/2005	12:21:51	0.5247	62.67	1.737	0.3372	0.844434
2/26/2005	12:21:53	0.5547	62.67	1.722	0.3672	0.837141
2/26/2005	12:21:55	0.5863	62.67	1.707	0.3988	0.829849
2/26/2005	12:21:57	0.6213	62.67	1.691	0.4338	0.822071
2/26/2005	12:21:59	0.658	62.67	1.673	0.4705	0.81332
2/26/2005	12:22:01	0.6963	62.67	1.656	0.5088	0.805056
2/26/2005	12:22:04	0.738	62.69	1.638	0.5505	0.796305
2/26/2005	12:22:06	0.7813	62.69	1.619	0.5938	0.787069
2/26/2005	12:22:09	0.828	62.69	1.599	0.6405	0.777346
2/26/2005	12:22:12	0.8763	62.69	1.579	0.6888	0.767623
2/26/2005	12:22:15	0.928	62.69	1.556	0.7405	0.756441
2/26/2005	12:22:18	0.983	62.69	1.534	0.7955	0.745746
2/26/2005	12:22:22	1.0413	62.69	1.511	0.8538	0.734565
2/26/2005	12:22:26	1.103	62.69	1.488	0.9155	0.723384
2/26/2005	12:22:30	1.168	62.69	1.464	0.9805	0.711716
2/26/2005	12:22:34	1.238	62.69	1.437	1.0505	0.69859
2/26/2005	12:22:38	1.3113	62.71	1.412	1.1238	0.686437
2/26/2005	12:22:43	1.3897	62.71	1.384	1.2022	0.672825
2/26/2005	12:22:48	1.473	62.71	1.356	1.2855	0.659212
2/26/2005	12:22:53	1.5613	62.71	1.326	1.3738	0.644628
2/26/2005	12:22:59	1.6547	62.73	1.297	1.4672	0.63053
2/26/2005	12:23:05	1.753	62.73	1.266	1.5655	0.615459
2/26/2005	12:23:11	1.858	62.76	1.235	1.6705	0.600389
2/26/2005	12:23:18	1.968	62.76	1.203	1.7805	0.584832
2/26/2005	12:23:25	2.0847	62.78	1.171	1.8972	0.569276
2/26/2005	12:23:32	2.2097	62.8	1.137	2.0222	0.552747
2/26/2005	12:23:40	2.3413	62.8	1.101	2.1538	0.535246
2/26/2005	12:23:48	2.4813	62.82	1.067	2.2938	0.518717
2/26/2005	12:23:57	2.6297	62.85	1.031	2.4422	0.501215
2/26/2005	12:24:07	2.7863	62.85	0.996	2.5988	0.4842
2/26/2005	12:24:17	2.953	62.87	0.959	2.7655	0.466213
2/26/2005	12:24:27	3.1297	62.87	0.922	2.9422	0.448226
2/26/2005	12:24:38	3.3163	62.87	0.887	3.1288	0.431211
2/26/2005	12:24:50	3.5147	62.89	0.848	3.3272	0.412251
2/26/2005	12:25:03	3.7247	62.89	0.81	3.5372	0.393777
2/26/2005	12:25:16	3.9463	62.91	0.773	3.7588	0.37579
2/26/2005	12:25:30	4.1813	62.91	0.737	3.9938	0.358289
2/26/2005	12:25:45	4.4297	62.91	0.702	4.2422	0.341274
2/26/2005	12:26:01	4.693	62.91	0.666	4.5055	0.323772
2/26/2005	12:26:18	4.973	62.91	0.63	4.7855	0.306271
2/26/2005	12:26:36	5.2697	62.91	0.594	5.0822	0.28877
2/26/2005	12:26:54	5.583	62.94	0.558	5.3955	0.271269
2/26/2005	12:27:14	5.9147	62.94	0.526	5.7272	0.255712
2/26/2005	12:27:35	6.2663	62.94	0.493	6.0788	0.239669
2/26/2005	12:27:58	6.6397	62.96	0.459	6.4522	0.22314
2/26/2005	12:28:22	7.0347	62.96	0.428	6.8472	0.208607
2/26/2005	12:28:47	7.453	62.96	0.396	7.2655	0.192513
2/26/2005	12:29:13	7.8963	62.96	0.363	7.7088	0.176471
2/26/2005	12:29:41	8.3663	62.96	0.336	8.1788	0.163345
2/26/2005	12:30:11	8.8647	62.98	0.307	8.6772	0.149246
2/26/2005	12:30:43	9.3913	62.98	0.285	9.2038	0.138551
2/26/2005	12:31:16	9.9497	62.98	0.258	9.7622	0.125425
2/26/2005	12:31:52	10.5413	63	0.237	10.3538	0.115216
2/26/2005	12:32:30	11.168	63	0.217	10.9805	0.105493
2/26/2005	12:33:09	11.8313	63	0.202	11.6438	0.098201
2/26/2005	12:33:52	12.5347	63	0.184	12.3472	0.089451
2/26/2005	12:34:36	13.2797	63.03	0.167	13.0922	0.081186
2/26/2005	12:35:24	14.0697	63.05	0.145	13.8822	0.070491
2/26/2005	12:36:14	14.9063	63.05	0.135	14.7188	0.06563
2/26/2005	12:37:07	15.7913	63.07	0.122	15.6038	0.05931
2/26/2005	12:38:03	16.7297	63.09	0.104	16.5422	0.050559
2/26/2005	12:39:03	17.723	63.09	0.098	17.5355	0.047642
2/26/2005	12:40:06	18.7763	63.09	0.092	18.5888	0.044725
2/26/2005	12:41:13	19.8913	63.09	0.077	19.7038	0.037433
2/26/2005	12:42:24	21.073	63.12	0.07	20.8855	0.03403
2/26/2005	12:43:39	22.3247	63.12	0.066	22.1372	0.032086

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 17:01:08
Report from file: ...\SN11262 2005-02-26 112812 17mw14sf.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw14sf

Test defined on: 2/26/2005 11:11:31
Test started on: 2/26/2005 11:28:12
Test stopped on: 2/26/2005 12:19:33

Data gathered using Logarithmic testing
Maximum time between data points: 10.0000 Minutes.
Number of data samples: 129

TOTAL DATA SAMPLES 129

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.507 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/26/2005	11:28:12	0	62.91	0			Plotted data
2/26/2005	11:28:12	0.005	62.98	-0.008			
2/26/2005	11:28:13	0.01	62.98	-0.01			
2/26/2005	11:28:13	0.015	62.98	-0.012			
2/26/2005	11:28:13	0.02	63	-0.012			
2/26/2005	11:28:14	0.025	63	-0.012			
2/26/2005	11:28:14	0.03	63	-0.014			
2/26/2005	11:28:14	0.035	63	-0.014			
2/26/2005	11:28:14	0.04	63	-0.014			
2/26/2005	11:28:15	0.045	63	-0.015			
2/26/2005	11:28:15	0.05	63.03	-0.015			
2/26/2005	11:28:15	0.055	63	-0.015			
2/26/2005	11:28:16	0.06	63.03	-0.016			
2/26/2005	11:28:16	0.065	63.03	-0.018			
2/26/2005	11:28:16	0.07	63.03	-0.015			
2/26/2005	11:28:17	0.075	63.03	-0.012			
2/26/2005	11:28:17	0.08	63.03	-0.016			
2/26/2005	11:28:17	0.085	63.03	-0.018			
2/26/2005	11:28:17	0.09	63.03	-0.015			
2/26/2005	11:28:18	0.095	63.03	-0.018			
2/26/2005	11:28:18	0.1	63.03	-0.02			
2/26/2005	11:28:18	0.1058	63.03	-0.013			
2/26/2005	11:28:19	0.112	63.03	-0.531			
2/26/2005	11:28:19	0.1185	63.03	-3.459			
2/26/2005	11:28:20	0.1255	63.03	-4.729			
2/26/2005	11:28:20	0.1328	63.03	-2.889			
2/26/2005	11:28:21	0.1407	63.03	-1.006			
2/26/2005	11:28:21	0.149	63.03	-1.903			
2/26/2005	11:28:22	0.1578	63.03	-1.348			
2/26/2005	11:28:22	0.1672	63	-1.729			
2/26/2005	11:28:23	0.177	63	-1.776		1	ho
2/26/2005	11:28:23	0.1875	63	-1.612	0.0105	0.907658	
2/26/2005	11:28:24	0.1985	63	-1.646	0.0215	0.926802	
2/26/2005	11:28:25	0.2102	62.98	-1.671	0.0332	0.940876	
2/26/2005	11:28:25	0.2227	62.98	-1.636	0.0457	0.921171	
2/26/2005	11:28:26	0.2358	62.98	-1.636	0.0588	0.921171	
2/26/2005	11:28:27	0.2498	62.98	-1.63	0.0728	0.917793	
2/26/2005	11:28:28	0.2647	62.98	-1.618	0.0877	0.911036	
2/26/2005	11:28:29	0.2803	62.98	-1.61	0.1033	0.906532	
2/26/2005	11:28:30	0.297	62.98	-1.599	0.12	0.900338	
2/26/2005	11:28:31	0.3147	62.96	-1.589	0.1377	0.894707	
2/26/2005	11:28:32	0.3333	62.96	-1.578	0.1563	0.888514	

2/26/2005	11:28:33	0.3532	62.96	-1.567	0.1762	0.88232
2/26/2005	11:28:35	0.3742	62.96	-1.554	0.1972	0.875
2/26/2005	11:28:36	0.3963	62.96	-1.541	0.2193	0.86768
2/26/2005	11:28:37	0.4198	62.96	-1.527	0.2428	0.859797
2/26/2005	11:28:39	0.4447	62.96	-1.46	0.2677	0.822072
2/26/2005	11:28:40	0.4697	62.96	-1.553	0.2927	0.874437
2/26/2005	11:28:42	0.4963	62.94	-1.466	0.3193	0.82545
2/26/2005	11:28:44	0.5247	62.94	-1.465	0.3477	0.824887
2/26/2005	11:28:45	0.5547	62.94	-1.454	0.3777	0.818694
2/26/2005	11:28:47	0.5863	62.94	-1.436	0.4093	0.808559
2/26/2005	11:28:49	0.6213	62.94	-1.419	0.4443	0.798986
2/26/2005	11:28:52	0.658	62.94	-1.4	0.481	0.788268
2/26/2005	11:28:54	0.6963	62.91	-1.382	0.5193	0.778153
2/26/2005	11:28:56	0.738	62.91	-1.362	0.561	0.766892
2/26/2005	11:28:59	0.7813	62.91	-1.342	0.6043	0.755631
2/26/2005	11:29:02	0.828	62.91	-1.32	0.651	0.743243
2/26/2005	11:29:05	0.8763	62.91	-1.3	0.6993	0.731982
2/26/2005	11:29:08	0.928	62.89	-1.277	0.751	0.719032
2/26/2005	11:29:11	0.983	62.89	-1.256	0.806	0.707207
2/26/2005	11:29:15	1.0413	62.89	-1.232	0.8643	0.693694
2/26/2005	11:29:18	1.103	62.89	-1.208	0.926	0.68018
2/26/2005	11:29:22	1.168	62.89	-1.183	0.991	0.666104
2/26/2005	11:29:26	1.238	62.87	-1.159	1.061	0.65259
2/26/2005	11:29:31	1.3113	62.87	-1.134	1.1343	0.638514
2/26/2005	11:29:35	1.3897	62.87	-1.108	1.2127	0.623874
2/26/2005	11:29:40	1.473	62.87	-1.081	1.296	0.608671
2/26/2005	11:29:46	1.5613	62.85	-1.056	1.3843	0.594595
2/26/2005	11:29:51	1.6547	62.85	-1.028	1.4777	0.578829
2/26/2005	11:29:57	1.753	62.85	-1.001	1.576	0.563626
2/26/2005	11:30:04	1.858	62.85	-0.972	1.681	0.547297
2/26/2005	11:30:10	1.968	62.85	-0.944	1.791	0.531532
2/26/2005	11:30:17	2.0847	62.82	-0.916	1.9074	0.515768
2/26/2005	11:30:25	2.2097	62.82	-0.887	2.0327	0.499437
2/26/2005	11:30:33	2.3413	62.82	-0.857	2.1643	0.482545
2/26/2005	11:30:41	2.4813	62.82	-0.827	2.3043	0.465653
2/26/2005	11:30:50	2.6297	62.82	-0.799	2.4527	0.449887
2/26/2005	11:30:59	2.7863	62.82	-0.768	2.6093	0.432432
2/26/2005	11:31:09	2.953	62.82	-0.738	2.776	0.415541
2/26/2005	11:31:20	3.1297	62.82	-0.708	2.9527	0.398649
2/26/2005	11:31:31	3.3163	62.82	-0.679	3.1393	0.38232
2/26/2005	11:31:43	3.5147	62.82	-0.649	3.3377	0.365428
2/26/2005	11:31:56	3.7247	62.82	-0.62	3.5477	0.349099
2/26/2005	11:32:09	3.9463	62.82	-0.593	3.7693	0.333896
2/26/2005	11:32:23	4.1813	62.82	-0.563	4.0043	0.317005
2/26/2005	11:32:38	4.4297	62.82	-0.534	4.2527	0.300676
2/26/2005	11:32:54	4.693	62.82	-0.508	4.516	0.286036
2/26/2005	11:33:10	4.973	62.82	-0.479	4.796	0.269707
2/26/2005	11:33:28	5.2697	62.6	-0.451	5.0927	0.253941
2/26/2005	11:33:47	5.583	62.78	-0.423	5.406	0.238176
2/26/2005	11:34:07	5.9147	62.76	-0.394	5.7377	0.221847
2/26/2005	11:34:28	6.2663	62.76	-0.367	6.0893	0.206644
2/26/2005	11:34:50	6.6397	62.73	-0.341	6.4627	0.192005
2/26/2005	11:35:14	7.0347	62.71	-0.316	6.8577	0.177926
2/26/2005	11:35:39	7.453	62.69	-0.292	7.276	0.164414
2/26/2005	11:36:06	7.8963	62.67	-0.269	7.7193	0.151464
2/26/2005	11:36:34	8.3663	62.64	-0.248	8.1893	0.13964
2/26/2005	11:37:04	8.8647	62.64	-0.226	8.6877	0.127252
2/26/2005	11:37:36	9.3913	62.67	-0.207	9.2143	0.116554
2/26/2005	11:38:09	9.9497	62.64	-0.189	9.7727	0.106419
2/26/2005	11:38:45	10.5413	62.62	-0.17	10.3643	0.095721
2/26/2005	11:39:22	11.168	62.6	-0.154	10.991	0.086712
2/26/2005	11:40:02	11.8313	62.62	-0.138	11.6543	0.077703
2/26/2005	11:40:44	12.5347	62.6	-0.123	12.3577	0.069257
2/26/2005	11:41:29	13.2797	62.58	-0.112	13.1027	0.063063
2/26/2005	11:42:16	14.0697	62.55	-0.1	13.8927	0.056306
2/26/2005	11:43:06	14.9063	62.53	-0.09	14.7293	0.050676
2/26/2005	11:44:00	15.7913	62.51	-0.088	15.6143	0.04955
2/26/2005	11:44:56	16.7297	62.49	-0.077	16.5527	0.043356
2/26/2005	11:45:55	17.723	62.46	-0.064	17.546	0.036036
2/26/2005	11:46:59	18.7763	62.44	-0.062	18.5993	0.03491
2/26/2005	11:48:06	19.8913	62.4	-0.045	19.7143	0.025338
2/26/2005	11:49:16	21.073	62.42	-0.038	20.896	0.021396
2/26/2005	11:50:32	22.3247	62.44	-0.035	22.1477	0.019707
2/26/2005	11:51:51	23.6497	62.46	-0.038	23.4727	0.021396
2/26/2005	11:53:15	25.0547	62.49	-0.034	24.8777	0.019144
2/26/2005	11:54:45	26.543	62.49	-0.029	26.366	0.016329
2/26/2005	11:56:19	28.118	62.51	-0.027	27.941	0.015203
2/26/2005	11:57:59	29.7863	62.51	-0.024	29.6093	0.013514
2/26/2005	11:59:45	31.5547	62.51	-0.026	31.3777	0.01464
2/26/2005	12:01:38	33.428	62.51	-0.026	33.251	0.01464
2/26/2005	12:03:37	35.4113	62.53	-0.027	35.2343	0.015203
2/26/2005	12:05:43	37.513	62.55	-0.023	37.336	0.01295
2/26/2005	12:07:56	39.7397	62.55	-0.02	39.5627	0.011261
2/26/2005	12:10:18	42.098	62.53	-0.013	41.921	0.00732
2/26/2005	12:12:48	44.5963	62.55	-0.013	44.4193	0.00732

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW14D
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By: JWR
Checked By: SJC 3/17/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	0.97 = To

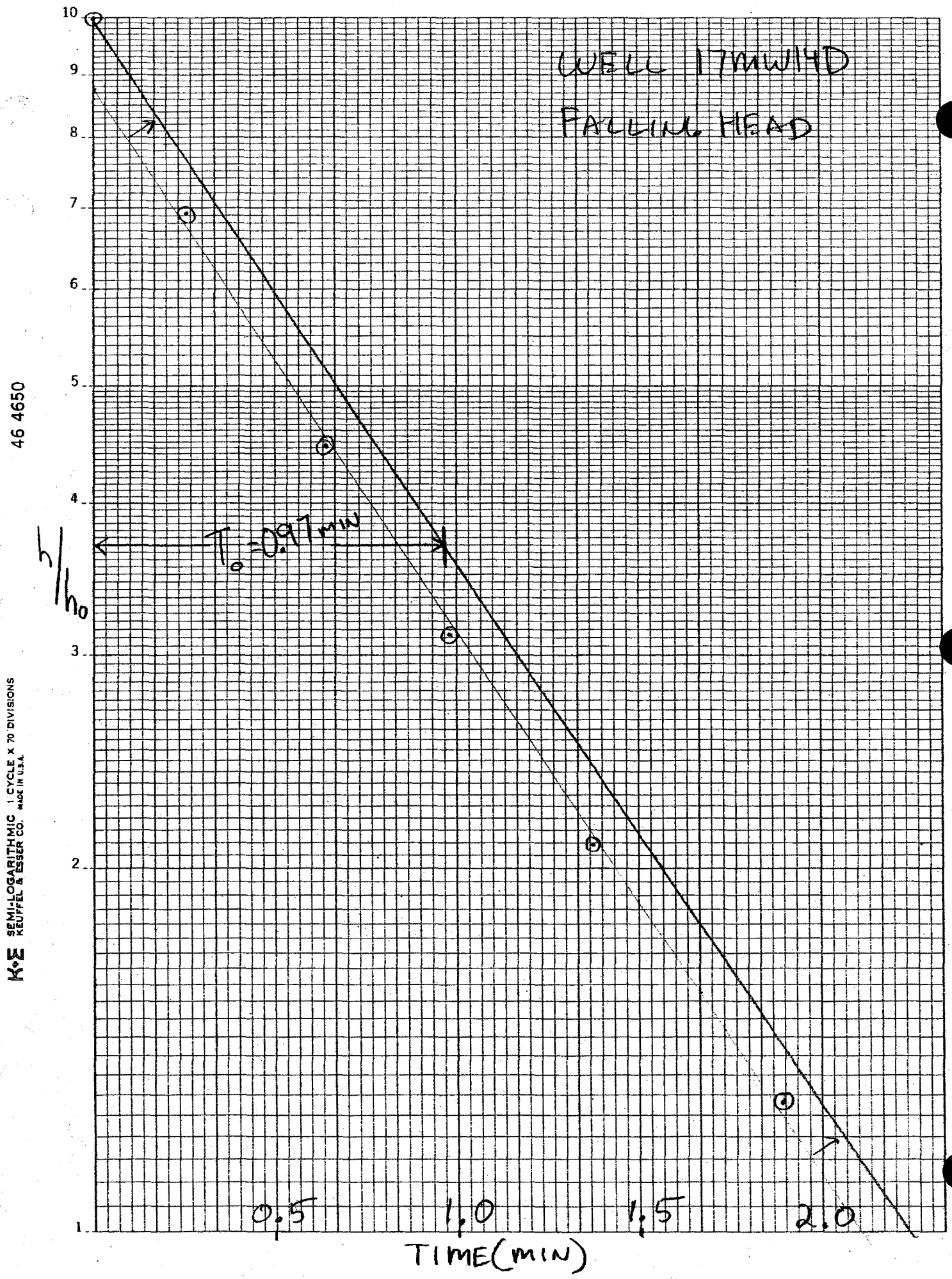
Hydraulic Conductivity (K) :

1.71E-03	ft./min.
2.86E-05	ft./sec.
2.47E+00	ft./day = 2.5 ft/day
8.71E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW14D
FALLING HEAD
T_o=0.97 MIN
h/h0
10
9
8
7
6
5
4
3
2
1
0.5
1.0
1.5
2.0
TIME(MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW14D
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By:
Checked By: SJC 5/17/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	0.90 = To

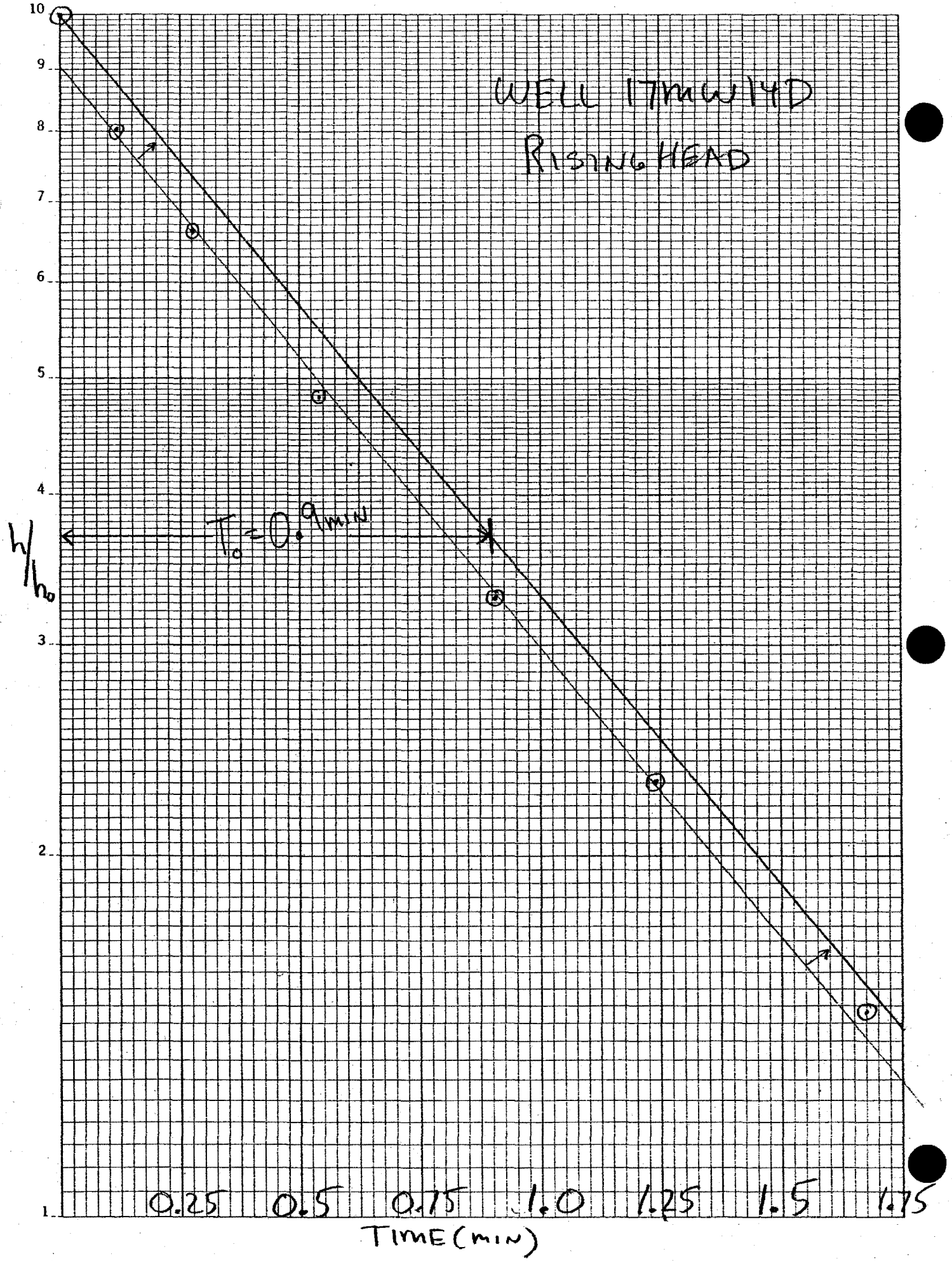
Hydraulic Conductivity (K) :

1.85E-03	ft./min.
3.08E-05	ft./sec.
2.66E+00	ft./day = 2.7 ft/day
9.38E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******



K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS KEUFFEL & ESSER CO. MADE IN U.S.A.
46 4650

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: CHARLESTON NWS SWMU 16/17 WELL/BORING NO.: 17MW14D

PROJECT NO.: 0528 GEOLOGIST: FROWRAMSRR

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10, 15-25 BGS TEST NO.: 1+2

STATIC WATER LEVEL (Depth/Elevation): 3.64 DATE: 2-26

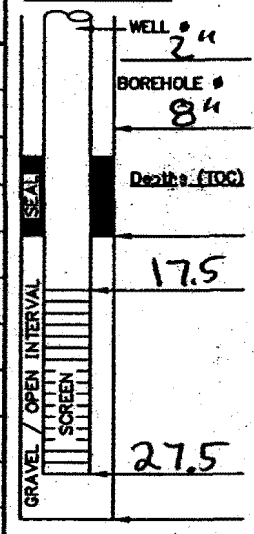
TEST TYPE (Rising/Falling/Constant Head): FALLING + RISING CHECKED: 5/17/05 SJC

METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG PAGE 1 OF 1

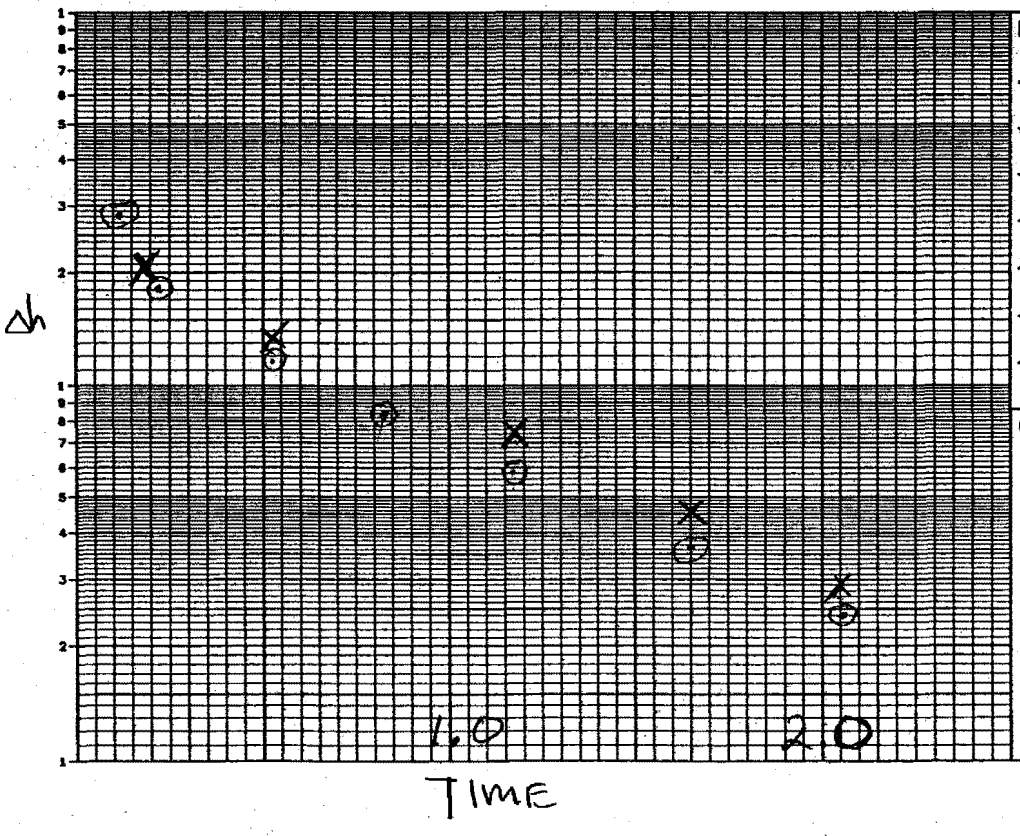
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

FALLING HEAD →			← RISING HEAD →		
ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.1185		2.918	0.065		2.807
0.149		2.201	0.1985		2.115
0.2227		1.864	0.3742		1.694
0.5247		1.179	0.5863		1.320
0.8280		0.843	0.9280		0.908
1.1680		0.589	1.1030		0.753
1.6547		0.360	1.5613		0.468
2.08		0.242	2.08		0.286
2.78		0.139	2.78		0.159
3.1297		0.114	3.12		0.125
4.18		0.072	4.18		0.073
5.58		0.058	5.58		0.052

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS: FALLING
START: 1252
STOPPED:
RISING
START: 1303
STOP: 1316
⊙ = FALLING HEAD
X = RISING HEAD

CALCS, SKETCH MAPS, ETC.:

ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 17:07:41
Report from file: ...\SN11262 2005-02-26 125230 17mw14df.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw14df

Test defined on: 2/26/2005 11:16:26
Test started on: 2/26/2005 12:52:30
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10 Minutes.
Number of data samples: 97

TOTAL DATA SAMPLES 97

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 12.713 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/26/2005	12:52:30	0	62.98	0			Plotted data
2/26/2005	12:52:30	0.005	63.03	-0.007			
2/26/2005	12:52:30	0.01	63.05	-0.009			
2/26/2005	12:52:30	0.015	63.05	-0.01			
2/26/2005	12:52:31	0.02	63.05	-0.013			
2/26/2005	12:52:31	0.025	63.07	-0.012			
2/26/2005	12:52:31	0.03	63.07	-0.012			
2/26/2005	12:52:32	0.035	63.07	-0.016			
2/26/2005	12:52:32	0.04	63.07	-0.014			
2/26/2005	12:52:32	0.045	63.07	-0.017			
2/26/2005	12:52:33	0.05	63.07	-0.016			
2/26/2005	12:52:33	0.055	63.07	-0.015			
2/26/2005	12:52:33	0.06	63.07	-0.017			
2/26/2005	12:52:33	0.065	63.07	-0.022			
2/26/2005	12:52:34	0.07	63.09	-0.012			
2/26/2005	12:52:34	0.075	63.07	-0.02			
2/26/2005	12:52:34	0.08	63.09	-0.021			
2/26/2005	12:52:35	0.085	63.09	-0.018			
2/26/2005	12:52:35	0.09	63.09	-0.078			
2/26/2005	12:52:35	0.095	63.09	-1.592			
2/26/2005	12:52:36	0.1	63.09	-2.888			
2/26/2005	12:52:36	0.1058	63.09	-3.788			
2/26/2005	12:52:36	0.112	63.09	-3.92			
2/26/2005	12:52:37	0.1185	63.09	-2.918			
2/26/2005	12:52:37	0.1255	63.09	-1.401			
2/26/2005	12:52:38	0.1328	63.09	-0.873			
2/26/2005	12:52:38	0.1407	63.09	-1.738			
2/26/2005	12:52:38	0.149	63.09	-2.201			
2/26/2005	12:52:39	0.1578	63.09	-2.146			
2/26/2005	12:52:40	0.1672	63.07	-1.765			
2/26/2005	12:52:40	0.177	63.05	-1.724			

2/26/2005	12:52:41	0.1875	63.05	-1.884	0	1	ho
2/26/2005	12:52:41	0.1985	63.05	-1.791	0.011	0.950637	
2/26/2005	12:52:42	0.2102	63.05	-1.741	0.0227	0.924098	
2/26/2005	12:52:43	0.2227	63.05	-1.804	0.0352	0.957537	
2/26/2005	12:52:44	0.2358	63.05	-1.658	0.0483	0.880042	
2/26/2005	12:52:45	0.2498	63.03	-1.673	0.0623	0.888004	
2/26/2005	12:52:45	0.2647	63.03	-1.634	0.0772	0.867304	
2/26/2005	12:52:46	0.2803	63.03	-1.591	0.0928	0.84448	
2/26/2005	12:52:47	0.297	63.03	-1.553	0.1095	0.82431	
2/26/2005	12:52:48	0.3147	63	-1.606	0.1272	0.852442	
2/26/2005	12:52:50	0.3333	63	-1.57	0.1458	0.833333	
2/26/2005	12:52:51	0.3532	63	-1.506	0.1657	0.799363	
2/26/2005	12:52:52	0.3742	62.98	-1.428	0.1867	0.757962	
2/26/2005	12:52:53	0.3963	62.98	-1.37	0.2088	0.727176	
2/26/2005	12:52:55	0.4198	62.98	-1.333	0.2323	0.707537	
2/26/2005	12:52:56	0.4447	62.96	-1.293	0.2572	0.686306	
2/26/2005	12:52:58	0.4697	62.96	-1.256	0.2822	0.666667	
2/26/2005	12:52:59	0.4963	62.94	-1.217	0.3088	0.645966	
2/26/2005	12:53:01	0.5247	62.94	-1.179	0.3372	0.625796	
2/26/2005	12:53:03	0.5547	62.91	-1.14	0.3672	0.605096	
2/26/2005	12:53:05	0.5863	62.91	-1.099	0.3988	0.583333	
2/26/2005	12:53:07	0.6213	62.89	-1.057	0.4338	0.56104	
2/26/2005	12:53:09	0.658	62.89	-1.016	0.4705	0.539278	
2/26/2005	12:53:11	0.6963	62.87	-0.974	0.5088	0.516985	
2/26/2005	12:53:14	0.738	62.87	-0.93	0.5505	0.493631	
2/26/2005	12:53:16	0.7813	62.85	-0.888	0.5938	0.471338	
2/26/2005	12:53:19	0.828	62.85	-0.843	0.6405	0.447452	
2/26/2005	12:53:22	0.8763	62.82	-0.801	0.6888	0.425159	
2/26/2005	12:53:25	0.928	62.8	-0.758	0.7405	0.402335	
2/26/2005	12:53:29	0.983	62.8	-0.715	0.7955	0.379512	
2/26/2005	12:53:32	1.0413	62.78	-0.672	0.8538	0.356688	
2/26/2005	12:53:36	1.103	62.78	-0.629	0.9155	0.333864	
2/26/2005	12:53:40	1.168	62.76	-0.589	0.9805	0.312633	
2/26/2005	12:53:44	1.238	62.76	-0.546	1.0505	0.289809	
2/26/2005	12:53:48	1.3113	62.73	-0.508	1.1238	0.269639	
2/26/2005	12:53:53	1.3897	62.73	-0.468	1.2022	0.248408	
2/26/2005	12:53:58	1.473	62.71	-0.432	1.2855	0.229299	
2/26/2005	12:54:03	1.5613	62.71	-0.394	1.3738	0.209113	
2/26/2005	12:54:09	1.6547	62.71	-0.36	1.4672	0.191083	
2/26/2005	12:54:15	1.753	62.69	-0.326	1.5655	0.173036	
2/26/2005	12:54:21	1.858	62.69	-0.296	1.6705	0.157113	
2/26/2005	12:54:28	1.968	62.69	-0.268	1.7805	0.142251	
2/26/2005	12:54:35	2.0847	62.67	-0.242	1.8572	0.128415	
2/26/2005	12:54:42	2.2097	62.67	-0.217	2.0222	0.11518	
2/26/2005	12:54:50	2.3413	62.64	-0.193	2.1538	0.102442	
2/26/2005	12:54:58	2.4813	62.64	-0.173	2.2938	0.091826	
2/26/2005	12:55:07	2.6297	62.62	-0.156	2.4422	0.082803	
2/26/2005	12:55:17	2.7863	62.58	-0.139	2.5988	0.073779	
2/26/2005	12:55:27	2.953	62.55	-0.126	2.7655	0.066879	
2/26/2005	12:55:37	3.1297	62.53	-0.114	2.9422	0.06051	
2/26/2005	12:55:49	3.3163	62.49	-0.102	3.1288	0.05414	
2/26/2005	12:56:00	3.5147	62.44	-0.093	3.3272	0.049363	
2/26/2005	12:56:13	3.7247	62.4	-0.084	3.5372	0.044586	
2/26/2005	12:56:26	3.9463	62.37	-0.077	3.7588	0.04087	
2/26/2005	12:56:40	4.1813	62.33	-0.072	3.9938	0.038217	
2/26/2005	12:56:55	4.4297	62.31	-0.066	4.2422	0.035032	
2/26/2005	12:57:11	4.693	62.28	-0.062	4.5055	0.032909	
2/26/2005	12:57:28	4.973	62.26	-0.06	4.7855	0.031847	
2/26/2005	12:57:46	5.2697	62.19	-0.059	5.0822	0.031316	
2/26/2005	12:58:05	5.583	62.15	-0.057	5.3955	0.030255	
2/26/2005	12:58:24	5.9147	62.13	-0.056	5.7272	0.029724	
2/26/2005	12:58:46	6.2663	62.13	-0.053	6.0788	0.028132	
2/26/2005	12:59:08	6.6397	62.13	-0.051	6.4522	0.02707	
2/26/2005	12:59:32	7.0347	62.13	-0.052	6.8472	0.027601	
2/26/2005	12:59:57	7.453	62.13	-0.051	7.2655	0.02707	
2/26/2005	13:00:23	7.8963	62.1	-0.05	7.7088	0.026539	

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 17:18:36
Report from file: ...\SN11262 2005-02-26 130307 17mw14dr.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw14dr

Test defined on: 2/26/2005 11:19:17
Test started on: 2/26/2005 13:03:07
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10.0000 Minutes.
Number of data samples: 94

TOTAL DATA SAMPLES 94

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 12.757 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho
2/26/2005	13:03:07	0	62.08	0		
2/26/2005	13:03:07	0.005	62.13	-0.008		
2/26/2005	13:03:07	0.01	62.13	-0.011		
2/26/2005	13:03:08	0.015	62.13	-0.014		
2/26/2005	13:03:08	0.02	62.15	-0.061		
2/26/2005	13:03:08	0.025	62.15	0.03		
2/26/2005	13:03:09	0.03	62.15	0.028		
2/26/2005	13:03:09	0.035	62.15	-0.028		
2/26/2005	13:03:09	0.04	62.15	-0.012		
2/26/2005	13:03:10	0.045	62.15	2.497		
2/26/2005	13:03:10	0.05	62.15	4.152		
2/26/2005	13:03:10	0.055	62.15	2.722		
2/26/2005	13:03:10	0.06	62.15	2.566		
2/26/2005	13:03:11	0.065	62.15	2.807		
2/26/2005	13:03:11	0.07	62.17	2.576		
2/26/2005	13:03:11	0.075	62.17	2.622	0	ho
2/26/2005	13:03:12	0.08	62.17	2.521	0.005	0.96148
2/26/2005	13:03:12	0.085	62.17	2.543	0.01	0.96987
2/26/2005	13:03:12	0.09	62.17	2.486	0.015	0.948131
2/26/2005	13:03:13	0.095	62.17	2.473	0.02	0.943173
2/26/2005	13:03:13	0.1	62.17	2.45	0.025	0.934401
2/26/2005	13:03:13	0.1058	62.17	2.423	0.0308	0.924104
2/26/2005	13:03:14	0.112	62.17	2.397	0.037	0.914188
2/26/2005	13:03:14	0.1185	62.17	2.372	0.0435	0.904653
2/26/2005	13:03:14	0.1255	62.17	2.345	0.0505	0.894355
2/26/2005	13:03:15	0.1328	62.17	2.318	0.0578	0.884058
2/26/2005	13:03:15	0.1407	62.17	2.292	0.0657	0.874142
2/26/2005	13:03:16	0.149	62.17	2.262	0.074	0.8627
2/26/2005	13:03:16	0.1578	62.17	2.233	0.0828	0.85164
2/26/2005	13:03:17	0.1672	62.15	2.206	0.0922	0.841342
2/26/2005	13:03:17	0.177	62.15	*2.179	0.102	0.831045

Plotted data

2/26/2005	13:03:18	0.1875	62.15	2.148	0.1125	0.819222
2/26/2005	13:03:19	0.1985	62.15	2.115	0.1235	0.806636
2/26/2005	13:03:19	0.2102	62.15	2.083	0.1352	0.794432
2/26/2005	13:03:20	0.2227	62.15	2.049	0.1477	0.781465
2/26/2005	13:03:21	0.2358	62.15	2.014	0.1608	0.768116
2/26/2005	13:03:22	0.2498	62.15	1.978	0.1748	0.754386
2/26/2005	13:03:23	0.2647	62.15	1.942	0.1897	0.740656
2/26/2005	13:03:24	0.2803	62.15	1.902	0.2053	0.7254
2/26/2005	13:03:25	0.297	62.15	1.863	0.222	0.710526
2/26/2005	13:03:26	0.3147	62.15	1.822	0.2397	0.694889
2/26/2005	13:03:27	0.3333	62.17	1.78	0.2583	0.678871
2/26/2005	13:03:28	0.3532	62.17	1.737	0.2782	0.662421
2/26/2005	13:03:29	0.3742	62.17	1.694	0.2992	0.646072
2/26/2005	13:03:31	0.3963	62.17	1.649	0.3213	0.628909
2/26/2005	13:03:32	0.4198	62.17	1.603	0.3448	0.611365
2/26/2005	13:03:33	0.4447	62.19	1.556	0.3697	0.59344
2/26/2005	13:03:35	0.4697	62.19	1.511	0.3947	0.576278
2/26/2005	13:03:37	0.4963	62.19	1.464	0.4213	0.558352
2/26/2005	13:03:38	0.5247	62.22	1.417	0.4497	0.540427
2/26/2005	13:03:40	0.5547	62.22	1.37	0.4797	0.522502
2/26/2005	13:03:42	0.5863	62.24	1.32	0.5113	0.503432
2/26/2005	13:03:44	0.6213	62.24	1.269	0.5463	0.483982
2/26/2005	13:03:46	0.658	62.26	1.218	0.583	0.464531
2/26/2005	13:03:49	0.6963	62.28	1.167	0.6213	0.44508
2/26/2005	13:03:51	0.738	62.31	1.115	0.663	0.425248
2/26/2005	13:03:54	0.7813	62.33	1.064	0.7063	0.405797
2/26/2005	13:03:56	0.828	62.35	1.011	0.753	0.385584
2/26/2005	13:03:59	0.8763	62.37	0.96	0.8013	0.366133
2/26/2005	13:04:02	0.928	62.42	0.908	0.853	0.346301
2/26/2005	13:04:06	0.983	62.44	0.858	0.908	0.327231
2/26/2005	13:04:09	1.0413	62.49	0.805	0.9663	0.307018
2/26/2005	13:04:13	1.103	62.53	0.753	1.028	0.287185
2/26/2005	13:04:17	1.168	62.58	0.702	1.093	0.267735
2/26/2005	13:04:21	1.238	62.62	0.653	1.163	0.249047
2/26/2005	13:04:25	1.3113	62.67	0.605	1.2383	0.23074
2/26/2005	13:04:30	1.3897	62.71	0.558	1.3147	0.212815
2/26/2005	13:04:35	1.473	62.76	0.513	1.398	0.195652
2/26/2005	13:04:40	1.5613	62.8	0.468	1.4863	0.17849
2/26/2005	13:04:46	1.6547	62.85	0.428	1.5797	0.163234
2/26/2005	13:04:52	1.753	62.89	0.39	1.678	0.148741
2/26/2005	13:04:58	1.858	62.94	0.352	1.783	0.134249
2/26/2005	13:05:05	1.968	62.98	0.317	1.893	0.1209
2/26/2005	13:05:12	2.0847	63.03	0.286	2.0097	0.109077
2/26/2005	13:05:19	2.2097	63.07	0.256	2.1347	0.097635
2/26/2005	13:05:27	2.3413	63.09	0.229	2.2663	0.087338
2/26/2005	13:05:36	2.4813	63.14	0.203	2.4063	0.077422
2/26/2005	13:05:45	2.6297	63.18	0.179	2.5547	0.068268
2/26/2005	13:05:54	2.7863	63.23	0.159	2.7113	0.060641
2/26/2005	13:06:04	2.953	63.25	0.139	2.878	0.053013
2/26/2005	13:06:15	3.1297	63.3	0.125	3.0547	0.047674
2/26/2005	13:06:26	3.3163	63.32	0.11	3.2413	0.041953
2/26/2005	13:06:38	3.5147	63.34	0.098	3.4397	0.037376
2/26/2005	13:06:50	3.7247	63.36	0.087	3.6497	0.033181
2/26/2005	13:07:04	3.9463	63.41	0.08	3.8713	0.030511
2/26/2005	13:07:18	4.1813	63.43	0.073	4.1063	0.027841
2/26/2005	13:07:33	4.4297	63.48	0.067	4.3547	0.025553
2/26/2005	13:07:48	4.693	63.5	0.063	4.618	0.024027
2/26/2005	13:08:05	4.973	63.52	0.058	4.898	0.022121
2/26/2005	13:08:23	5.2697	63.52	0.053	5.1947	0.020214
2/26/2005	13:08:42	5.583	63.57	0.052	5.508	0.019832
2/26/2005	13:09:02	5.9147	63.57	0.051	5.8397	0.019451
2/26/2005	13:09:23	6.2663	63.57	0.051	6.1913	0.019451
2/26/2005	13:09:45	6.6397	63.59	0.049	6.5647	0.018688

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW15S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By: JWR
Checked By: SJC 5/17/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	3.15 = To

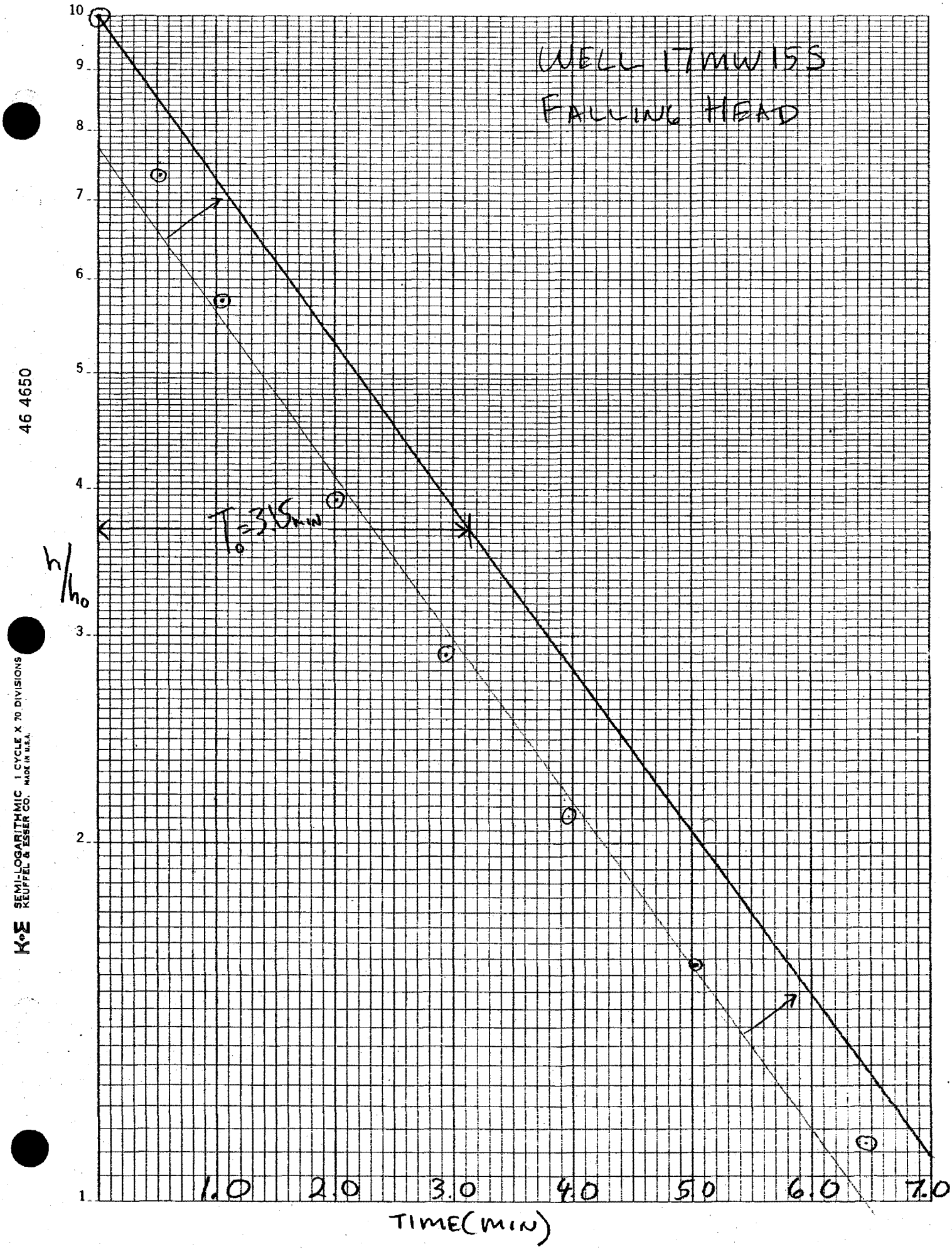
Hydraulic Conductivity (K) :

5.28E-04	ft./min.
8.80E-06	ft./sec.
7.60E-01	ft./day ≈ .8 ft/day
2.68E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW15S
FALLING HEAD
T_0 = 3.5 min
h/h0
10
9
8
7
6
5
4
3
2
1
1.0
2.0
3.0
4.0
5.0
6.0
7.0
TIME(MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW15S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By: SWR
Checked By: SJC 5/17/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	4.60 = To

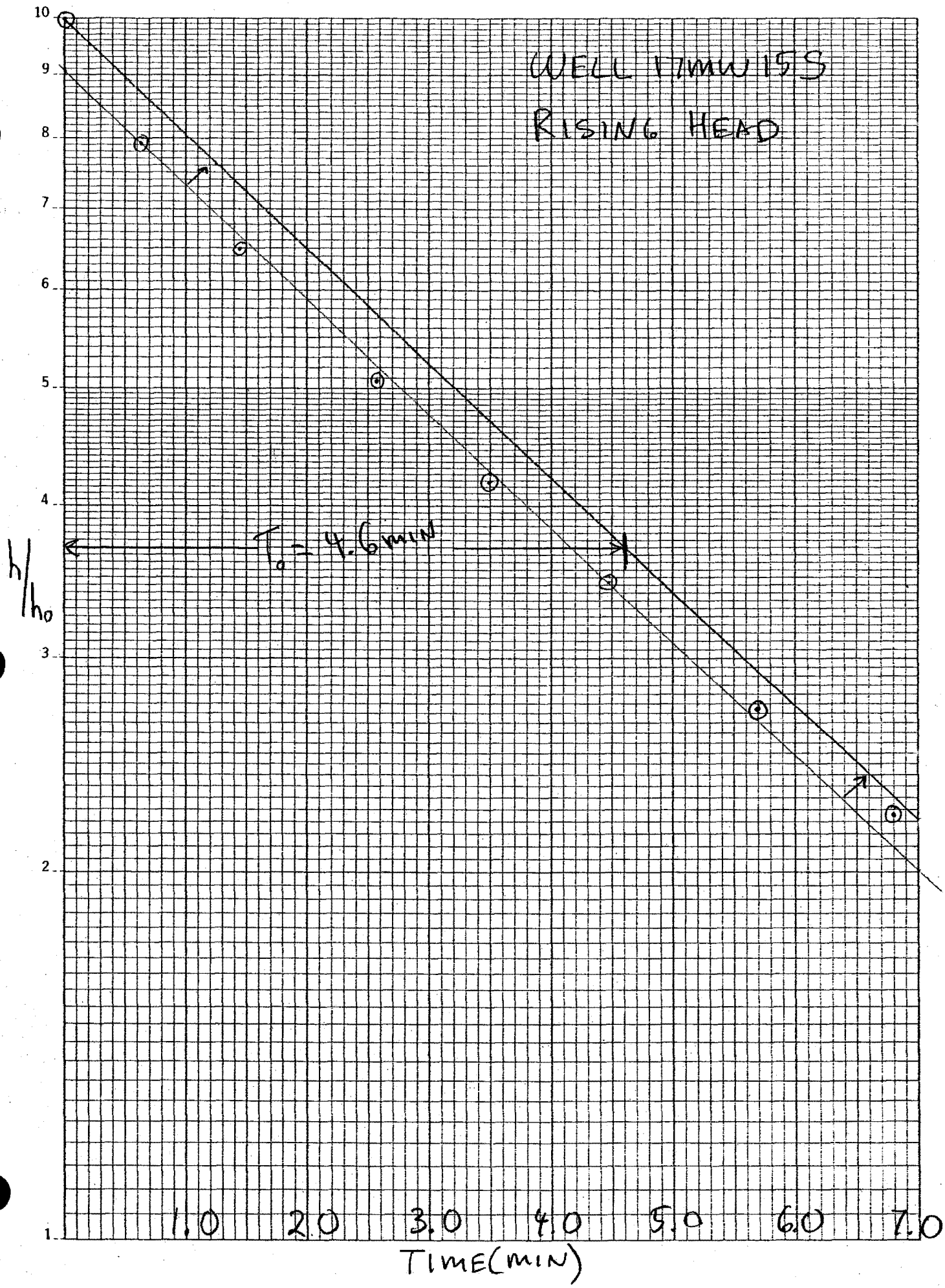
Hydraulic Conductivity (K) :

3.61E-04	ft./min.
6.02E-06	ft./sec.
5.20E-01	ft./day = .5 ft/day
1.84E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******



46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: CHARLESTON NWS SWMU 16/17 WELL/BORING NO.: 17MW15S

PROJECT NO.: 0528 GEOLOGIST: FRED W RAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10, 10-20BGS TEST NO.:

STATIC WATER LEVEL (Depth/Elevation): 2.51 DATE: 2-26-05

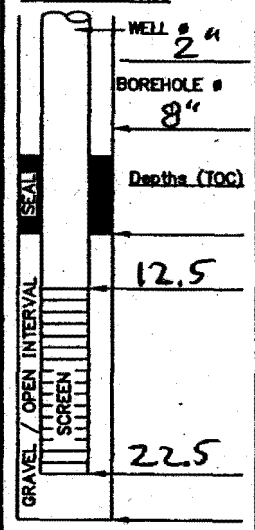
TEST TYPE (Rising/Falling/Constant Head): RISING+FALLING CHECKED: SJC 5/17/05

METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG PAGE 1 OF 1

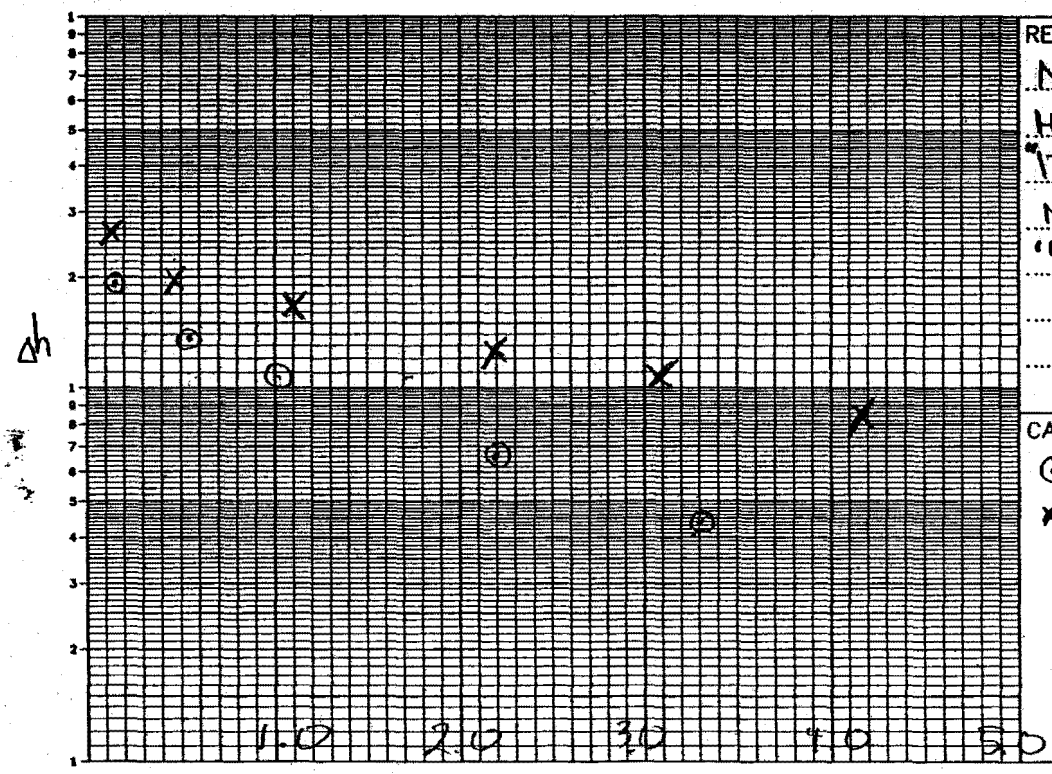
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.):

FALLING HEAD			RISING HEAD		
ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.112		2.876	.1255		2.635
0.1578		1.952	.2358		2.141
0.1985		1.733	.4697		1.965
0.5547		1.350	1.1030		1.660
1.04		1.070	2.2097		1.290
1.5613		0.861	3.12		1.061
2.2097		0.620	4.18		0.857
3.3163		0.465	5.2697		0.693
5.26		0.270	7.4530		0.462
7.4530		0.160	10.54		0.282
8.8647		0.116	14.9063		0.160
11.83		0.067	23.64		0.085

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

NAMED FALLING HEAD TEST "17MW15SF"

NAMED RISING HEAD "17MW15SR"

CALCS, SKETCH MAPS, ETC.:

⊙ = FALLING HEAD

x = RISING HEAD

ACAD: FORM_HYDCONTST.dwg 07/06/99 INL

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 17:25:21
Report from file: ...\SN11262 2005-02-26 135402 17mw15sr.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw15sf

Test defined on: 2/26/2005 13:53:00
Test started on: 2/26/2005 13:54:02
Test stopped on: 2/26/2005 14:08:20

Data gathered using Logarithmic testing
Maximum time between data points: 10.0000 Minutes.
Number of data samples: 107

TOTAL DATA SAMPLES 107

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.834 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/26/2005	13:54:02	0	63.63	0			Plotted data
2/26/2005	13:54:03	0.005	63.68	-0.007			
2/26/2005	13:54:03	0.01	63.68	-0.011			
2/26/2005	13:54:03	0.015	63.7	-0.012			
2/26/2005	13:54:04	0.02	63.7	-0.013			
2/26/2005	13:54:04	0.025	63.7	-0.013			
2/26/2005	13:54:04	0.03	63.7	-0.014			
2/26/2005	13:54:04	0.035	63.7	-0.014			
2/26/2005	13:54:05	0.04	63.7	-0.014			
2/26/2005	13:54:05	0.045	63.73	-0.012			
2/26/2005	13:54:05	0.05	63.73	-0.015			
2/26/2005	13:54:06	0.055	63.73	-0.014			
2/26/2005	13:54:06	0.06	63.73	-0.015			
2/26/2005	13:54:08	0.065	63.73	-0.016			
2/26/2005	13:54:07	0.07	63.73	-0.019			
2/26/2005	13:54:07	0.075	63.73	-0.019			
2/26/2005	13:54:07	0.08	63.73	-0.015			
2/26/2005	13:54:07	0.085	63.73	-0.015			
2/26/2005	13:54:08	0.09	63.73	-0.678			
2/26/2005	13:54:08	0.095	63.73	-2.306			
2/26/2005	13:54:08	0.1	63.73	-3.352			
2/26/2005	13:54:09	0.1058	63.75	-3.714			
2/26/2005	13:54:09	0.112	63.75	-2.876			
2/26/2005	13:54:10	0.1185	63.73	-1.867			
2/26/2005	13:54:10	0.1255	63.73	-1.076			
2/26/2005	13:54:10	0.1328	63.75	-1.029			
2/26/2005	13:54:11	0.1407	63.73	-1.68			
2/26/2005	13:54:11	0.149	63.75	-2.01			
2/26/2005	13:54:12	0.1578	63.75	-1.952			
2/26/2005	13:54:12	0.1672	63.7	-1.634			
2/26/2005	13:54:13	0.177	63.7	-1.525			
2/26/2005	13:54:14	0.1875	63.7	-1.705	0	1	ho
2/26/2005	13:54:14	0.1985	63.68	-1.733	0.011	1.016422	
2/26/2005	13:54:15	0.2102	63.68	-1.622	0.0227	0.95132	
2/26/2005	13:54:16	0.2227	63.68	-1.622	0.0352	0.95132	
2/26/2005	13:54:17	0.2358	63.68	-1.638	0.0483	0.960704	

2/26/2005	13:54:17	0.2498	63.68	-1.599	0.0623	0.93783
2/26/2005	13:54:18	0.2647	63.68	-1.591	0.0772	0.933138
2/26/2005	13:54:19	0.2803	63.68	-1.577	0.0928	0.924927
2/26/2005	13:54:20	0.297	63.66	-1.558	0.1095	0.913783
2/26/2005	13:54:21	0.3147	63.66	-1.542	0.1272	0.904399
2/26/2005	13:54:22	0.3333	63.66	-1.525	0.1458	0.894428
2/26/2005	13:54:24	0.3532	63.66	-1.506	0.1657	0.883284
2/26/2005	13:54:25	0.3742	63.66	-1.489	0.1867	0.873314
2/26/2005	13:54:26	0.3963	63.66	-1.469	0.2088	0.861584
2/26/2005	13:54:28	0.4198	63.66	-1.45	0.2323	0.85044
2/26/2005	13:54:29	0.4447	63.63	-1.43	0.2572	0.83871
2/26/2005	13:54:31	0.4697	63.63	-1.411	0.2822	0.827566
2/26/2005	13:54:32	0.4963	63.63	-1.39	0.3088	0.815249
2/26/2005	13:54:34	0.5247	63.63	-1.37	0.3372	0.803519
2/26/2005	13:54:36	0.5547	63.63	-1.35	0.3672	0.791789
2/26/2005	13:54:38	0.5863	63.63	-1.327	0.3988	0.778299
2/26/2005	13:54:40	0.6213	63.63	-1.304	0.4338	0.764809
2/26/2005	13:54:42	0.658	63.61	-1.28	0.4705	0.750733
2/26/2005	13:54:44	0.6963	63.61	-1.257	0.5088	0.737243
2/26/2005	13:54:47	0.738	63.61	-1.231	0.5505	0.721994
2/26/2005	13:54:49	0.7813	63.61	-1.205	0.5938	0.706745
2/26/2005	13:54:52	0.828	63.61	-1.178	0.6405	0.690909
2/26/2005	13:54:55	0.8763	63.59	-1.153	0.6888	0.676246
2/26/2005	13:54:58	0.928	63.61	-1.125	0.7405	0.659824
2/26/2005	13:55:01	0.983	63.59	-1.098	0.7955	0.643988
2/26/2005	13:55:05	1.0413	63.59	-1.07	0.8538	0.627566
2/26/2005	13:55:09	1.103	63.59	-1.041	0.9155	0.610557
2/26/2005	13:55:12	1.168	63.57	-1.013	0.9805	0.594135
2/26/2005	13:55:17	1.238	63.57	-0.983	1.0505	0.576954
2/26/2005	13:55:21	1.3113	63.54	-0.954	1.1238	0.559531
2/26/2005	13:55:26	1.3897	63.54	-0.924	1.2022	0.541935
2/26/2005	13:55:31	1.473	63.54	-0.892	1.2855	0.523167
2/26/2005	13:55:36	1.5613	63.54	-0.861	1.3738	0.504985
2/26/2005	13:55:42	1.6547	63.54	-0.83	1.4672	0.486804
2/26/2005	13:55:48	1.753	63.54	-0.798	1.5655	0.468035
2/26/2005	13:55:54	1.858	63.54	-0.764	1.6705	0.448094
2/26/2005	13:56:00	1.968	63.54	-0.734	1.7805	0.430499
2/26/2005	13:56:07	2.0847	63.57	-0.701	1.8972	0.411144
2/26/2005	13:56:15	2.2097	63.57	-0.67	2.0222	0.392562
2/26/2005	13:56:23	2.3413	63.57	-0.639	2.1538	0.37478
2/26/2005	13:56:31	2.4813	63.57	-0.609	2.2938	0.357185
2/26/2005	13:56:40	2.6297	63.57	-0.579	2.4422	0.339589
2/26/2005	13:56:50	2.7863	63.57	-0.55	2.5988	0.322581
2/26/2005	13:57:00	2.953	63.57	-0.521	2.7655	0.305572
2/26/2005	13:57:10	3.1297	63.57	-0.494	2.9422	0.289636
2/26/2005	13:57:21	3.3163	63.57	-0.465	3.1288	0.272727
2/26/2005	13:57:33	3.5147	63.57	-0.439	3.3272	0.257478
2/26/2005	13:57:46	3.7247	63.57	-0.412	3.5372	0.241642
2/26/2005	13:57:59	3.9463	63.57	-0.387	3.7588	0.226979
2/26/2005	13:58:13	4.1813	63.54	-0.361	3.9938	0.211163
2/26/2005	13:58:28	4.4297	63.5	-0.336	4.2422	0.197067
2/26/2005	13:58:44	4.693	63.48	-0.313	4.5055	0.183578
2/26/2005	13:59:01	4.973	63.43	-0.291	4.7855	0.170674
2/26/2005	13:59:19	5.2697	63.43	-0.27	5.0822	0.158356
2/26/2005	13:59:37	5.583	63.43	-0.249	5.3955	0.146041
2/26/2005	13:59:57	5.9147	63.43	-0.23	5.7272	0.134897
2/26/2005	14:00:18	6.2663	63.43	-0.211	6.0788	0.123754
2/26/2005	14:00:41	6.6397	63.43	-0.193	6.4522	0.113196
2/26/2005	14:01:04	7.0347	63.43	-0.175	6.8472	0.102639
2/26/2005	14:01:30	7.453	63.43	-0.16	7.2655	0.093842
2/26/2005	14:01:56	7.8963	63.36	-0.144	7.7088	0.084457
2/26/2005	14:02:24	8.3663	63.32	-0.129	8.1788	0.07566
2/26/2005	14:02:54	8.8647	63.34	-0.116	8.6772	0.068035
2/26/2005	14:03:26	9.3913	63.36	-0.106	9.2038	0.06217
2/26/2005	14:03:59	9.9497	63.36	-0.096	9.7622	0.056305
2/26/2005	14:04:35	10.5413	63.36	-0.087	10.3538	0.051026
2/26/2005	14:05:12	11.168	63.36	-0.075	10.9805	0.043968
2/26/2005	14:05:52	11.8313	63.41	-0.067	11.6438	0.039296
2/26/2005	14:06:34	12.5347	63.43	-0.06	12.3472	0.035191
2/26/2005	14:07:19	13.2797	63.45	-0.054	13.0922	0.031672
2/26/2005	14:08:07	14.0697	63.43	-0.05	13.8822	0.029326

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 17:27:55
Report from file: ...\SN11262 2005-02-26 141329 17mw15sl.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw15sl

Test defined on: 2/26/2005 13:51:48
Test started on: 2/26/2005 14:13:29
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10.0000 Minutes.
Number of data samples: 116

TOTAL DATA SAMPLES 118

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.855 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho
2/26/2005	14:13:29	0	63.23	0		
2/26/2005	14:13:30	0.005	63.27	-0.007		
2/26/2005	14:13:30	0.01	63.27	-0.011		
2/26/2005	14:13:30	0.015	63.3	-0.012		
2/26/2005	14:13:30	0.02	63.3	-0.012		
2/26/2005	14:13:31	0.025	63.3	-0.013		
2/26/2005	14:13:31	0.03	63.3	-0.013		
2/26/2005	14:13:31	0.035	63.3	-0.014		
2/26/2005	14:13:32	0.04	63.3	-0.014		
2/26/2005	14:13:32	0.045	63.3	-0.015		
2/26/2005	14:13:32	0.05	63.32	-0.021		
2/26/2005	14:13:33	0.055	63.32	-0.014		
2/26/2005	14:13:33	0.06	63.32	-0.01		
2/26/2005	14:13:33	0.065	63.32	-0.011		
2/26/2005	14:13:33	0.07	63.32	-0.016		
2/26/2005	14:13:34	0.075	63.32	-0.025		
2/26/2005	14:13:34	0.08	63.32	0.177		
2/26/2005	14:13:34	0.085	63.32	2.878		
2/26/2005	14:13:35	0.09	63.32	5.33		
2/26/2005	14:13:35	0.095	63.32	2.077		
2/26/2005	14:13:35	0.1	63.32	0.827		
2/26/2005	14:13:36	0.1058	63.32	2.771		
2/26/2005	14:13:36	0.112	63.32	3.109		
2/26/2005	14:13:36	0.1185	63.32	1.392		
2/26/2005	14:13:37	0.1255	63.32	2.635		
2/26/2005	14:13:37	0.1328	63.32	2.245		
2/26/2005	14:13:38	0.1407	63.32	1.962		
2/26/2005	14:13:38	0.149	63.32	2.451		
2/26/2005	14:13:39	0.1578	63.32	1.981		
2/26/2005	14:13:39	0.1672	63.3	2.297		
2/26/2005	14:13:40	0.177	63.3	2.131		
2/26/2005	14:13:41	0.1875	63.3	2.108		
2/26/2005	14:13:41	0.1985	63.3	2.237	0	1 ho
2/26/2005	14:13:42	0.2102	63.3	2.101	0.0117	0.939204
2/26/2005	14:13:43	0.2227	63.3	2.103	0.0242	0.940098
2/26/2005	14:13:43	0.2358	63.3	2.141	0.0373	0.957085
2/26/2005	14:13:44	0.2498	63.3	2.13	0.0513	0.952168

Plotted data

2/26/2005	14:13:45	0.2647	63.3	2.106	0.0662	0.941439
2/26/2005	14:13:46	0.2803	63.3	2.089	0.0818	0.93384
2/26/2005	14:13:47	0.297	63.3	2.076	0.0985	0.928029
2/26/2005	14:13:48	0.3147	63.32	2.064	0.1162	0.922664
2/26/2005	14:13:49	0.3333	63.32	2.053	0.1348	0.917747
2/26/2005	14:13:50	0.3532	63.32	2.039	0.1547	0.911489
2/26/2005	14:13:52	0.3742	63.34	2.025	0.1757	0.90523
2/26/2005	14:13:53	0.3963	63.34	2.01	0.1978	0.898525
2/26/2005	14:13:54	0.4198	63.34	1.995	0.2213	0.891819
2/26/2005	14:13:56	0.4447	63.36	1.979	0.2462	0.884667
2/26/2005	14:13:57	0.4697	63.36	1.965	0.2712	0.878409
2/26/2005	14:13:59	0.4963	63.39	1.948	0.2978	0.870809
2/26/2005	14:14:01	0.5247	63.39	1.933	0.3262	0.864104
2/26/2005	14:14:03	0.5547	63.39	1.915	0.3562	0.856057
2/26/2005	14:14:04	0.5863	63.41	1.898	0.3878	0.848458
2/26/2005	14:14:07	0.6213	63.41	1.88	0.4228	0.840411
2/26/2005	14:14:09	0.658	63.43	1.86	0.4595	0.831471
2/26/2005	14:14:11	0.6963	63.43	1.841	0.4978	0.822977
2/26/2005	14:14:14	0.738	63.43	1.82	0.5395	0.81359
2/26/2005	14:14:16	0.7813	63.45	1.799	0.5828	0.804202
2/26/2005	14:14:19	0.828	63.45	1.778	0.6295	0.794814
2/26/2005	14:14:22	0.8763	63.45	1.755	0.6778	0.784533
2/26/2005	14:14:25	0.928	63.48	1.733	0.7295	0.774698
2/26/2005	14:14:28	0.983	63.48	1.71	0.7845	0.764417
2/26/2005	14:14:32	1.0413	63.5	1.686	0.8428	0.753688
2/26/2005	14:14:35	1.103	63.5	1.66	0.9045	0.742065
2/26/2005	14:14:39	1.166	63.5	1.634	0.9695	0.730443
2/26/2005	14:14:44	1.238	63.52	1.608	1.0395	0.71882
2/26/2005	14:14:48	1.3113	63.54	1.579	1.1128	0.705856
2/26/2005	14:14:53	1.3897	63.54	1.551	1.1912	0.693339
2/26/2005	14:14:58	1.473	63.57	1.52	1.2745	0.679481
2/26/2005	14:15:03	1.5613	63.57	1.489	1.3628	0.665624
2/26/2005	14:15:09	1.6547	63.57	1.458	1.4562	0.651766
2/26/2005	14:15:14	1.753	63.59	1.425	1.5545	0.637014
2/26/2005	14:15:21	1.858	63.59	1.393	1.6595	0.622709
2/26/2005	14:15:27	1.968	63.61	1.36	1.7695	0.607957
2/26/2005	14:15:34	2.0847	63.61	1.325	1.8862	0.592311
2/26/2005	14:15:42	2.2097	63.63	1.29	2.0112	0.576665
2/26/2005	14:15:50	2.3413	63.63	1.253	2.1428	0.560125
2/26/2005	14:15:58	2.4813	63.63	1.215	2.2828	0.543138
2/26/2005	14:16:07	2.6297	63.66	1.177	2.4312	0.526151
2/26/2005	14:16:16	2.7863	63.66	1.139	2.5878	0.508764
2/26/2005	14:16:26	2.953	63.66	1.099	2.7545	0.491283
2/26/2005	14:16:37	3.1297	63.68	1.061	2.9312	0.474296
2/26/2005	14:16:48	3.3163	63.68	1.021	3.1178	0.456415
2/26/2005	14:17:00	3.5147	63.68	0.98	3.3162	0.438087
2/26/2005	14:17:13	3.7247	63.68	0.939	3.5262	0.419259
2/26/2005	14:17:26	3.9463	63.68	0.897	3.7478	0.400983
2/26/2005	14:17:40	4.1813	63.7	0.857	3.9828	0.383102
2/26/2005	14:17:55	4.4297	63.73	0.816	4.2312	0.364774
2/26/2005	14:16:11	4.693	63.75	0.775	4.4945	0.346446
2/26/2005	14:18:28	4.973	63.77	0.734	4.7745	0.328118
2/26/2005	14:18:45	5.2697	63.79	0.693	5.0712	0.30979
2/26/2005	14:19:04	5.583	63.79	0.653	5.3845	0.291909
2/26/2005	14:19:24	5.9147	63.82	0.614	5.7162	0.274475
2/26/2005	14:19:45	6.2663	63.82	0.574	6.0678	0.256594
2/26/2005	14:20:08	6.6397	63.82	0.535	6.4412	0.23916
2/26/2005	14:20:31	7.0347	63.79	0.498	6.8362	0.22262
2/26/2005	14:20:56	7.453	63.75	0.462	7.2545	0.206527
2/26/2005	14:21:23	7.8963	63.68	0.429	7.6978	0.191775
2/26/2005	14:21:51	8.3663	63.63	0.398	8.1678	0.177917
2/26/2005	14:22:21	8.8647	63.63	0.366	8.6662	0.163612
2/26/2005	14:22:53	9.3913	63.63	0.338	9.1928	0.151095
2/26/2005	14:23:26	9.9497	63.61	0.309	9.7512	0.138131
2/26/2005	14:24:02	10.5413	63.66	0.282	10.3428	0.126062
2/26/2005	14:24:39	11.168	63.68	0.257	10.9695	0.114886
2/26/2005	14:25:19	11.8313	63.66	0.234	11.6328	0.104604
2/26/2005	14:26:01	12.5347	63.63	0.215	12.3362	0.096111
2/26/2005	14:26:46	13.2797	63.66	0.195	13.0812	0.08717
2/26/2005	14:27:33	14.0697	63.7	0.176	13.8712	0.078677
2/26/2005	14:26:24	14.9063	63.68	0.16	14.7078	0.071524
2/26/2005	14:29:17	15.7913	63.61	0.146	15.5928	0.065266
2/26/2005	14:30:13	16.7297	63.61	0.133	16.5312	0.059455
2/26/2005	14:31:13	17.723	63.61	0.12	17.5245	0.053643
2/26/2005	14:32:16	18.7763	63.59	0.11	18.5778	0.049173
2/26/2005	14:33:23	19.8913	63.68	0.104	19.6928	0.046491
2/26/2005	14:34:34	21.073	63.75	0.097	20.8745	0.043362
2/26/2005	14:35:49	22.3247	63.77	0.09	22.1262	0.040232
2/26/2005	14:37:08	23.6497	63.66	0.085	23.4512	0.037997

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW15D
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By: JWR
Checked By: SJC 5/17/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	0.13 = To

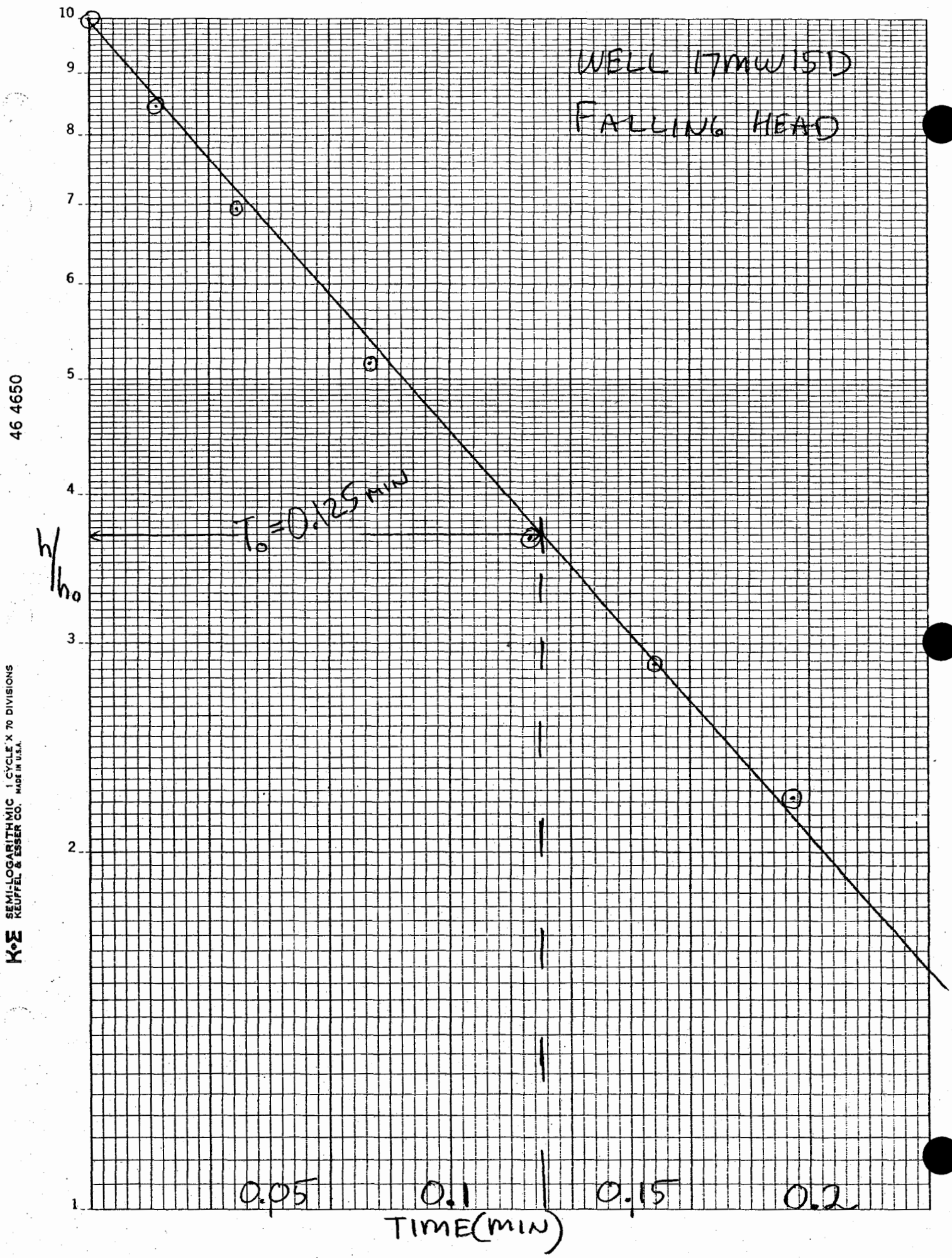
Hydraulic Conductivity (K) :

1.33E-02	ft./min.
2.22E-04	ft./sec.
1.91E+01	ft./day = 19 ft/day
6.76E-03	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW15D
FALLING HEAD
$T_0 = 0.125$ MIN
h/h_0
10
9
8
7
6
5
4
3
2
1
0.05
0.1
0.15
0.2
TIME(MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW15D
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By: [illegible]
Checked By: SJC 5/17/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	0.11 = To

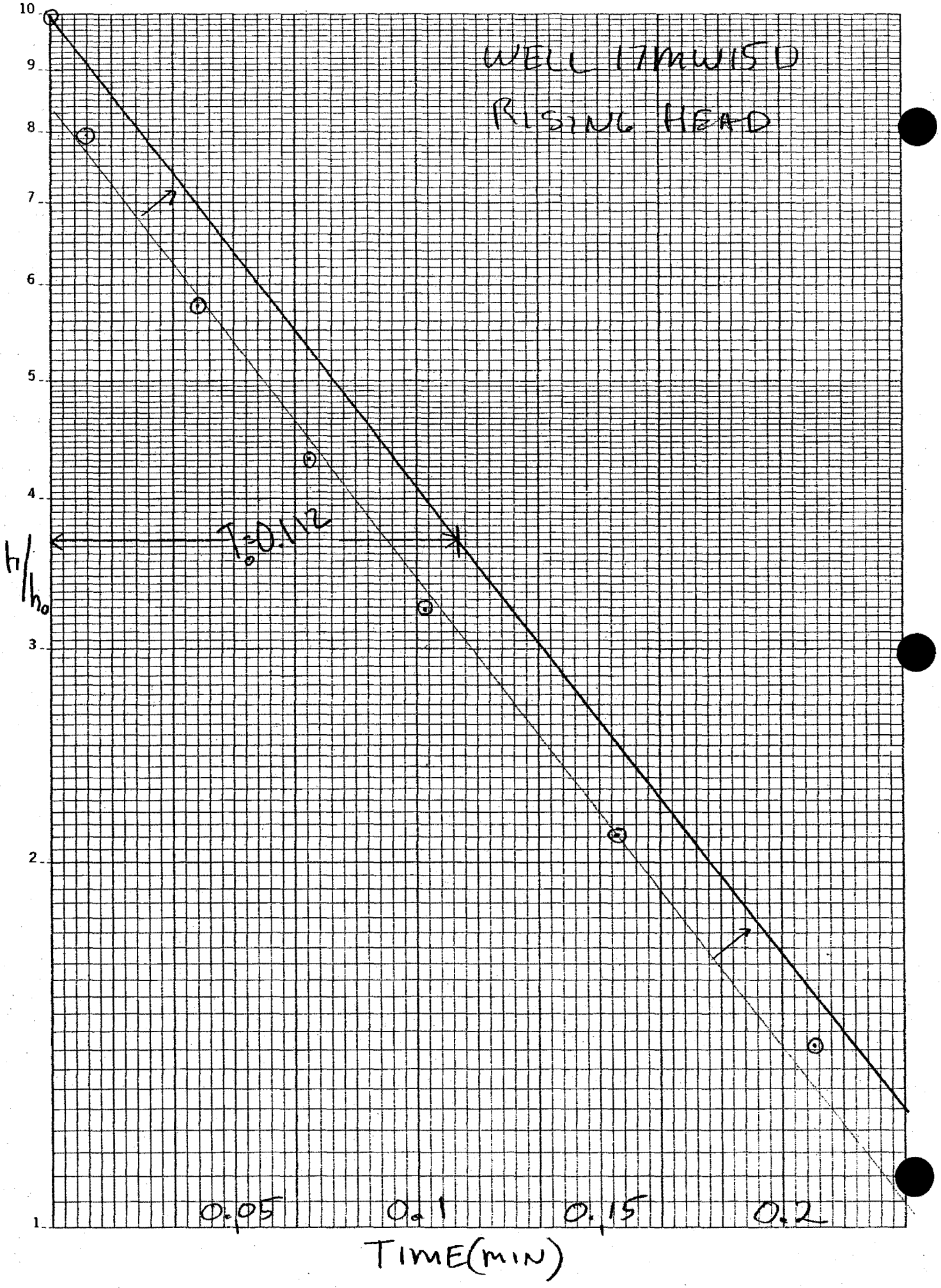
Hydraulic Conductivity (K) :

1.48E-02	ft./min.
2.47E-04	ft./sec.
2.14E+01	ft./day ≈ 21 ft/day
7.54E-03	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW15D
RISING HEAD
$T_0 = 0.112$
h/h_0
10
9
8
7
6
5
4
3
2
1
0.05
0.1
0.15
0.2
TIME(MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: CHARLESTON NWS SWMU 17 WELL/BORING NO.: 17MW15D

PROJECT NO.: 0528 GEOLOGIST: FRED WRAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10' TEST NO.:

STATIC WATER LEVEL (Depth/Elevation): 2.80, 29-39 DATE: 2-26-05

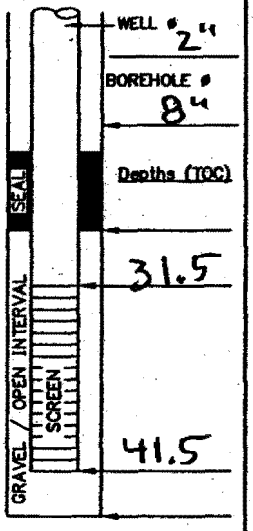
TEST TYPE (Rising/Falling/Constant Head): RISING + FALLING CHECKED: SJC 5/17/05

METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG 13' x 4.9' PAGE 1 OF 1

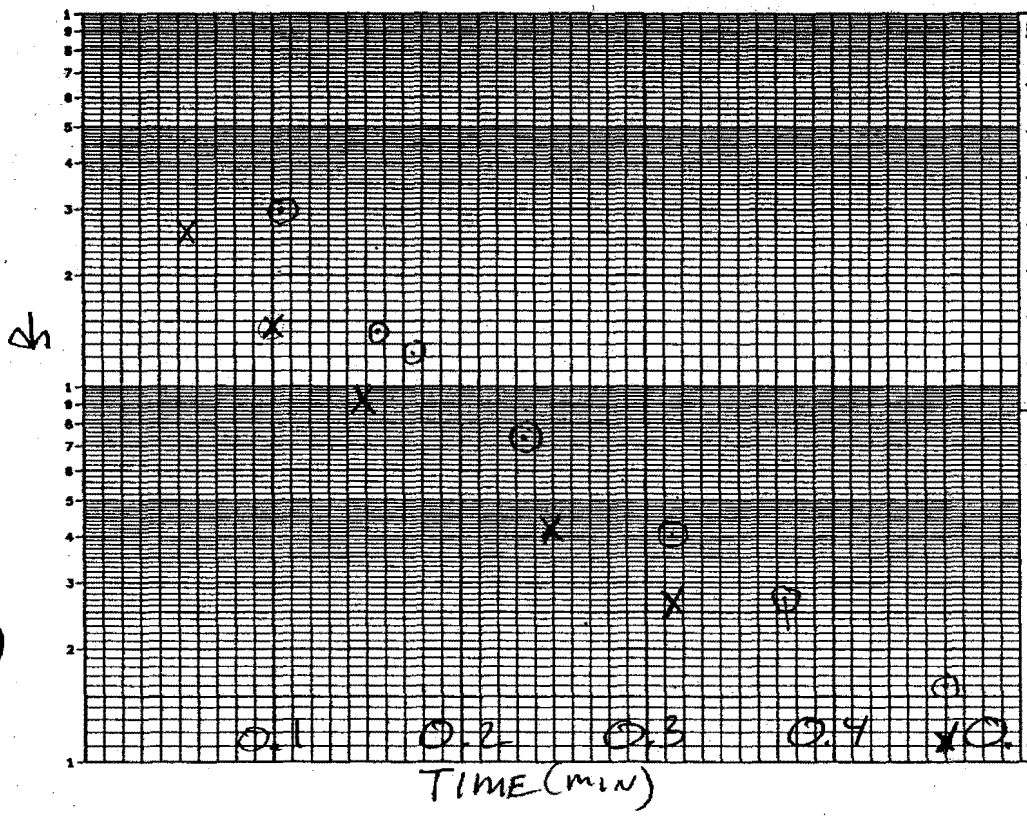
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

FALLING HEAD			RISING HEAD		
ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.1058		3.064	0.0550		2.69
0.1575		1.436	0.065		2.14
0.1672		1.356	0.075		1.914
0.1770		1.218	0.085		1.724
0.1875		1.101	0.100		1.481
0.2102		0.909	0.1120		1.316
0.2358		0.742	0.1490		0.938
0.2803		0.526	0.1770		0.743
0.3147		0.412	0.1985		0.624
0.3742		0.277	0.2498		0.422
0.4697		0.163	0.3147		0.271
0.5547		0.110	0.4697		0.119

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:
FALLING HEAD
START 1503
STOP 1512
RISING HEAD:
START: 1515
STOP: 1522

CALCS, SKETCH MAPS, ETC.:
⊙ = FALLING HEAD
X = RISING HEAD

ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 17:36:26
Report from file: ...\SN11262 2005-02-26 151500 17mw15dr.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw15dr

Test defined on: 2/26/2005 14:41:19
Test started on: 2/26/2005 15:15:00
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10.000 Minutes.
Number of data samples: 82

TOTAL DATA SAMPLES 82

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.434 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho
2/26/2005	15:15:00	0	62.44	0		Plotted data
2/26/2005	15:15:00	0.005	62.51	-0.008		
2/26/2005	15:15:00	0.01	62.51	-0.01		
2/26/2005	15:15:01	0.015	62.51	-0.013		
2/26/2005	15:15:01	0.02	62.53	-0.012		
2/26/2005	15:15:01	0.025	62.53	-0.014		
2/26/2005	15:15:01	0.03	62.53	-0.014		
2/26/2005	15:15:02	0.035	62.53	-0.017		
2/26/2005	15:15:02	0.04	62.53	1.503		
2/26/2005	15:15:02	0.045	62.53	3.776		
2/26/2005	15:15:03	0.05	62.53	3.318		
2/26/2005	15:15:03	0.055	62.53	2.69	0	1 ho
2/26/2005	15:15:03	0.06	62.55	2.336	0.005	0.868401
2/26/2005	15:15:04	0.065	62.53	2.141	0.01	0.795911
2/26/2005	15:15:04	0.07	62.53	2.011	0.015	0.747584
2/26/2005	15:15:04	0.075	62.55	1.914	0.02	0.711524
2/26/2005	15:15:04	0.08	62.55	1.814	0.025	0.674349
2/26/2005	15:15:05	0.085	62.55	1.724	0.03	0.640892
2/26/2005	15:15:05	0.09	62.55	1.638	0.035	0.608922
2/26/2005	15:15:05	0.095	62.55	1.557	0.04	0.57881
2/26/2005	15:15:06	0.1	62.55	1.481	0.045	0.550558
2/26/2005	15:15:06	0.1058	62.55	1.398	0.0508	0.519703
2/26/2005	15:15:06	0.112	62.55	1.316	0.057	0.489219
2/26/2005	15:15:07	0.1185	62.55	1.238	0.0635	0.460223
2/26/2005	15:15:07	0.1255	62.55	1.16	0.0705	0.431227

2/26/2005	15:15:08	0.1328	62.55	1.084	0.0778	0.402974
2/26/2005	15:15:08	0.1407	62.55	1.01	0.0857	0.375465
2/26/2005	15:15:09	0.149	62.55	0.938	0.094	0.348699
2/26/2005	15:15:09	0.1578	62.58	0.868	0.1028	0.322677
2/26/2005	15:15:10	0.1672	62.53	0.806	0.1122	0.299628
2/26/2005	15:15:10	0.177	62.53	0.743	0.122	0.276208
2/26/2005	15:15:11	0.1875	62.53	0.681	0.1325	0.25316
2/26/2005	15:15:12	0.1985	62.53	0.624	0.1435	0.23197
2/26/2005	15:15:12	0.2102	62.55	0.569	0.1552	0.211524
2/26/2005	15:15:13	0.2227	62.55	0.517	0.1677	0.192193
2/26/2005	15:15:14	0.2358	62.55	0.467	0.1808	0.173606
2/26/2005	15:15:15	0.2498	62.55	0.422	0.1948	0.156877
2/26/2005	15:15:16	0.2647	62.55	0.38	0.2097	0.141264
2/26/2005	15:15:16	0.2803	62.58	0.34	0.2253	0.126394
2/26/2005	15:15:17	0.297	62.58	0.304	0.242	0.113011
2/26/2005	15:15:19	0.3147	62.6	0.271	0.2597	0.100743
2/26/2005	15:15:20	0.3333	62.6	0.241	0.2783	0.089591
2/26/2005	15:15:21	0.3532	62.62	0.213	0.2982	0.079182
2/26/2005	15:15:22	0.3742	62.64	0.19	0.3192	0.070632
2/26/2005	15:15:23	0.3963	62.64	0.168	0.3413	0.062454
2/26/2005	15:15:25	0.4198	62.67	0.15	0.3648	0.055762
2/26/2005	15:15:26	0.4447	62.69	0.133	0.3897	0.049442
2/26/2005	15:15:28	0.4697	62.71	0.119	0.4147	0.044238
2/26/2005	15:15:29	0.4963	62.73	0.107	0.4413	0.039777
2/26/2005	15:15:31	0.5247	62.76	0.097	0.4697	0.036059
2/26/2005	15:15:33	0.5547	62.78	0.088	0.4997	0.032714
2/26/2005	15:15:35	0.5863	62.8	0.08	0.5313	0.02974
2/26/2005	15:15:37	0.6213	62.82	0.073	0.5663	0.027138
2/26/2005	15:15:39	0.658	62.85	0.067	0.603	0.024907
2/26/2005	15:15:41	0.6963	62.87	0.061	0.6413	0.022677
2/26/2005	15:15:44	0.738	62.89	0.058	0.683	0.021561
2/26/2005	15:15:47	0.7813	62.91	0.054	0.7263	0.020074
2/26/2005	15:15:49	0.828	62.96	0.051	0.773	0.018959
2/26/2005	15:15:52	0.8763	62.98	0.048	0.8213	0.017844
2/26/2005	15:15:55	0.928	63.03	0.045	0.873	0.016729
2/26/2005	15:15:59	0.983	63.05	0.042	0.928	0.015613
2/26/2005	15:16:02	1.0413	63.07	0.04	0.9863	0.01487
2/26/2005	15:16:06	1.103	63.09	0.038	1.048	0.014126
2/26/2005	15:16:10	1.168	63.14	0.037	1.113	0.013755
2/26/2005	15:16:14	1.238	63.16	0.035	1.183	0.013011
2/26/2005	15:16:18	1.3113	63.21	0.035	1.2563	0.013011
2/26/2005	15:16:23	1.3897	63.23	0.032	1.3347	0.011896
2/26/2005	15:16:28	1.473	63.27	0.032	1.418	0.011896
2/26/2005	15:16:33	1.5613	63.3	0.031	1.5063	0.011524
2/26/2005	15:16:39	1.6547	63.32	0.029	1.5997	0.010781
2/26/2005	15:16:45	1.753	63.36	0.028	1.698	0.010409
2/26/2005	15:16:51	1.858	63.39	0.026	1.803	0.009665
2/26/2005	15:16:58	1.968	63.43	0.027	1.913	0.010037
2/26/2005	15:17:05	2.0847	63.45	0.026	2.0297	0.009665
2/26/2005	15:17:12	2.2097	63.48	0.025	2.1547	0.009294
2/26/2005	15:17:20	2.3413	63.52	0.024	2.2863	0.008922
2/26/2005	15:17:29	2.4813	63.54	0.023	2.4263	0.00855
2/26/2005	15:17:37	2.6297	63.57	0.024	2.5747	0.008922
2/26/2005	15:17:47	2.7863	63.59	0.023	2.7313	0.00855
2/26/2005	15:17:57	2.953	63.61	0.023	2.898	0.00855
2/26/2005	15:18:07	3.1297	63.63	0.023	3.0747	0.00855
2/26/2005	15:18:19	3.3163	63.66	0.021	3.2613	0.007807

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 17:30:17
Report from file: ...\SN11262 2005-02-26 150306 17mw15df.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw15df

Test defined on: 2/26/2005 14:40:37
Test started on: 2/26/2005 15:03:06
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1Minutes.
Number of data samples: 83

TOTAL DATA SAMPLES 83

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.424 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/26/2005	15:03:06	0	63.73	0			Plotted data
2/26/2005	15:03:06	0.005	63.77	-0.008			
2/26/2005	15:03:06	0.01	63.77	-0.011			
2/26/2005	15:03:07	0.015	63.79	-0.013			
2/26/2005	15:03:07	0.02	63.79	-0.013			
2/26/2005	15:03:07	0.025	63.79	-0.014			
2/26/2005	15:03:07	0.03	63.82	-0.014			
2/26/2005	15:03:08	0.035	63.82	-0.014			
2/26/2005	15:03:08	0.04	63.82	-0.025			
2/26/2005	15:03:08	0.045	63.82	-0.015			
2/26/2005	15:03:09	0.05	63.82	-0.014			
2/26/2005	15:03:09	0.055	63.82	-0.015			
2/26/2005	15:03:09	0.06	63.82	-0.012			
2/26/2005	15:03:10	0.065	63.82	-0.015			
2/26/2005	15:03:10	0.07	63.82	-0.015			
2/26/2005	15:03:10	0.075	63.82	-0.015			
2/26/2005	15:03:10	0.08	63.84	-0.016			
2/26/2005	15:03:11	0.085	63.84	-0.02			
2/26/2005	15:03:11	0.09	63.84	-0.018			
2/26/2005	15:03:11	0.095	63.84	-0.016			
2/26/2005	15:03:12	0.1	63.84	-0.017			
2/26/2005	15:03:12	0.1058	63.84	-3.064			

2/26/2005	15:03:12	0.112	63.84	-3.373			
2/26/2005	15:03:13	0.1185	63.84	-3.435			
2/26/2005	15:03:13	0.1255	63.84	-3.233			
2/26/2005	15:03:14	0.1328	63.84	-1.417			
2/26/2005	15:03:14	0.1407	63.84	-1.209			
2/26/2005	15:03:15	0.149	63.84	-1.284			
2/26/2005	15:03:15	0.1578	63.84	-1.436	0	1	ho
2/26/2005	15:03:16	0.1672	63.79	-1.356	0.0094	0.94429	
2/26/2005	15:03:16	0.177	63.79	-1.218	0.0192	0.848189	
2/26/2005	15:03:17	0.1875	63.79	-1.101	0.0297	0.766713	
2/26/2005	15:03:18	0.1985	63.79	-0.997	0.0407	0.69429	
2/26/2005	15:03:18	0.2102	63.79	-0.909	0.0524	0.633008	
2/26/2005	15:03:19	0.2227	63.79	-0.823	0.0649	0.57312	
2/26/2005	15:03:20	0.2358	63.79	-0.742	0.078	0.516713	
2/26/2005	15:03:21	0.2498	63.77	-0.665	0.092	0.463092	
2/26/2005	15:03:22	0.2647	63.77	-0.592	0.1069	0.412256	
2/26/2005	15:03:22	0.2803	63.77	-0.526	0.1225	0.366295	
2/26/2005	15:03:23	0.297	63.75	-0.465	0.1392	0.323816	
2/26/2005	15:03:25	0.3147	63.75	-0.412	0.1569	0.286908	
2/26/2005	15:03:26	0.3333	63.73	-0.362	0.1755	0.252089	
2/26/2005	15:03:27	0.3532	63.7	-0.317	0.1954	0.220752	
2/26/2005	15:03:28	0.3742	63.7	-0.277	0.2164	0.192897	
2/26/2005	15:03:29	0.3963	63.68	-0.242	0.2385	0.168524	
2/26/2005	15:03:31	0.4198	63.66	-0.212	0.262	0.147632	
2/26/2005	15:03:32	0.4447	63.63	-0.185	0.2869	0.12883	
2/26/2005	15:03:34	0.4697	63.61	-0.163	0.3119	0.11351	
2/26/2005	15:03:35	0.4963	63.59	-0.142	0.3385	0.098886	
2/26/2005	15:03:37	0.5247	63.54	-0.126	0.3669	0.087744	
2/26/2005	15:03:39	0.5547	63.52	-0.11	0.3969	0.076602	
2/26/2005	15:03:41	0.5863	63.5	-0.098	0.4285	0.068245	
2/26/2005	15:03:43	0.6213	63.48	-0.087	0.4635	0.060585	
2/26/2005	15:03:45	0.658	63.45	-0.077	0.5002	0.053621	
2/26/2005	15:03:47	0.6963	63.41	-0.071	0.5385	0.049443	
2/26/2005	15:03:50	0.738	63.39	-0.065	0.5802	0.045265	
2/26/2005	15:03:53	0.7813	63.36	-0.06	0.6235	0.041783	
2/26/2005	15:03:55	0.828	63.34	-0.054	0.6702	0.037604	
2/26/2005	15:03:58	0.8763	63.32	-0.049	0.7185	0.034123	
2/26/2005	15:04:01	0.928	63.27	-0.046	0.7702	0.032033	
2/26/2005	15:04:05	0.983	63.25	-0.044	0.8252	0.030641	
2/26/2005	15:04:08	1.0413	63.23	-0.042	0.8835	0.029248	
2/26/2005	15:04:12	1.103	63.21	-0.039	0.9452	0.027159	
2/26/2005	15:04:16	1.168	63.18	-0.036	1.0102	0.02507	
2/26/2005	15:04:20	1.238	63.16	-0.034	1.0802	0.023677	
2/26/2005	15:04:24	1.3113	63.14	-0.033	1.1535	0.022981	
2/26/2005	15:04:29	1.3897	63.09	-0.031	1.2319	0.021588	
2/26/2005	15:04:34	1.473	63.07	-0.031	1.3152	0.021588	
2/26/2005	15:04:39	1.5613	63.05	-0.03	1.4035	0.020891	
2/26/2005	15:04:45	1.6547	63.03	-0.029	1.4969	0.020195	
2/26/2005	15:04:51	1.753	63	-0.028	1.5952	0.019499	
2/26/2005	15:04:57	1.858	62.96	-0.027	1.7002	0.018802	
2/26/2005	15:05:04	1.968	62.94	-0.025	1.8102	0.017409	
2/26/2005	15:05:11	2.0847	62.91	-0.024	1.9269	0.016713	
2/26/2005	15:05:18	2.2097	62.89	-0.023	2.0519	0.016017	
2/26/2005	15:05:26	2.3413	62.85	-0.022	2.1835	0.01532	
2/26/2005	15:05:35	2.4813	62.82	-0.02	2.3235	0.013928	
2/26/2005	15:05:43	2.6297	62.76	-0.02	2.4719	0.013928	
2/26/2005	15:05:53	2.7863	62.73	-0.019	2.6285	0.013231	
2/26/2005	15:06:03	2.953	62.69	-0.019	2.7952	0.013231	
2/26/2005	15:06:13	3.1297	62.62	-0.017	2.9719	0.011838	
2/26/2005	15:06:25	3.3163	62.58	-0.018	3.1585	0.012535	
2/26/2005	15:06:37	3.5147	62.53	-0.018	3.3569	0.012535	

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW16S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By: JWR
Checked By: SJC 5/17/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	1.58 = To

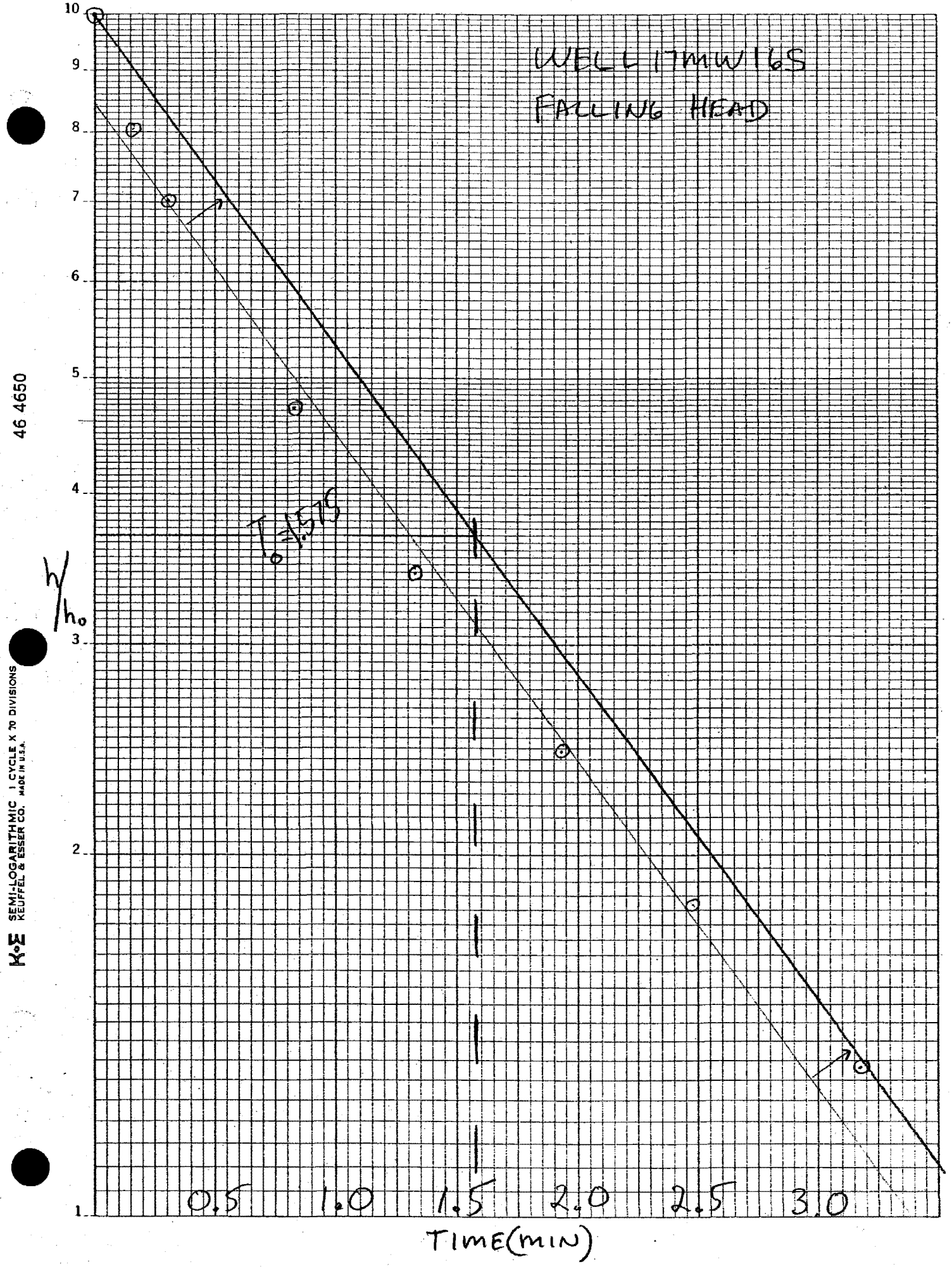
Hydraulic Conductivity (K) :

1.06E-03	ft./min.
1.76E-05	ft./sec.
1.52E+00	ft./day = 1.5 ft/day
5.36E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW165
FALLING HEAD
$T_0 = 1.5$ MIN
h/h_0
10
9
8
7
6
5
4
3
2
1
0.5
1.0
1.5
2.0
2.5
3.0
TIME(MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW16S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By: JWR
Checked By: SJC 5/17/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	1.50 = To

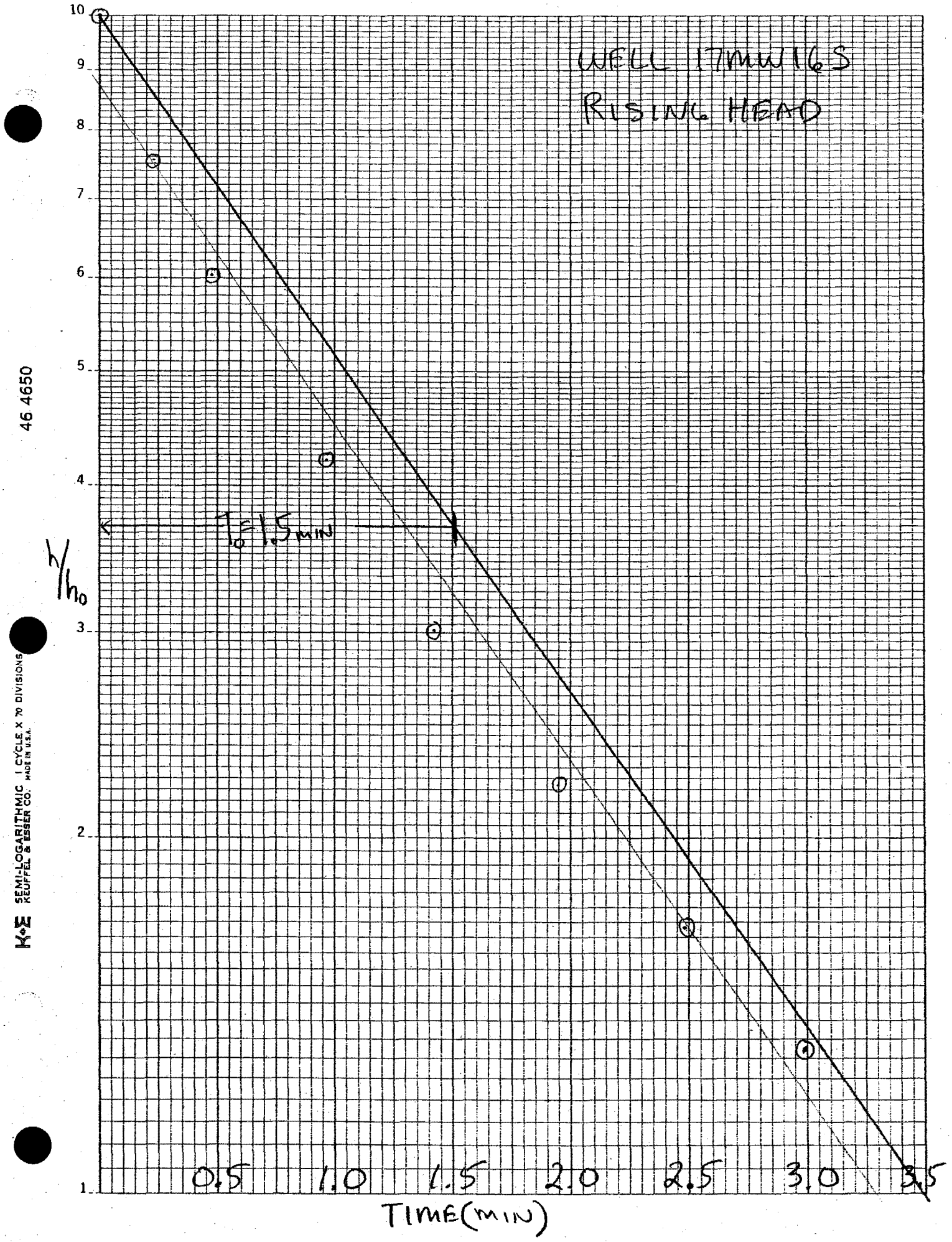
Hydraulic Conductivity (K) :

1.11E-03	ft./min.
1.85E-05	ft./sec.
1.60E+00	ft./day ≈ 1.6 ft/day
5.63E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW16S
RISING HEAD
$T_0 = 1.5$ MIN
h/h_0
10
9
8
7
6
5
4
3
2
1
0.5
1.0
1.5
2.0
2.5
3.0
3.5
TIME (MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: CHARLESTON NWS SWMU 17 WELL/BORING NO.: 17MW16S

PROJECT NO.: 0528 GEOLOGIST: FRED WRAMSEL

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10', 5-15 BGS TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 2.41 DATE: 2-26-05

TEST TYPE (Rising/Falling/Constant Head): FALLING + RISING CHECKED: SJC 5/17/05

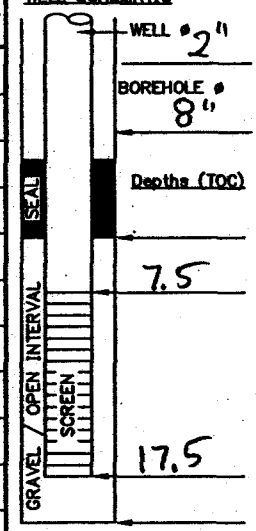
METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

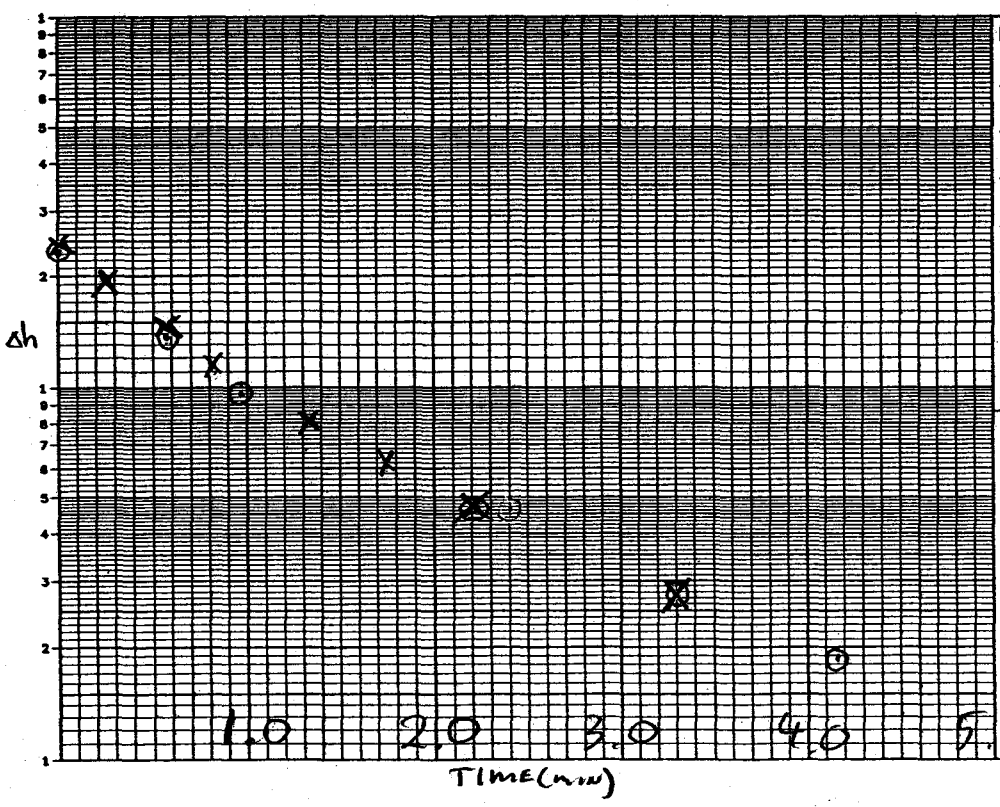
← FALLING HEAD → ← RISING HEAD →

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.100		2.385	0.1120		2.390
0.2498		1.728	0.2498		1.903
0.3532		1.567	0.3532		1.718
0.4963		1.384	0.5247		1.471
0.9830		0.967	0.738		1.192
1.3113		0.280	1.3113		0.811
1.6547		0.634	1.7530		0.611
2.2097		0.466	2.2097		0.469
3.3163		0.274	3.3163		0.273
4.1813		0.195	4.1813		0.192
5.2697		0.136	5.2697		0.137
6.2663		0.103	6.2663		0.106

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS: FALLING H.
START: 0851
END: 0903
RISING HEAD;
START: 0908
END: 0919

CALCS, SKETCH MAPS, ETC.:
⊙ = FALLING HEAD
X = RISING HEAD

ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 16:31:26
Report from file: ...\SN11262 2005-02-26 085110 17mw16sf.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw16sf

Test defined on: 2/26/2005 8:37:45
Test started on: 2/26/2005 8:51:10
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: Minutes.
Number of data samples: 103

TOTAL DATA SAMPLES 103

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.909 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/26/2005	8:51:10	0	63.54	0			Plotted data
2/26/2005	8:51:11	0.005	63.59	-0.009			
2/26/2005	8:51:11	0.01	63.59	-0.012			
2/26/2005	8:51:11	0.015	63.61	-0.013			
2/26/2005	8:51:12	0.02	63.61	-0.015			
2/26/2005	8:51:12	0.025	63.61	-0.015			
2/26/2005	8:51:12	0.03	63.61	-0.017			
2/26/2005	8:51:13	0.035	63.61	-0.017			
2/26/2005	8:51:13	0.04	63.61	-0.017			
2/26/2005	8:51:13	0.045	63.63	-0.016			
2/26/2005	8:51:13	0.05	63.63	-0.016			
2/26/2005	8:51:14	0.055	63.63	-0.021			
2/26/2005	8:51:14	0.06	63.63	-0.019			
2/26/2005	8:51:14	0.065	63.63	-0.019			
2/26/2005	8:51:15	0.07	63.63	-0.02			
2/26/2005	8:51:15	0.075	63.63	-0.02			
2/26/2005	8:51:15	0.08	63.63	-0.967			
2/26/2005	8:51:16	0.085	63.63	-3.533			
2/26/2005	8:51:16	0.09	63.63	-4.943			
2/26/2005	8:51:16	0.095	63.63	-4.152			
2/26/2005	8:51:16	0.1	63.66	-2.385			
2/26/2005	8:51:17	0.1058	63.66	-1.724			
2/26/2005	8:51:17	0.112	63.66	-1.85			
2/26/2005	8:51:18	0.1185	63.66	-1.548			
2/26/2005	8:51:18	0.1255	63.66	-1.736			
2/26/2005	8:51:18	0.1328	63.66	-2.014			
2/26/2005	8:51:19	0.1407	63.63	-2.048	0	1	ho
2/26/2005	8:51:19	0.149	63.66	-1.927	0.0083	0.940918	
2/26/2005	8:51:20	0.1578	63.66	-1.877	0.0171	0.916504	
2/26/2005	8:51:21	0.1672	63.61	-1.884	0.0265	0.919922	
2/26/2005	6:51:21	0.177	63.61	-1.875	0.0363	0.915527	

2/26/2005	8:51:22	0.1875	63.61	-1.842	0.0468	0.899414
2/26/2005	8:51:22	0.1985	63.61	-1.82	0.0578	0.888672
2/26/2005	8:51:23	0.2102	63.61	-1.8	0.0695	0.878906
2/26/2005	8:51:24	0.2227	63.61	-1.776	0.082	0.867188
2/26/2005	8:51:25	0.2358	63.61	-1.753	0.0951	0.855957
2/26/2005	8:51:25	0.2498	63.61	-1.728	0.1091	0.84375
2/26/2005	8:51:26	0.2647	63.59	-1.703	0.124	0.831543
2/26/2005	8:51:27	0.2803	63.59	-1.677	0.1396	0.818848
2/26/2005	8:51:28	0.297	63.59	-1.65	0.1563	0.805664
2/26/2005	8:51:29	0.3147	63.61	-1.623	0.174	0.79248
2/26/2005	8:51:30	0.3333	63.61	-1.594	0.1926	0.77832
2/26/2005	8:51:32	0.3532	63.61	-1.567	0.2125	0.765137
2/26/2005	8:51:33	0.3742	63.61	-1.538	0.2335	0.750977
2/26/2005	8:51:34	0.3963	63.61	-1.508	0.2556	0.736328
2/26/2005	8:51:36	0.4198	63.61	-1.477	0.2791	0.721191
2/26/2005	8:51:37	0.4447	63.61	-1.445	0.304	0.705566
2/26/2005	8:51:39	0.4697	63.61	-1.416	0.329	0.691406
2/26/2005	8:51:40	0.4963	63.61	-1.384	0.3556	0.675781
2/26/2005	8:51:42	0.5247	63.61	-1.381	0.384	0.674316
2/26/2005	8:51:44	0.5547	63.61	-1.371	0.414	0.669434
2/26/2005	8:51:46	0.5863	63.61	-1.294	0.4456	0.631836
2/26/2005	8:51:48	0.6213	63.61	-1.253	0.4806	0.611816
2/26/2005	8:51:50	0.658	63.61	-1.218	0.5173	0.594727
2/26/2005	8:51:52	0.6963	63.61	-1.182	0.5556	0.577148
2/26/2005	8:51:55	0.738	63.61	-1.146	0.5973	0.55957
2/26/2005	8:51:57	0.7813	63.61	-1.112	0.6406	0.542969
2/26/2005	8:52:00	0.828	63.59	-1.075	0.6873	0.524902
2/26/2005	8:52:03	0.8763	63.59	-1.04	0.7356	0.507813
2/26/2005	8:52:06	0.928	63.59	-1.003	0.7873	0.489746
2/26/2005	8:52:09	0.983	63.59	-0.967	0.8423	0.472168
2/26/2005	8:52:13	1.0413	63.59	-0.929	0.9006	0.453613
2/26/2005	8:52:17	1.103	63.59	-0.89	0.9623	0.43457
2/26/2005	8:52:21	1.168	63.57	-0.853	1.0273	0.416504
2/26/2005	8:52:25	1.238	63.57	-0.816	1.0973	0.398438
2/26/2005	8:52:29	1.3113	63.57	-0.78	1.1706	0.380859
2/26/2005	8:52:34	1.3897	63.54	-0.744	1.249	0.363281
2/26/2005	8:52:39	1.473	63.54	-0.706	1.3323	0.344727
2/26/2005	8:52:44	1.5613	63.54	-0.67	1.4206	0.327148
2/26/2005	8:52:50	1.6547	63.52	-0.634	1.514	0.30957
2/26/2005	8:52:56	1.753	63.52	-0.599	1.6123	0.29248
2/26/2005	8:53:02	1.858	63.5	-0.565	1.7173	0.275879
2/26/2005	8:53:09	1.968	63.5	-0.531	1.8273	0.259277
2/26/2005	8:53:16	2.0847	63.5	-0.499	1.944	0.243652
2/26/2005	8:53:23	2.2097	63.5	-0.466	2.069	0.227539
2/26/2005	8:53:31	2.3413	63.5	-0.435	2.2006	0.212402
2/26/2005	8:53:39	2.4813	63.48	-0.404	2.3406	0.197266
2/26/2005	8:53:48	2.6297	63.48	-0.375	2.489	0.183105
2/26/2005	8:53:58	2.7863	63.5	-0.348	2.6456	0.169922
2/26/2005	8:54:08	2.953	63.48	-0.322	2.8123	0.157227
2/26/2005	8:54:18	3.1297	63.5	-0.295	2.989	0.144043
2/26/2005	8:54:29	3.3163	63.5	-0.274	3.1756	0.133789
2/26/2005	8:54:41	3.5147	63.48	-0.252	3.374	0.123047
2/26/2005	8:54:54	3.7247	63.48	-0.232	3.584	0.113281
2/26/2005	8:55:07	3.9463	63.48	-0.212	3.8056	0.103516
2/26/2005	8:55:21	4.1813	63.45	-0.195	4.0406	0.095215
2/26/2005	8:55:36	4.4297	63.45	-0.179	4.289	0.087402
2/26/2005	8:55:52	4.693	63.45	-0.164	4.5523	0.080078
2/26/2005	8:56:09	4.973	63.45	-0.15	4.8323	0.073242
2/26/2005	8:56:27	5.2697	63.43	-0.136	5.129	0.066406
2/26/2005	8:56:45	5.583	63.43	-0.124	5.4423	0.060547
2/26/2005	8:57:05	5.9147	63.43	-0.113	5.774	0.055176
2/26/2005	8:57:26	6.2663	63.43	-0.103	6.1256	0.050293
2/26/2005	8:57:49	6.6397	63.45	-0.094	6.499	0.045898
2/26/2005	8:58:13	7.0347	63.45	-0.086	6.894	0.041992
2/26/2005	8:58:38	7.453	63.48	-0.08	7.3123	0.039063
2/26/2005	8:59:04	7.8963	63.48	-0.072	7.7556	0.035156
2/26/2005	8:59:32	8.3663	63.48	-0.066	8.2256	0.032227
2/26/2005	9:00:02	8.8647	63.48	-0.061	8.724	0.029785
2/26/2005	9:00:34	9.3913	63.48	-0.056	9.2506	0.027344
2/26/2005	9:01:07	9.9497	63.48	-0.051	9.809	0.024902
2/26/2005	9:01:43	10.5413	63.48	-0.047	10.4006	0.022949
2/26/2005	9:02:21	11.168	63.48	-0.043	11.0273	0.020996

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 16:35:55
Report from file: ...\SN11262 2005-02-26 090811 17mw16sr.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw16sr

Test defined on: 2/26/2005 8:39:47
Test started on: 2/26/2005 9:08:11
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10.0(Minutes.
Number of data samples: 96

TOTAL DATA SAMPLES 96

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.935 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho
2/26/2005	9:08:11	0	63.5	0		
2/26/2005	9:08:11	0.005	63.54	-0.009		
2/26/2005	9:08:12	0.01	63.54	-0.012		
2/26/2005	9:08:12	0.015	63.57	-0.013		
2/26/2005	9:08:12	0.02	63.57	-0.014		
2/26/2005	9:08:13	0.025	63.57	-0.015		
2/26/2005	9:08:13	0.03	63.57	-0.015		
2/26/2005	9:08:13	0.035	63.57	-0.015		
2/26/2005	9:08:14	0.04	63.57	-0.015		
2/26/2005	9:08:14	0.045	63.59	-0.015		
2/26/2005	9:08:14	0.05	63.59	-0.015		
2/26/2005	9:08:14	0.055	63.59	-0.024		
2/26/2005	9:08:15	0.06	63.59	-0.01		
2/26/2005	9:08:15	0.065	63.59	-0.007		
2/26/2005	9:08:15	0.07	63.59	-0.014		
2/26/2005	9:08:16	0.075	63.59	-0.017		
2/26/2005	9:08:16	0.08	63.59	-0.019		
2/26/2005	9:08:16	0.085	63.59	-0.014		
2/26/2005	9:08:17	0.09	63.59	0.605		
2/26/2005	9:08:17	0.095	63.59	6.201		
2/26/2005	9:08:17	0.1	63.59	1.465		
2/26/2005	9:08:18	0.1058	63.59	2.294		
2/26/2005	9:08:18	0.112	63.59	2.39		
2/26/2005	9:08:18	0.1185	63.59	2.243		
2/26/2005	9:08:19	0.1255	63.59	2.137		
2/26/2005	9:08:19	0.1328	63.59	2.228	0	1 ho
2/26/2005	9:08:20	0.1407	63.59	2.154	0.0079	0.966786
2/26/2005	9:08:20	0.149	63.59	2.127	0.0162	0.954668
2/26/2005	9:08:21	0.1578	63.59	2.107	0.025	0.945691
2/26/2005	9:08:21	0.1672	63.57	2.086	0.0344	0.936266
2/26/2005	9:08:22	0.177	63.57	2.063	0.0442	0.925943

Plotted data

2/26/2005	9:08:22	0.1875	63.57	2.038	0.0547	0.914722
2/26/2005	9:08:23	0.1985	63.57	2.012	0.0657	0.903052
2/26/2005	9:08:24	0.2102	63.57	1.987	0.0774	0.891831
2/26/2005	9:08:25	0.2227	63.57	1.959	0.0899	0.879264
2/26/2005	9:08:25	0.2358	63.54	1.931	0.103	0.866697
2/26/2005	9:08:26	0.2498	63.54	1.903	0.117	0.854129
2/26/2005	9:08:27	0.2647	63.54	1.874	0.1319	0.841113
2/26/2005	9:08:28	0.2803	63.54	1.845	0.1475	0.828097
2/26/2005	9:08:29	0.297	63.54	1.814	0.1642	0.814183
2/26/2005	9:08:30	0.3147	63.54	1.783	0.1819	0.800269
2/26/2005	9:08:31	0.3333	63.54	1.75	0.2005	0.785458
2/26/2005	9:08:32	0.3532	63.54	1.718	0.2204	0.771095
2/26/2005	9:08:34	0.3742	63.54	1.684	0.2414	0.755635
2/26/2005	9:08:35	0.3963	63.54	1.649	0.2635	0.740126
2/26/2005	9:08:36	0.4198	63.54	1.614	0.287	0.724417
2/26/2005	9:08:38	0.4447	63.54	1.578	0.3119	0.708259
2/26/2005	9:08:39	0.4697	63.54	1.543	0.3369	0.692549
2/26/2005	9:08:41	0.4963	63.54	1.507	0.3635	0.676391
2/26/2005	9:08:43	0.5247	63.54	1.471	0.3919	0.660233
2/26/2005	9:08:44	0.5547	63.54	1.433	0.4219	0.643178
2/26/2005	9:08:46	0.5863	63.54	1.396	0.4535	0.626571
2/26/2005	9:08:48	0.6213	63.54	1.356	0.4885	0.608818
2/26/2005	9:08:51	0.658	63.54	1.316	0.5252	0.590664
2/26/2005	9:08:53	0.6963	63.54	1.275	0.5635	0.572262
2/26/2005	9:08:55	0.738	63.54	1.234	0.6052	0.55386
2/26/2005	9:08:58	0.7813	63.54	1.192	0.6485	0.535009
2/26/2005	9:09:01	0.828	63.54	1.15	0.6952	0.516158
2/26/2005	9:09:04	0.8763	63.52	1.109	0.7435	0.497756
2/26/2005	9:09:07	0.928	63.54	1.068	0.7952	0.479354
2/26/2005	9:09:10	0.983	63.52	1.024	0.8502	0.459605
2/26/2005	9:09:14	1.0413	63.52	0.981	0.9085	0.440305
2/26/2005	9:09:17	1.103	63.52	0.939	0.9702	0.421454
2/26/2005	9:09:21	1.168	63.52	0.898	1.0352	0.403052
2/26/2005	9:09:25	1.238	63.52	0.854	1.1052	0.383303
2/26/2005	9:09:30	1.3113	63.5	0.811	1.1785	0.364004
2/26/2005	9:09:35	1.3897	63.5	0.771	1.2569	0.34605
2/26/2005	9:09:40	1.473	63.5	0.729	1.3402	0.327199
2/26/2005	9:09:45	1.5613	63.48	0.689	1.4285	0.309246
2/26/2005	9:09:50	1.6547	63.48	0.65	1.5219	0.291741
2/26/2005	9:09:56	1.753	63.48	0.611	1.6202	0.274237
2/26/2005	9:10:03	1.858	63.48	0.574	1.7252	0.25763
2/26/2005	9:10:09	1.968	63.48	0.538	1.8352	0.241472
2/26/2005	9:10:16	2.0847	63.48	0.503	1.9519	0.225763
2/26/2005	9:10:24	2.2097	63.48	0.469	2.0769	0.210503
2/26/2005	9:10:32	2.3413	63.48	0.436	2.2085	0.195691
2/26/2005	9:10:40	2.4813	63.48	0.405	2.3485	0.181777
2/26/2005	9:10:49	2.6297	63.48	0.375	2.4969	0.168312
2/26/2005	9:10:58	2.7863	63.48	0.348	2.6535	0.156194
2/26/2005	9:11:08	2.953	63.48	0.322	2.8202	0.144524
2/26/2005	9:11:19	3.1297	63.48	0.297	2.9969	0.133303
2/26/2005	9:11:30	3.3163	63.48	0.273	3.1835	0.122531
2/26/2005	9:11:42	3.5147	63.48	0.251	3.3819	0.112657
2/26/2005	9:11:55	3.7247	63.45	0.229	3.5919	0.102783
2/26/2005	9:12:08	3.9463	63.45	0.209	3.8135	0.093806
2/26/2005	9:12:22	4.1813	63.45	0.192	4.0485	0.086176
2/26/2005	9:12:37	4.4297	63.43	0.176	4.2969	0.078995
2/26/2005	9:12:53	4.693	63.41	0.162	4.5602	0.072711
2/26/2005	9:13:10	4.973	63.41	0.148	4.8402	0.066427
2/26/2005	9:13:27	5.2697	63.41	0.137	5.1369	0.06149
2/26/2005	9:13:46	5.583	63.41	0.126	5.4502	0.056553
2/26/2005	9:14:06	5.9147	63.41	0.116	5.7819	0.052065
2/26/2005	9:14:27	6.2663	63.41	0.106	6.1335	0.047576
2/26/2005	9:14:50	6.6397	63.39	0.098	6.5069	0.043986
2/26/2005	9:15:13	7.0347	63.41	0.09	6.9019	0.040395
2/26/2005	9:15:38	7.453	63.41	0.085	7.3202	0.038151

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW16I
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By: SWR
Checked By: SSC 5/17/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	0.71 = To

Hydraulic Conductivity (K) :

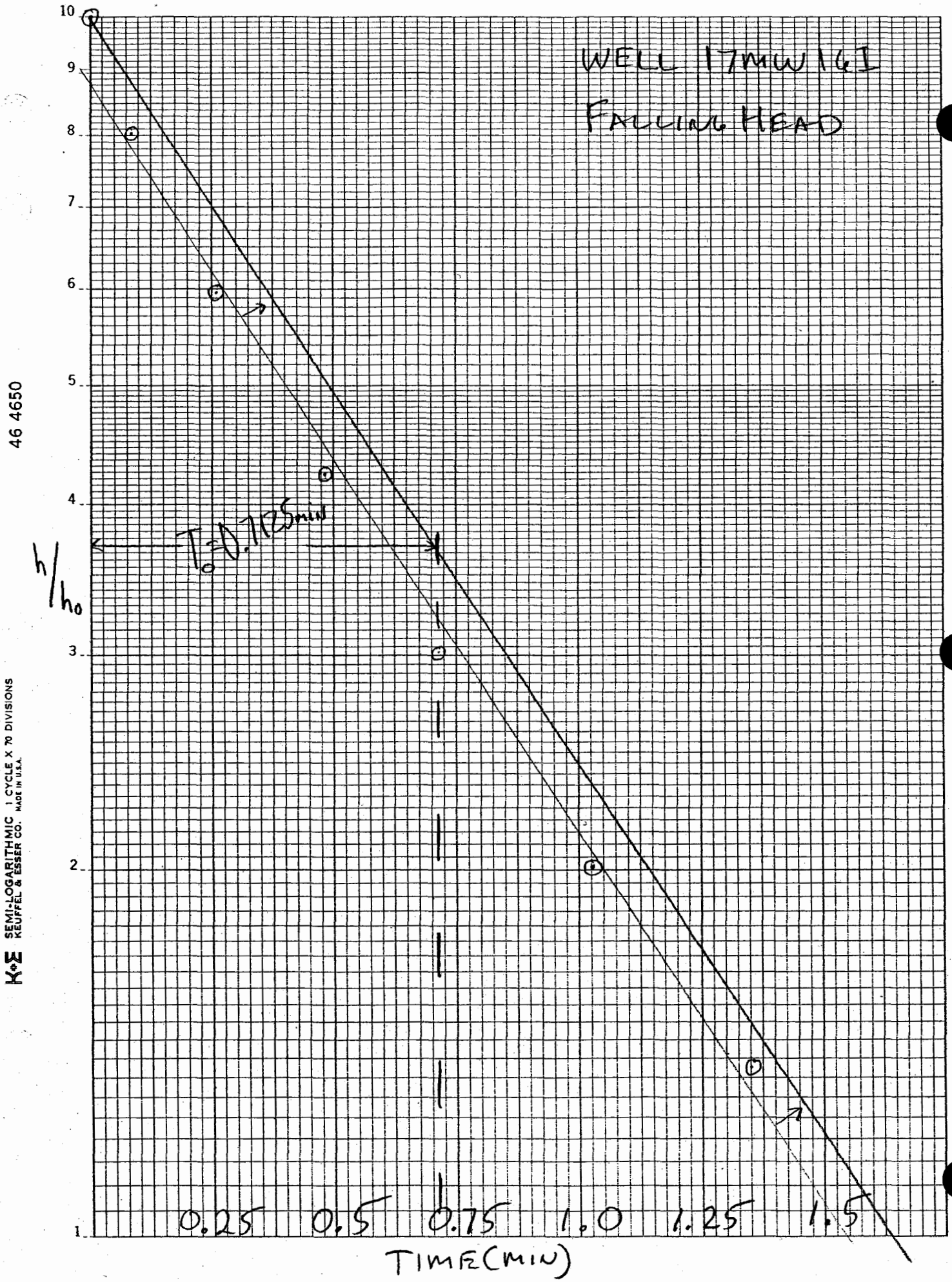
2.33E-03	ft./min.
3.89E-05	ft./sec.
3.36E+00	ft./day =
1.19E-03	cm./sec.

3.4 ft/day

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW161
FALLING HEAD
T_0=0.1125min
h/h0
10
9
8
7
6
5
4
3
2
1
0.25
0.5
0.75
1.0
1.25
1.5
TIME(MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW16I
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By: SLW
Checked By: SJC 5/17/05

Radius of Well Casing (in.) :	1	= r
Effective Radius of Well Screen (in.) :	1	= R
Length of Well Screen (ft.) :	10	= L
Time for 37% head change (min.) :	0.68	= To

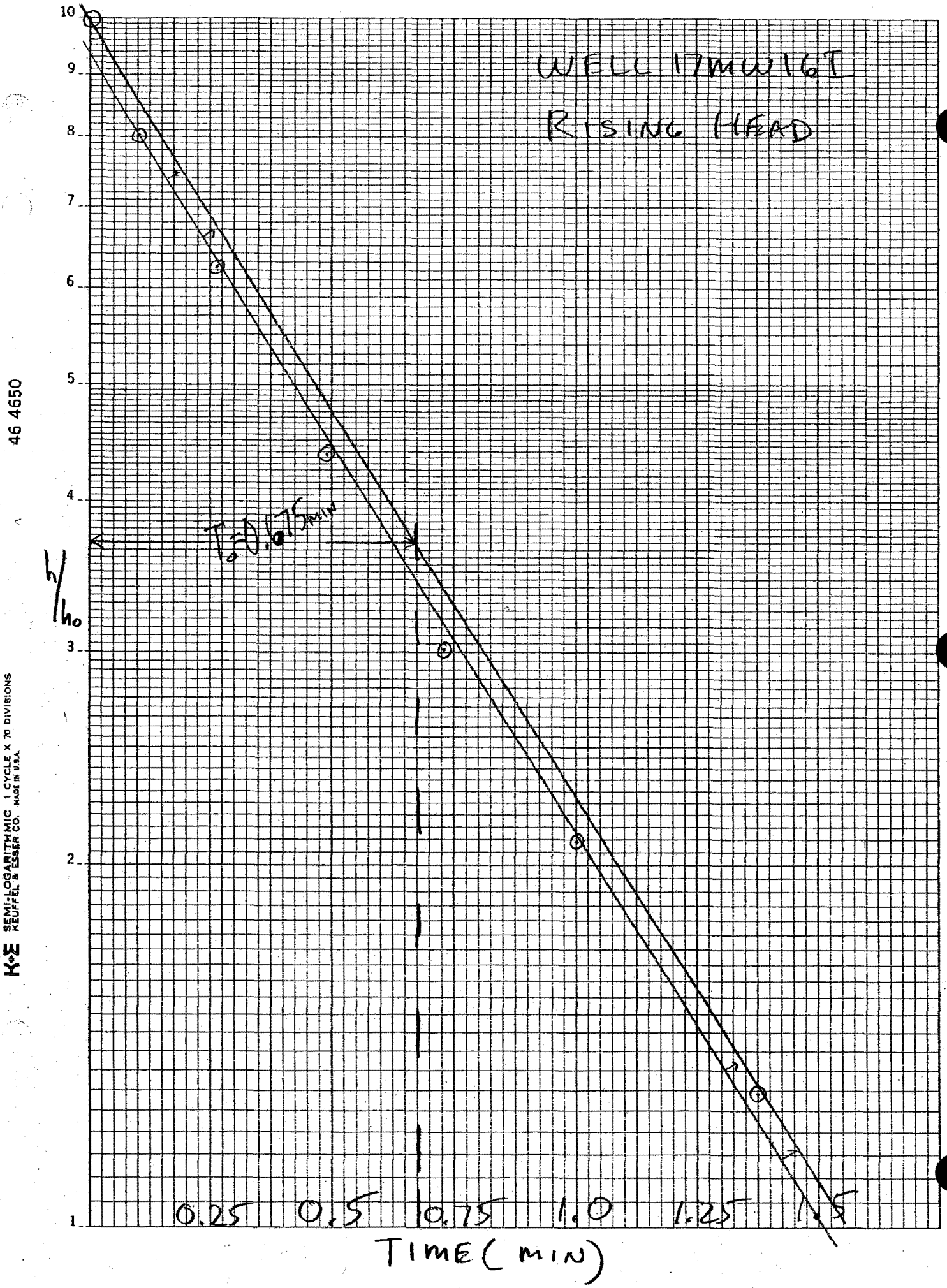
Hydraulic Conductivity (K) :

2.46E-03	ft./min.
4.10E-05	ft./sec.
3.55E+00	ft./day = 3.6 ft/day
1.25E-03	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW16I
RISING HEAD
$T_0 = 0.675$ min
h/h₀
10
9
8
7
6
5
4
3
2
1
0.25
0.5
0.75
1.0
1.25
1.5
TIME (MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: CHARLESTON NWS SWMU 17 WELL/BORING NO.: 17MW61

PROJECT NO.: 0528 GEOLOGIST: FRED RAMSEY

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10' 15-25 BGS TEST NO.: 1+2

STATIC WATER LEVEL (Depth/Elevation): 2.93 DATE: 2/26/05

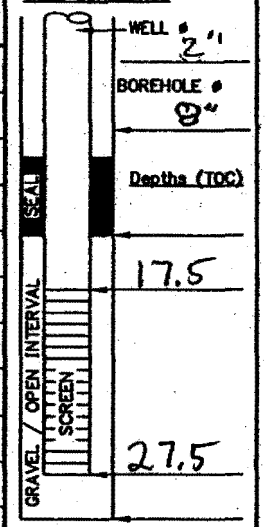
TEST TYPE (Rising/Falling/Constant Head): RISING + FALLING CHECKED: SJC 5/17/05

METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG PAGE 1 OF 1

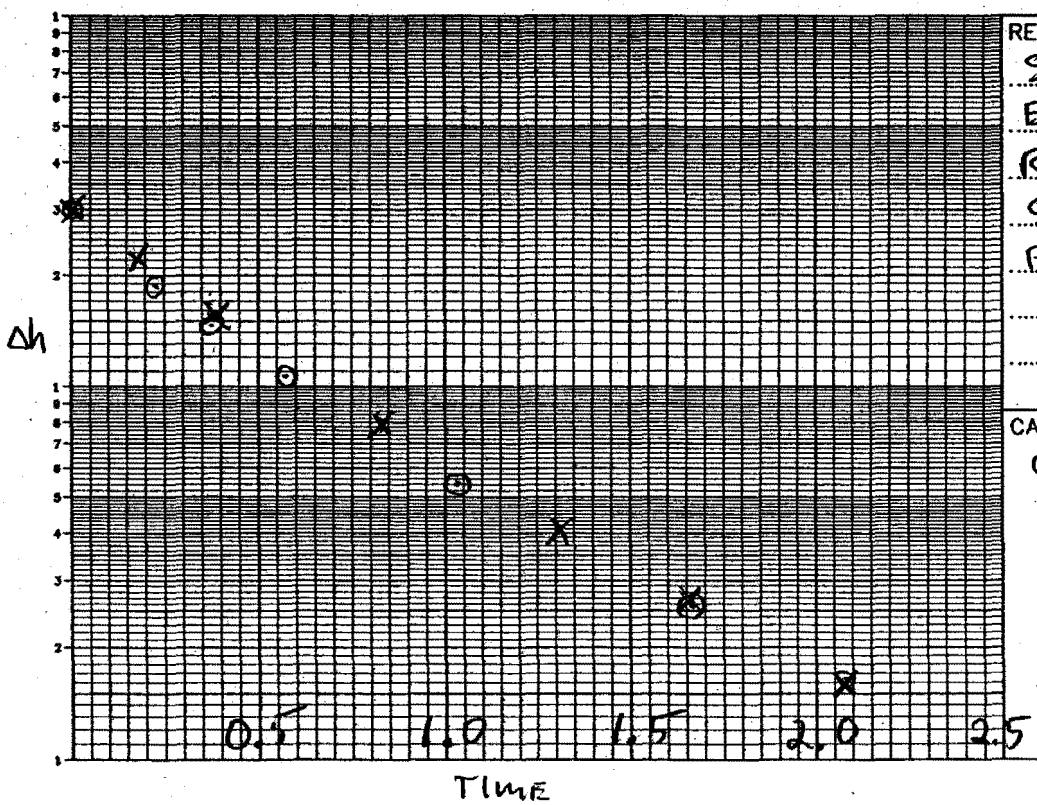
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

FALLING HEAD			RISING		
ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.1770		2.457	0.085		2.872
0.2358		1.887	0.1578		2.218
0.3742		1.466	0.2647		1.855
0.5547		1.047	0.3963		1.503
0.6963		0.889	0.6213		1.070
0.8763		0.691	0.8280		0.793
1.04		0.555	0.9830		0.638
1.3113		0.393	1.3113		0.410
1.6547		0.261	1.6547		0.266
2.08		0.164	2.08		0.162
2.6297		0.099	2.6297		0.095

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS: FALLING HEAD
STARTED: 1025
END : 1035
RISING HEAD:
STARTED 1037
END: 1041

CALCS, SKETCH MAPS, ETC.:
⊙ = FALLING HEAD
X = RISING HEAD

ACAD: FORM_HYDCONTST.dwg 07/06/99 INL

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 16:54:00
Report from file: ...\SN11262 2005-02-26 102722 17mw16if.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw16if

Test defined on: 2/26/2005 8:42:41
Test started on: 2/26/2005 10:27:22
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10.000(Minutes.
Number of data samples: 97

TOTAL DATA SAMPLES 97

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.343 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/26/2005	10:27:22	0	64.06	0			Pressure data
2/26/2005	10:27:23	0.005	64.11	-0.009			
2/26/2005	10:27:23	0.01	64.13	-0.012			
2/26/2005	10:27:23	0.015	64.13	-0.013			
2/26/2005	10:27:24	0.02	64.13	-0.014			
2/26/2005	10:27:24	0.025	64.15	-0.014			
2/26/2005	10:27:24	0.03	64.15	-0.015			
2/26/2005	10:27:25	0.035	64.15	-0.015			
2/26/2005	10:27:25	0.04	64.15	-0.015			
2/26/2005	10:27:25	0.045	64.15	-0.016			
2/26/2005	10:27:25	0.05	64.15	-0.016			
2/26/2005	10:27:26	0.055	64.15	-0.016			
2/26/2005	10:27:26	0.06	64.15	-0.016			
2/26/2005	10:27:26	0.065	64.15	-0.016			
2/26/2005	10:27:27	0.07	64.15	-0.016			
2/26/2005	10:27:27	0.075	64.15	-0.015			
2/26/2005	10:27:27	0.08	64.15	-0.016			
2/26/2005	10:27:28	0.085	64.15	-0.016			
2/26/2005	10:27:28	0.09	64.18	-0.016			
2/26/2005	10:27:28	0.095	64.18	-0.016			
2/26/2005	10:27:28	0.1	64.18	-0.016			
2/26/2005	10:27:29	0.1058	64.18	-0.018			
2/26/2005	10:27:29	0.112	64.18	-0.017			
2/26/2005	10:27:30	0.1185	64.18	-0.021			
2/26/2005	10:27:30	0.1255	64.18	-0.018			
2/26/2005	10:27:30	0.1328	64.18	-0.015			
2/26/2005	10:27:31	0.1407	64.18	-0.016			
2/26/2005	10:27:31	0.149	64.18	-0.048			
2/26/2005	10:27:32	0.1578	64.18	-3.721			
2/26/2005	10:27:32	0.1672	64.15	-4.362			
2/26/2005	10:27:33	0.177	64.15	-2.457			

2/26/2005	10:27:34	0.1875	64.13	-1.584			
2/26/2005	10:27:34	0.1985	64.13	-1.915			
2/26/2005	10:27:35	0.2102	64.13	-2.097	0	1	ho
2/26/2005	10:27:36	0.2227	64.13	-1.922	0.0125	0.916547	
2/26/2005	10:27:37	0.2358	64.13	-1.887	0.0256	0.899857	
2/26/2005	10:27:37	0.2498	64.13	-1.837	0.0396	0.876013	
2/26/2005	10:27:38	0.2647	64.13	-1.785	0.0545	0.851216	
2/26/2005	10:27:39	0.2803	64.13	-1.745	0.0701	0.832141	
2/26/2005	10:27:40	0.297	64.13	-1.681	0.0868	0.801621	
2/26/2005	10:27:41	0.3147	64.13	-1.625	0.1045	0.774917	
2/26/2005	10:27:42	0.3333	64.11	-1.573	0.1231	0.750119	
2/26/2005	10:27:44	0.3532	64.11	-1.519	0.143	0.724368	
2/26/2005	10:27:45	0.3742	64.11	-1.466	0.164	0.699094	
2/26/2005	10:27:46	0.3963	64.11	-1.412	0.1861	0.673343	
2/26/2005	10:27:48	0.4198	64.11	-1.357	0.2096	0.647115	
2/26/2005	10:27:49	0.4447	64.11	-1.302	0.2345	0.620887	
2/26/2005	10:27:51	0.4697	64.09	-1.253	0.2595	0.59752	
2/26/2005	10:27:52	0.4963	64.09	-1.2	0.2861	0.572246	
2/26/2005	10:27:54	0.5247	64.09	-1.148	0.3145	0.547449	
2/26/2005	10:27:56	0.5547	64.06	-1.097	0.3445	0.523128	
2/26/2005	10:27:58	0.5863	64.06	-1.046	0.3761	0.498808	
2/26/2005	10:28:00	0.6213	64.04	-0.992	0.4111	0.473057	
2/26/2005	10:28:02	0.658	64.04	-0.941	0.4478	0.448736	
2/26/2005	10:28:04	0.6963	64.02	-0.889	0.4861	0.423939	
2/26/2005	10:28:07	0.738	64	-0.838	0.5278	0.399619	
2/26/2005	10:28:09	0.7813	63.97	-0.789	0.5711	0.376252	
2/26/2005	10:28:12	0.828	63.93	-0.739	0.6178	0.352408	
2/26/2005	10:28:15	0.8763	63.88	-0.691	0.6661	0.329518	
2/26/2005	10:28:18	0.928	63.84	-0.645	0.7178	0.307582	
2/26/2005	10:28:21	0.983	63.79	-0.599	0.7728	0.285646	
2/26/2005	10:28:25	1.0413	63.73	-0.555	0.8311	0.264664	
2/26/2005	10:28:29	1.103	63.66	-0.511	0.8928	0.243681	
2/26/2005	10:28:32	1.168	63.57	-0.47	0.9578	0.22413	
2/26/2005	10:28:37	1.238	63.48	-0.43	1.0278	0.205055	
2/26/2005	10:28:41	1.3113	63.39	-0.393	1.1011	0.187411	
2/26/2005	10:28:46	1.3897	63.27	-0.356	1.1795	0.169766	
2/26/2005	10:28:51	1.473	63.18	-0.322	1.2628	0.153553	
2/26/2005	10:28:56	1.5613	63.09	-0.291	1.3511	0.13877	
2/26/2005	10:29:02	1.6547	62.98	-0.261	1.4445	0.124464	
2/26/2005	10:29:08	1.753	62.89	-0.234	1.5428	0.111588	
2/26/2005	10:29:14	1.858	62.8	-0.208	1.6478	0.099189	
2/26/2005	10:29:20	1.968	62.71	-0.186	1.7578	0.088698	
2/26/2005	10:29:27	2.0847	62.62	-0.164	1.8745	0.078207	
2/26/2005	10:29:35	2.2097	62.53	-0.144	1.9995	0.06867	
2/26/2005	10:29:43	2.3413	62.44	-0.128	2.1311	0.06104	
2/26/2005	10:29:51	2.4813	62.37	-0.111	2.2711	0.052933	
2/26/2005	10:30:00	2.6297	62.31	-0.099	2.4195	0.04721	
2/26/2005	10:30:10	2.7863	62.24	-0.087	2.5761	0.041488	
2/26/2005	10:30:20	2.953	62.19	-0.077	2.7428	0.036719	
2/26/2005	10:30:30	3.1297	62.13	-0.069	2.9195	0.032904	
2/26/2005	10:30:41	3.3163	62.08	-0.062	3.1061	0.029566	
2/26/2005	10:30:53	3.5147	62.04	-0.055	3.3045	0.026228	
2/26/2005	10:31:06	3.7247	62.01	-0.05	3.5145	0.023844	
2/26/2005	10:31:19	3.9463	61.99	-0.047	3.7361	0.022413	
2/26/2005	10:31:33	4.1813	61.97	-0.044	3.9711	0.020982	
2/26/2005	10:31:48	4.4297	61.95	-0.04	4.2195	0.019075	
2/26/2005	10:32:04	4.693	61.95	-0.038	4.4828	0.018121	
2/26/2005	10:32:21	4.973	61.92	-0.035	4.7628	0.016691	
2/26/2005	10:32:39	5.2697	61.92	-0.035	5.0595	0.016691	
2/26/2005	10:32:57	5.583	61.92	-0.034	5.3728	0.016214	
2/26/2005	10:33:17	5.9147	61.92	-0.033	5.7045	0.015737	
2/26/2005	10:33:38	6.2663	61.95	-0.031	6.0561	0.014783	
2/26/2005	10:34:01	6.6397	61.95	-0.031	6.4295	0.014783	
2/26/2005	10:34:24	7.0347	61.97	-0.031	6.8245	0.014783	
2/26/2005	10:34:50	7.453	61.99	-0.029	7.2428	0.013829	
2/26/2005	10:35:16	7.8963	62.01	-0.029	7.6861	0.013829	

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 16:57:02
Report from file: ...\SN11262 2005-02-26 103725 17mw16ir.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw16ir

Test defined on: 2/26/2005 8:43:22
Test started on: 2/26/2005 10:37:25
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data poin Minutes.
Number of data samples: 84

TOTAL DATA SAMPLES 84

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.372 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/26/2005	10:37:25	0	62.15	0			Plotted data
2/26/2005	10:37:25	0.005	62.19	-0.007			
2/26/2005	10:37:25	0.01	62.19	-0.009			
2/26/2005	10:37:26	0.015	62.22	-0.01			
2/26/2005	10:37:26	0.02	62.22	-0.012			
2/26/2005	10:37:26	0.025	62.22	-0.013			
2/26/2005	10:37:27	0.03	62.22	-0.013			
2/26/2005	10:37:27	0.035	62.22	-0.013			
2/26/2005	10:37:27	0.04	62.24	-0.012			
2/26/2005	10:37:27	0.045	62.22	-0.013			
2/26/2005	10:37:28	0.05	62.24	-0.012			
2/26/2005	10:37:28	0.055	62.24	-0.014			
2/26/2005	10:37:28	0.06	62.24	0.83			
2/26/2005	10:37:29	0.065	62.24	3.78			
2/26/2005	10:37:29	0.07	62.24	4.707			
2/26/2005	10:37:29	0.075	62.24	2.184			
2/26/2005	10:37:30	0.08	62.24	2.569			
2/26/2005	10:37:30	0.085	62.24	2.872			
2/26/2005	10:37:30	0.09	62.24	2.409			
2/26/2005	10:37:30	0.095	62.24	2.579	0	1	ho
2/26/2005	10:37:31	0.1	62.24	2.486	0.005	0.96394	
2/26/2005	10:37:31	0.1058	62.24	2.461	0.0108	0.954246	
2/26/2005	10:37:31	0.112	62.26	2.425	0.017	0.940287	
2/26/2005	10:37:32	0.1185	62.26	2.397	0.0235	0.92943	
2/26/2005	10:37:32	0.1255	62.24	2.358	0.0305	0.914308	
2/26/2005	10:37:33	0.1328	62.26	2.327	0.0378	0.902288	
2/26/2005	10:37:33	0.1407	62.26	2.291	0.0457	0.888329	
2/26/2005	10:37:34	0.149	62.26	2.254	0.054	0.873982	
2/26/2005	10:37:34	0.1578	62.26	2.218	0.0628	0.860023	
2/26/2005	10:37:35	0.1672	62.24	2.186	0.0722	0.847615	
2/26/2005	10:37:35	0.177	62.24	2.149	0.082	0.833269	

2/26/2005	10:37:36	0.1875	62.24	2.111	0.0925	0.818534
2/26/2005	10:37:37	0.1985	62.22	2.07	0.1035	0.802637
2/26/2005	10:37:37	0.2102	62.24	2.029	0.1152	0.786739
2/26/2005	10:37:38	0.2227	62.24	1.988	0.1277	0.770841
2/26/2005	10:37:39	0.2358	62.24	1.945	0.1408	0.754168
2/26/2005	10:37:40	0.2498	62.24	1.9	0.1548	0.73672
2/26/2005	10:37:41	0.2647	62.24	1.855	0.1697	0.719271
2/26/2005	10:37:42	0.2803	62.26	1.808	0.1853	0.701047
2/26/2005	10:37:43	0.297	62.26	1.759	0.202	0.682047
2/26/2005	10:37:44	0.3147	62.28	1.711	0.2197	0.663435
2/26/2005	10:37:45	0.3333	62.28	1.661	0.2383	0.644048
2/26/2005	10:37:46	0.3532	62.31	1.609	0.2582	0.623885
2/26/2005	10:37:47	0.3742	62.33	1.558	0.2792	0.60411
2/26/2005	10:37:48	0.3963	62.35	1.503	0.3013	0.582784
2/26/2005	10:37:50	0.4198	62.37	1.45	0.3248	0.562233
2/26/2005	10:37:51	0.4447	62.4	1.396	0.3497	0.541295
2/26/2005	10:37:53	0.4697	62.42	1.344	0.3747	0.521132
2/26/2005	10:37:54	0.4963	62.46	1.29	0.4013	0.500194
2/26/2005	10:37:56	0.5247	62.49	1.235	0.4297	0.478868
2/26/2005	10:37:58	0.5547	62.53	1.181	0.4597	0.457929
2/26/2005	10:38:00	0.5863	62.58	1.127	0.4913	0.436991
2/26/2005	10:38:02	0.6213	62.62	1.07	0.5263	0.414889
2/26/2005	10:38:04	0.658	62.67	1.013	0.563	0.392788
2/26/2005	10:38:06	0.6963	62.73	0.959	0.6013	0.37185
2/26/2005	10:38:09	0.738	62.78	0.903	0.643	0.350136
2/26/2005	10:38:12	0.7813	62.85	0.849	0.6863	0.329197
2/26/2005	10:38:14	0.828	62.89	0.793	0.733	0.307484
2/26/2005	10:38:17	0.8763	62.96	0.74	0.7813	0.286933
2/26/2005	10:38:20	0.928	63.03	0.689	0.833	0.267158
2/26/2005	10:38:24	0.983	63.07	0.638	0.888	0.247383
2/26/2005	10:38:27	1.0413	63.14	0.589	0.9463	0.228383
2/26/2005	10:38:31	1.103	63.21	0.54	1.008	0.209383
2/26/2005	10:38:35	1.168	63.25	0.495	1.073	0.191935
2/26/2005	10:38:39	1.238	63.32	0.451	1.143	0.174874
2/26/2005	10:38:43	1.3113	63.39	0.41	1.2163	0.158976
2/26/2005	10:38:48	1.3897	63.43	0.37	1.2947	0.143466
2/26/2005	10:38:53	1.473	63.5	0.334	1.378	0.129508
2/26/2005	10:38:58	1.5613	63.54	0.298	1.4663	0.115549
2/26/2005	10:39:04	1.6547	63.59	0.266	1.5597	0.103141
2/26/2005	10:39:10	1.753	63.66	0.237	1.658	0.091896
2/26/2005	10:39:16	1.858	63.7	0.209	1.763	0.081039
2/26/2005	10:39:23	1.968	63.75	0.185	1.873	0.071733
2/26/2005	10:39:30	2.0847	63.79	0.162	1.9897	0.062815
2/26/2005	10:39:37	2.2097	63.84	0.141	2.1147	0.054672
2/26/2005	10:39:45	2.3413	63.88	0.123	2.2463	0.047693
2/26/2005	10:39:54	2.4813	63.93	0.109	2.3863	0.042264
2/26/2005	10:40:02	2.6297	63.97	0.095	2.5347	0.036836
2/26/2005	10:40:12	2.7863	64.02	0.084	2.6913	0.032571
2/26/2005	10:40:22	2.953	64.04	0.072	2.858	0.027918
2/26/2005	10:40:32	3.1297	64.09	0.063	3.0347	0.024428
2/26/2005	10:40:44	3.3163	64.13	0.057	3.2213	0.022102
2/26/2005	10:40:56	3.5147	64.15	0.052	3.4197	0.020163
2/26/2005	10:41:08	3.7247	64.18	0.045	3.6297	0.017449

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW16D
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By: JWC
Checked By: SJC 5/17/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	0.14 = To

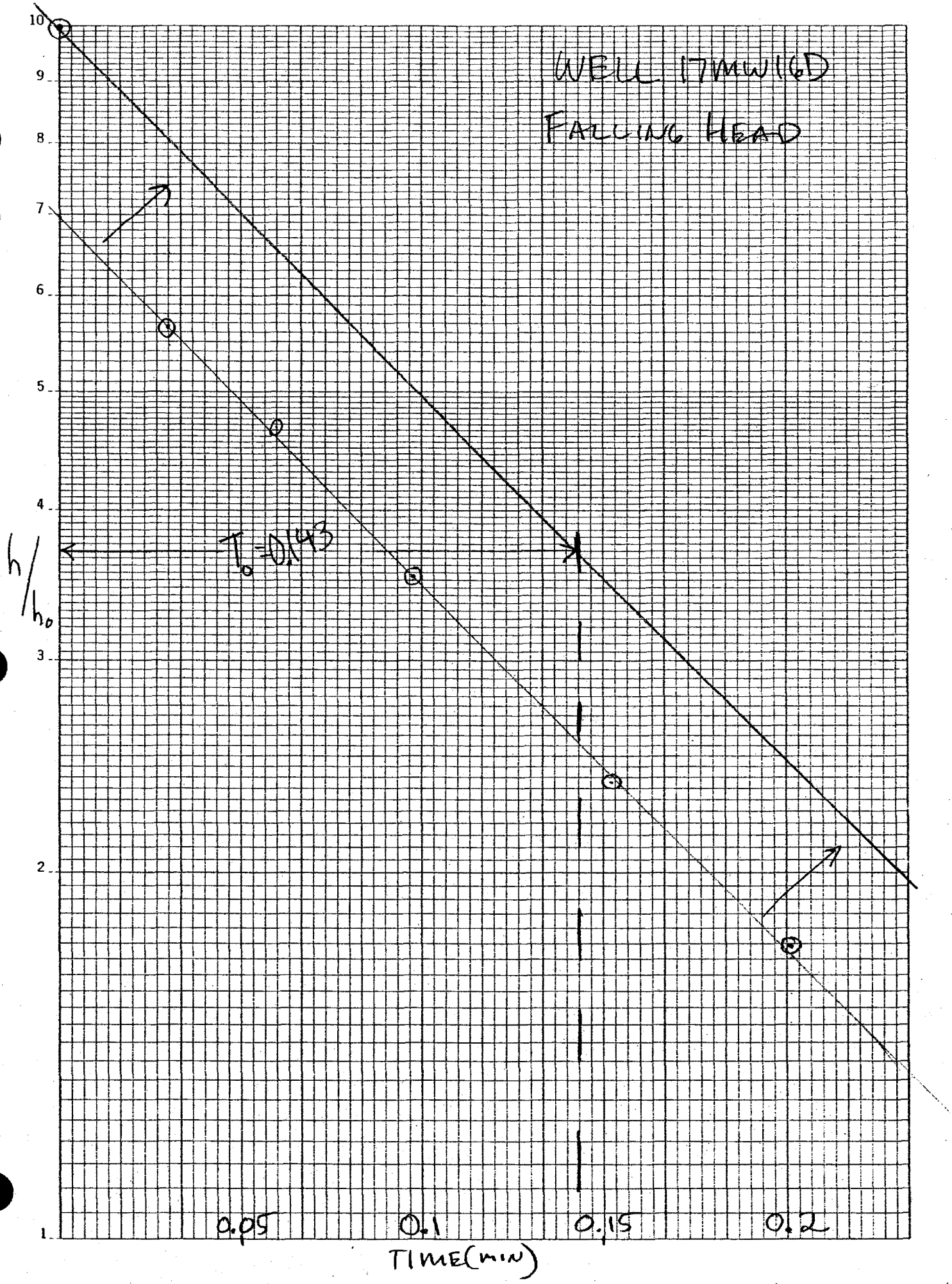
Hydraulic Conductivity (K) :

1.16E-02	ft./min.
1.94E-04	ft./sec.
1.67E+01	ft./day ≈ 17 ft/day
5.91E-03	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW16D
FALLING HEAD
$T_o = 0.143$
h/h_o
10
9
8
7
6
5
4
3
2
1
0.05
0.1
0.15
0.2
TIME(min)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW16D
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By: BWR
Checked By: SJC 5/17/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	0.12 = To

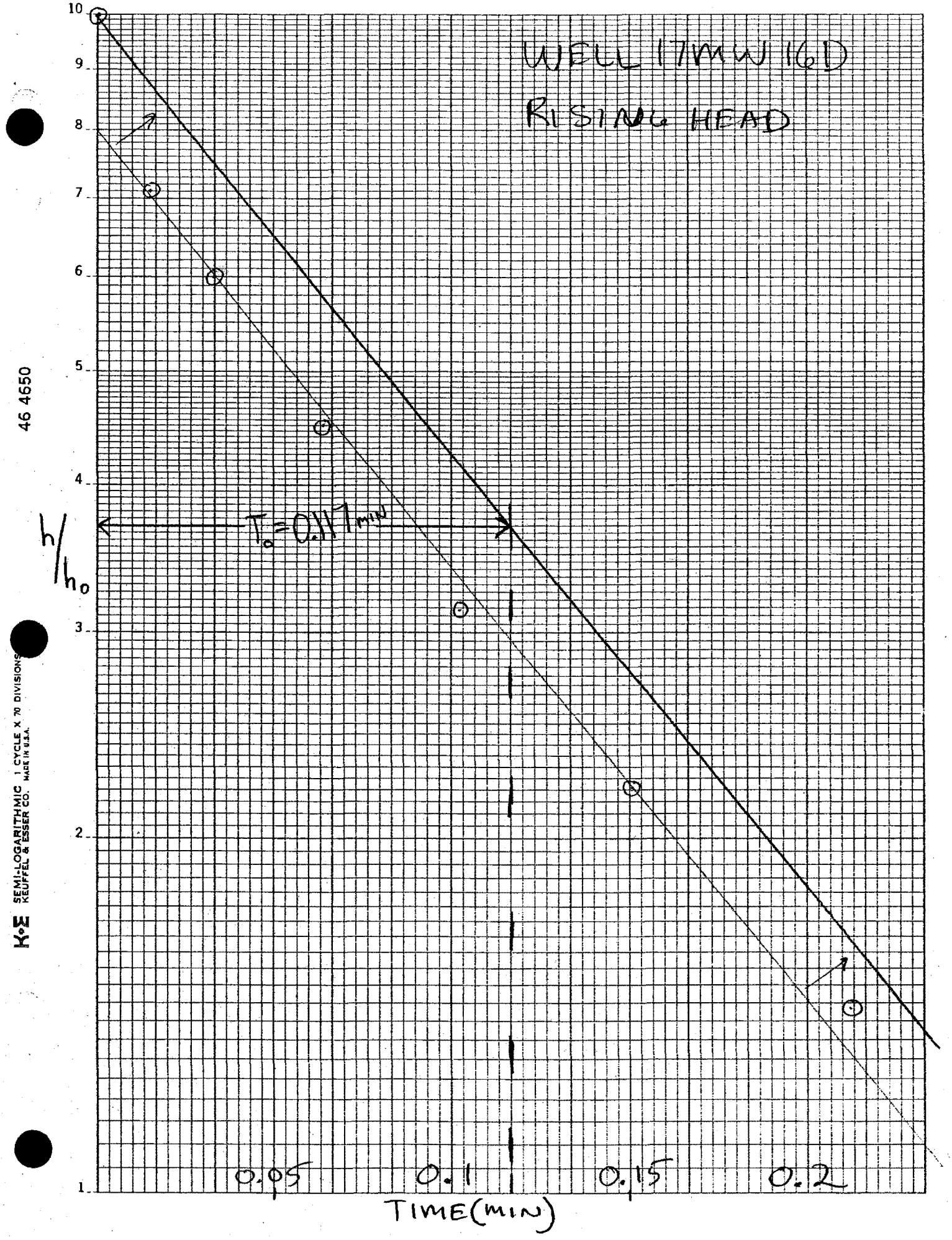
Hydraulic Conductivity (K) :

1.42E-02	ft./min.
2.37E-04	ft./sec.
2.05E+01	ft./day ≈ 20 ft/day
7.22E-03	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW 16D
RISING HEAD
$T_o = 0.117$ min
h/h₀
10
9
8
7
6
5
4
3
2
1
0.05
0.1
0.15
0.2
TIME(MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: CHARLESTON NWS WELL/BORING NO.: 17MW16D

PROJECT NO.: 0528 GEOLOGIST: FRED W RAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10', 32'-42' BGS TEST NO.: 1, 2

STATIC WATER LEVEL (Depth/Elevation): 2.85 DATE: 2-26-05

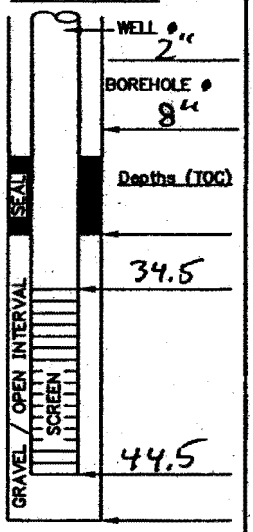
TEST TYPE (Rising/Falling/Constant Head): FALLING + RISING CHECKED: SJC 5/17/05

METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG PAGE 1 OF 1

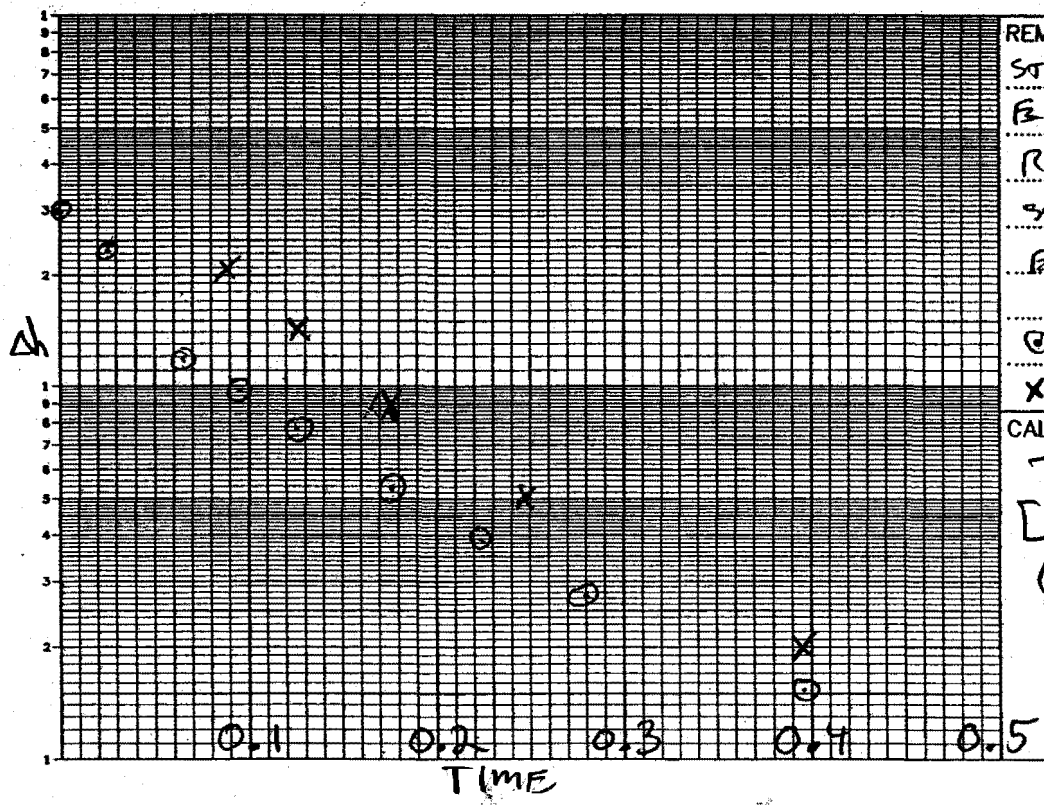
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): 0.00

FALLING HEAD			RISING HEAD		
ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.025		2.34	0.085		2.514
0.035		2.08	0.090		2.073
0.050		1.09	0.100		1.779
0.065		1.178	0.1255		1.410
0.095		0.973	0.1770		0.889
0.1255		0.721	0.2227		0.616
0.1770		0.531	0.2498		0.502
0.2227		0.344	0.3147		0.322
0.2803		0.279	0.3963		0.200
0.3963		0.153	0.4963		0.125
0.4963		0.101	0.6213		0.083
0.5547		0.083			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS: FALLING HEAD
START 1008
END
RISING HEAD
START 952
END 953

⊙ = FALLING HEAD
X = RISING HEAD

CALCS, SKETCH MAPS, ETC.:
TEST NAME FALLIN
[17MW16d(rt)
(ABORTED FIRST FALLING HEAD)

ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 16:47:32
Report from file: ...\SN11262 2005-02-26 100857 17mw16dfrt.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw16dfrt

Test defined on: 2/26/2005 10:02:19
Test started on: 2/26/2005 10:08:57
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10.0000 Minutes.
Number of data samples: 74

TOTAL DATA SAMPLES 74

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.489 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho
2/26/2005	10:08:57	0	64.04	0		
2/26/2005	10:08:57	0.005	64.11	-4.422		
2/26/2005	10:08:57	0.01	64.11	-2.265		
2/26/2005	10:08:58	0.015	64.13	-2.874		
2/26/2005	10:08:58	0.02	64.13	-2.946		
2/26/2005	10:08:58	0.025	64.13	-2.342		
2/26/2005	10:08:59	0.03	64.13	-2.088		
2/26/2005	10:08:59	0.035	64.13	-2.083		
2/26/2005	10:08:59	0.04	64.13	-1.55	0.005	0.744119
2/26/2005	10:08:59	0.045	64.13	-1.157	0.01	0.555449
2/26/2005	10:09:00	0.05	64.13	-1.093	0.015	0.524724
2/26/2005	10:09:00	0.055	64.13	-1.052	0.02	0.505041
2/26/2005	10:09:00	0.06	64.13	-1.116	0.025	0.535766
2/26/2005	10:09:01	0.065	64.13	-1.178	0.03	0.56653
2/26/2005	10:09:01	0.07	64.13	-1.203	0.035	0.577532
2/26/2005	10:09:01	0.075	64.13	-1.188	0.04	0.570331
2/26/2005	10:09:02	0.08	64.15	-1.139	0.045	0.546807
2/26/2005	10:09:02	0.085	64.13	-1.081	0.05	0.518963
2/26/2005	10:09:02	0.09	64.13	-1.023	0.055	0.491119
2/26/2005	10:09:02	0.095	64.13	-0.973	0.06	0.467115
2/26/2005	10:09:03	0.1	64.13	-0.935	0.065	0.448872
2/26/2005	10:09:03	0.1058	64.13	-0.892	0.0708	0.428229
2/26/2005	10:09:03	0.112	64.13	-0.854	0.077	0.409986
2/26/2005	10:09:04	0.1185	64.13	-0.812	0.0835	0.389822
2/26/2005	10:09:04	0.1255	64.13	-0.771	0.0905	0.370139

Plotted data

ho

2/26/2005	10:09:05	0.1328	64.13	-0.731	0.0978	0.350936
2/26/2005	10:09:05	0.1407	64.13	-0.69	0.1057	0.331253
2/26/2005	10:09:06	0.149	64.13	-0.65	0.114	0.31205
2/26/2005	10:09:06	0.1578	64.13	-0.61	0.1228	0.292847
2/26/2005	10:09:07	0.1672	64.09	-0.568	0.1322	0.272684
2/26/2005	10:09:07	0.177	64.09	-0.531	0.142	0.254921
2/26/2005	10:09:08	0.1875	64.06	-0.495	0.1525	0.237638
2/26/2005	10:09:09	0.1985	64.06	-0.459	0.1635	0.220355
2/26/2005	10:09:09	0.2102	64.04	-0.427	0.1752	0.204993
2/26/2005	10:09:10	0.2227	64.04	-0.394	0.1877	0.18915
2/26/2005	10:09:11	0.2358	64.04	-0.363	0.2008	0.174268
2/26/2005	10:09:12	0.2498	64.02	-0.246	0.2148	0.118099
2/26/2005	10:09:13	0.2647	64	-0.3	0.2297	0.144023
2/26/2005	10:09:14	0.2803	64	-0.279	0.2453	0.133941
2/26/2005	10:09:15	0.297	63.97	-0.254	0.262	0.12194
2/26/2005	10:09:16	0.3147	63.95	-0.231	0.2797	0.110898
2/26/2005	10:09:17	0.3333	63.93	-0.209	0.2983	0.100336
2/26/2005	10:09:18	0.3532	63.93	-0.189	0.3182	0.090735
2/26/2005	10:09:19	0.3742	63.91	-0.17	0.3392	0.081613
2/26/2005	10:09:21	0.3963	63.88	-0.153	0.3613	0.073452
2/26/2005	10:09:22	0.4198	63.86	-0.137	0.3848	0.065771
2/26/2005	10:09:23	0.4447	63.84	-0.123	0.4097	0.059049
2/26/2005	10:09:25	0.4697	63.82	-0.112	0.4347	0.053769
2/26/2005	10:09:27	0.4963	63.79	-0.101	0.4613	0.048488
2/26/2005	10:09:28	0.5247	63.77	-0.091	0.4897	0.043687
2/26/2005	10:09:30	0.5547	63.75	-0.083	0.5197	0.039846
2/26/2005	10:09:32	0.5863	63.73	-0.074	0.5513	0.035526
2/26/2005	10:09:34	0.6213	63.7	-0.068	0.5863	0.032645
2/26/2005	10:09:36	0.658	63.68	-0.063	0.623	0.030245
2/26/2005	10:09:39	0.6963	63.66	-0.057	0.6613	0.027364
2/26/2005	10:09:41	0.738	63.63	-0.053	0.703	0.025444
2/26/2005	10:09:44	0.7813	63.61	-0.049	0.7463	0.023524
2/26/2005	10:09:46	0.828	63.59	-0.045	0.793	0.021603
2/26/2005	10:09:49	0.8763	63.57	-0.042	0.8413	0.020163
2/26/2005	10:09:52	0.928	63.54	-0.04	0.893	0.019203
2/26/2005	10:09:56	0.983	63.52	-0.037	0.948	0.017763
2/26/2005	10:09:59	1.0413	63.52	-0.035	1.0063	0.016803
2/26/2005	10:10:03	1.103	63.48	-0.033	1.068	0.015843
2/26/2005	10:10:07	1.168	63.48	-0.03	1.133	0.014402
2/26/2005	10:10:11	1.238	63.45	-0.03	1.203	0.014402
2/26/2005	10:10:15	1.3113	63.43	-0.029	1.2763	0.013922
2/26/2005	10:10:20	1.3897	63.41	-0.026	1.3547	0.012482
2/26/2005	10:10:25	1.473	63.41	-0.026	1.438	0.012482
2/26/2005	10:10:30	1.5613	63.39	-0.024	1.5263	0.011522
2/26/2005	10:10:36	1.6547	63.36	-0.025	1.6197	0.012002
2/26/2005	10:10:42	1.753	63.34	-0.029	1.718	0.013922
2/26/2005	10:10:48	1.858	63.32	-0.022	1.823	0.010562
2/26/2005	10:10:55	1.968	63.3	-0.022	1.933	0.010562
2/26/2005	10:11:02	2.0847	63.27	-0.022	2.0497	0.010562

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 16:41:59
Report from file: ...\SN11262 2005-02-26 095236 17mw16dr.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw16dr

Test defined on: 2/26/2005 8:41:53
Test started on: 2/26/2005 9:52:36
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10.0000 Minutes.
Number of data samples: 65

TOTAL DATA SAMPLES 65

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.487 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/26/2005	9:52:36	0	63	0			Plotted data
2/26/2005	9:52:36	0.005	63.05	-0.009			
2/26/2005	9:52:36	0.01	63.05	-0.013			
2/26/2005	9:52:37	0.015	63.07	-0.013			
2/26/2005	9:52:37	0.02	63.07	-0.015			
2/26/2005	9:52:37	0.025	63.07	-0.017			
2/26/2005	9:52:38	0.03	63.07	-0.017			
2/26/2005	9:52:38	0.035	63.07	-0.014			
2/26/2005	9:52:38	0.04	63.07	-0.018			
2/26/2005	9:52:39	0.045	63.07	-0.017			
2/26/2005	9:52:39	0.05	63.09	-0.017			
2/26/2005	9:52:39	0.055	63.07	-0.02			
2/26/2005	9:52:39	0.06	63.07	-0.015			
2/26/2005	9:52:40	0.065	63.07	0.511			
2/26/2005	9:52:40	0.07	63.09	5.089			
2/26/2005	9:52:40	0.075	63.07	2.56			
2/26/2005	9:52:41	0.08	63.09	3.133			
2/26/2005	9:52:41	0.085	63.09	2.514	0	1	ho
2/26/2005	9:52:41	0.09	63.09	2.073	0.005	0.824582	
2/26/2005	9:52:42	0.095	63.09	1.875	0.01	0.745823	
2/26/2005	9:52:42	0.1	63.09	1.779	0.015	0.707637	
2/26/2005	9:52:42	0.1058	63.09	1.701	0.0208	0.676611	
2/26/2005	9:52:43	0.112	63.09	1.609	0.027	0.640016	
2/26/2005	9:52:43	0.1185	63.09	1.511	0.0335	0.601034	
2/26/2005	9:52:43	0.1255	63.09	1.41	0.0405	0.560859	

2/26/2005	9:52:44	0.1328	63.09	1.315	0.0478	0.523071
2/26/2005	9:52:44	0.1407	63.09	1.223	0.0557	0.486476
2/26/2005	9:52:45	0.149	63.09	1.132	0.064	0.450278
2/26/2005	9:52:45	0.1578	63.09	1.045	0.0728	0.415672
2/26/2005	9:52:46	0.1672	63.05	0.967	0.0822	0.384646
2/26/2005	9:52:46	0.177	63.05	0.889	0.092	0.35362
2/26/2005	9:52:47	0.1875	63.05	0.814	0.1025	0.323787
2/26/2005	9:52:48	0.1985	63.05	0.746	0.1135	0.296738
2/26/2005	9:52:48	0.2102	63.05	0.68	0.1252	0.270485
2/26/2005	9:52:49	0.2227	63.05	0.616	0.1377	0.245028
2/26/2005	9:52:50	0.2358	63.05	0.557	0.1508	0.221559
2/26/2005	9:52:51	0.2498	63.05	0.502	0.1648	0.199682
2/26/2005	9:52:52	0.2647	63.07	0.452	0.1797	0.179793
2/26/2005	9:52:53	0.2803	63.07	0.404	0.1953	0.1607
2/26/2005	9:52:54	0.297	63.07	0.36	0.212	0.143198
2/26/2005	9:52:55	0.3147	63.07	0.322	0.2297	0.128083
2/26/2005	9:52:56	0.3333	63.07	0.287	0.2483	0.114161
2/26/2005	9:52:57	0.3532	63.09	0.255	0.2682	0.101432
2/26/2005	9:52:58	0.3742	63.09	0.225	0.2892	0.089499
2/26/2005	9:53:00	0.3963	63.12	0.2	0.3113	0.079554
2/26/2005	9:53:01	0.4198	63.12	0.176	0.3348	0.070008
2/26/2005	9:53:02	0.4447	63.14	0.157	0.3597	0.06245
2/26/2005	9:53:04	0.4697	63.16	0.14	0.3847	0.055688
2/26/2005	9:53:06	0.4963	63.16	0.125	0.4113	0.049722
2/26/2005	9:53:07	0.5247	63.18	0.112	0.4397	0.044551
2/26/2005	9:53:09	0.5547	63.21	0.101	0.4697	0.040175
2/26/2005	9:53:11	0.5863	63.21	0.091	0.5013	0.036197
2/26/2005	9:53:13	0.6213	63.23	0.083	0.5363	0.033015
2/26/2005	9:53:15	0.658	63.25	0.076	0.573	0.030231
2/26/2005	9:53:18	0.6963	63.27	0.069	0.6113	0.027446
2/26/2005	9:53:20	0.738	63.3	0.064	0.653	0.025457
2/26/2005	9:53:23	0.7813	63.32	0.059	0.6963	0.023469
2/26/2005	9:53:25	0.828	63.34	0.056	0.743	0.022275
2/26/2005	9:53:28	0.8763	63.36	0.051	0.7913	0.020286
2/26/2005	9:53:31	0.928	63.39	0.048	0.843	0.019093
2/26/2005	9:53:35	0.983	63.41	0.046	0.898	0.018298
2/26/2005	9:53:38	1.0413	63.43	0.042	0.9563	0.016706
2/26/2005	9:53:42	1.103	63.45	0.04	1.018	0.015911
2/26/2005	9:53:46	1.168	63.48	0.039	1.083	0.015513
2/26/2005	9:53:50	1.238	63.5	0.037	1.153	0.014718

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW17S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By: JWR
Checked By: SJC 5/17/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	2.08 = To

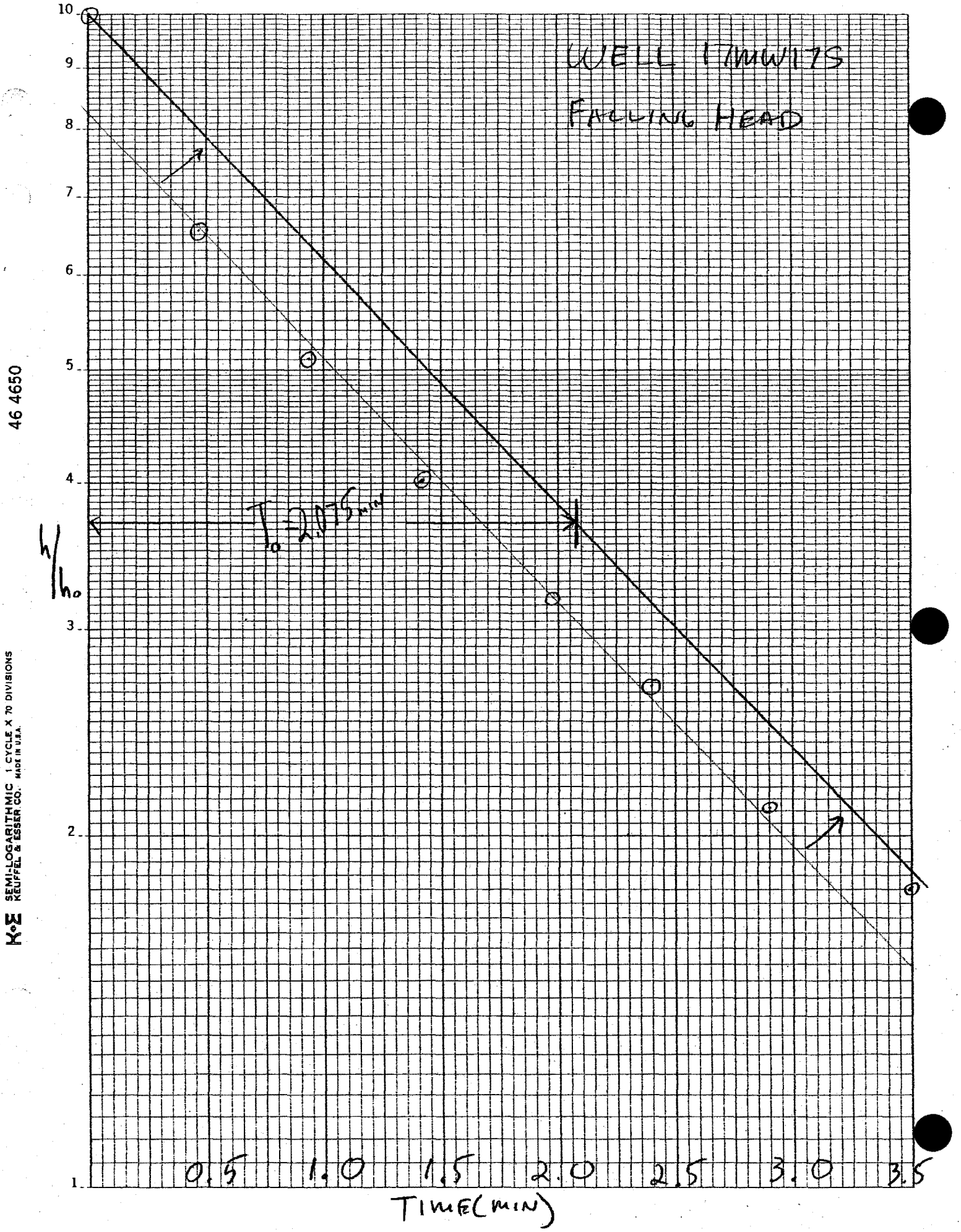
Hydraulic Conductivity (K) :

8.01E-04	ft./min.
1.34E-05	ft./sec.
1.15E+00	ft./day = 1.2 ft/day
4.07E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW17S
FALLING HEAD
$T_0 = 2.075$ min
h/h0
10
9
8
7
6
5
4
3
2
1
0.5
1.0
1.5
2.0
2.5
3.0
3.5
TIME (MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW17S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By: ZWR
Checked By: SJC 5/17/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	2.40 = To

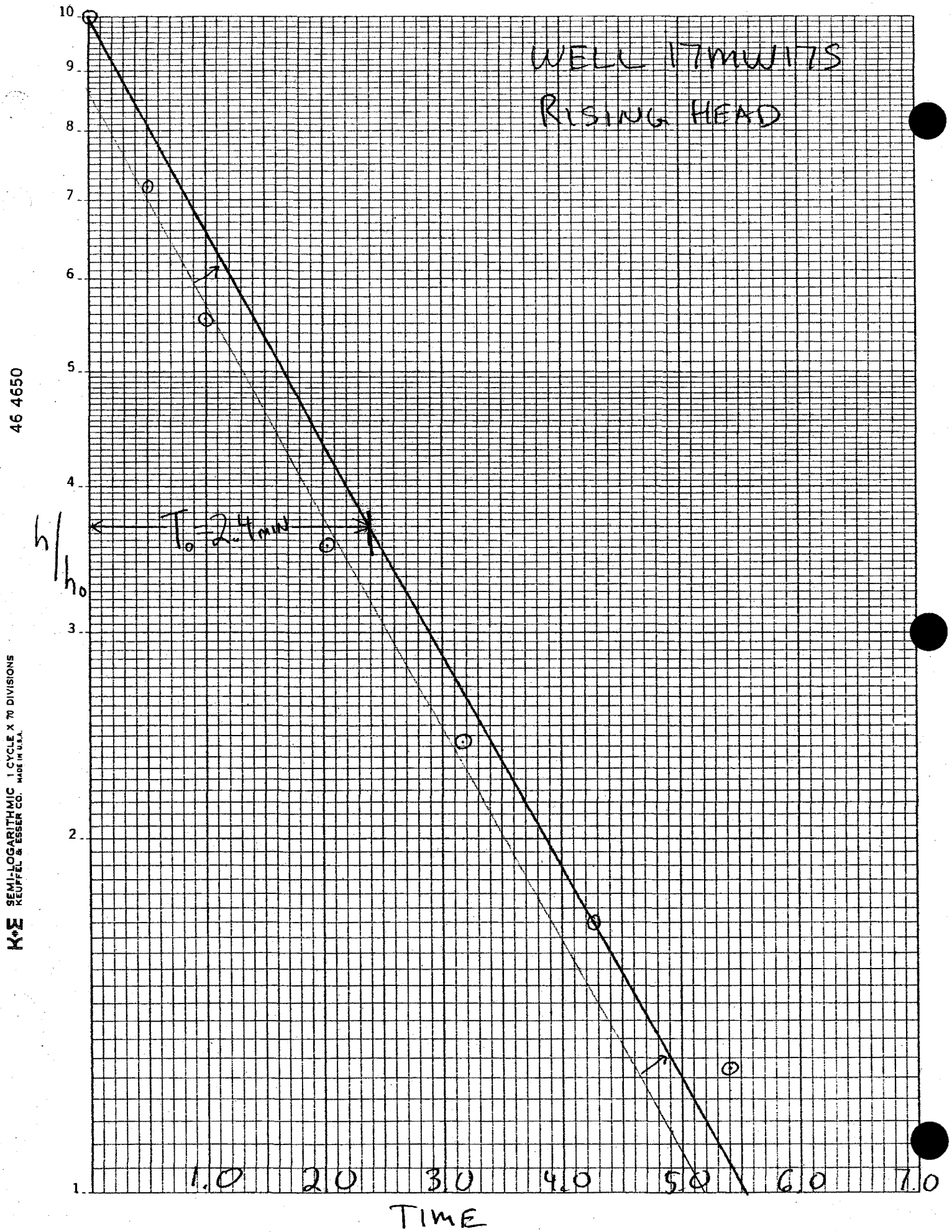
Hydraulic Conductivity (K) :

6.93E-04	ft./min.
1.15E-05	ft./sec.
9.97E-01	ft./day = 1 ft/day
3.52E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW17S
RISING HEAD
$T_0 = 2.4$ min
h/h_0
10
9
8
7
6
5
4
3
2
1
1.0
2.0
3.0
4.0
5.0
6.0
7.0
TIME
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: CHARLESTON NWS WELL/BORING NO.: 17MW17S

PROJECT NO.: 0528 GEOLOGIST: FRED WRAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10, 4-14 TEST NO.: 1 + 2

STATIC WATER LEVEL (Depth/Elevation): 2.45 DATE: 2-28-05

TEST TYPE (Rising/Falling/Constant Head): FALLING + RISING CHECKED: SJC 5/17/05

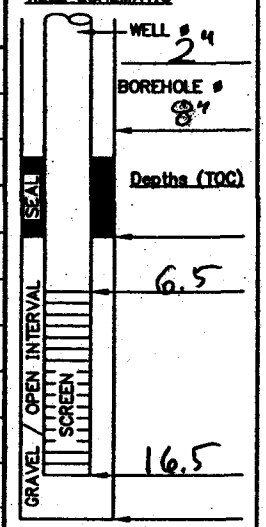
METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

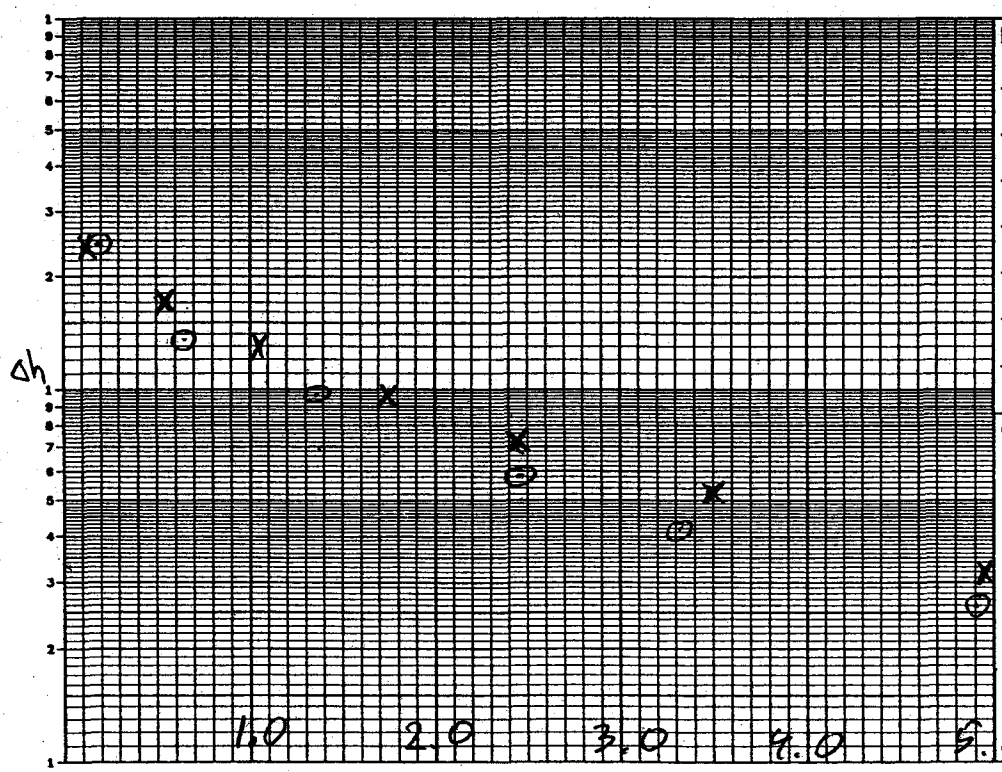
ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

FALLING HEAD			RISING HEAD		
ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.1875		2.481	0.1328		2.484
0.2227		2.081	0.2647		2.082
0.2803		1.760	0.5547		1.744
0.3532		1.681	0.7380		1.577
0.6580		1.392	1.0413		1.347
0.9280		1.199	1.7530		0.974
1.3897		0.960	2.4813		0.238
1.7530		0.811	3.5147		0.520
2.4813		0.595	4.9730		0.339
3.3163		0.433	7.4530		0.199
4.9730		0.259	8.8647		0.160
6.2663		0.175	11.8313		0.116

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

FALLING HEAD:

START: 1331

END: 1345

RISING HEAD:

START: 1348

END: 1401

⊙ = FALLING

X = RISING

CALCS, SKETCH MAPS, ETC.:

In-Situ Inc. MiniTroll Pro

Report generated: 3/1/2005 8:52:20
Report from file: ...\SN11262 2005-02-28 133109 17mw17sf.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw17sf

Test defined on: 2/28/2005 12:50:57
Test started on: 2/28/2005 13:31:09
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1Minutes.
Number of data samples: 105

TOTAL DATA SAMPLES 105

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.919 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/28/2005	13:31:09	0	62.91	0			Plotted data
2/28/2005	13:31:10	0.005	62.96	-0.009			
2/28/2005	13:31:10	0.01	62.98	-0.012			
2/28/2005	13:31:10	0.015	62.98	-0.013			
2/28/2005	13:31:10	0.02	63	-0.014			
2/28/2005	13:31:11	0.025	63	-0.014			
2/28/2005	13:31:11	0.03	63	-0.015			
2/28/2005	13:31:11	0.035	63	-0.016			
2/28/2005	13:31:12	0.04	63	-0.016			
2/28/2005	13:31:12	0.045	63	-0.016			
2/28/2005	13:31:12	0.05	63	-0.016			
2/28/2005	13:31:13	0.055	63	-0.016			
2/28/2005	13:31:13	0.06	63	-0.016			
2/28/2005	13:31:13	0.065	63.03	-0.016			
2/28/2005	13:31:13	0.07	63.03	-0.016			
2/28/2005	13:31:14	0.075	63.03	-0.016			
2/28/2005	13:31:14	0.08	63.03	-0.016			
2/28/2005	13:31:14	0.085	63.03	-0.016			
2/28/2005	13:31:15	0.09	63.03	-0.017			
2/28/2005	13:31:15	0.095	63.03	-0.017			
2/28/2005	13:31:15	0.1	63.03	-0.018			
2/28/2005	13:31:16	0.1058	63.03	-0.016			
2/28/2005	13:31:16	0.112	63.03	-0.017			
2/28/2005	13:31:16	0.1185	63.03	-0.017			
2/28/2005	13:31:17	0.1255	63.03	-0.021			
2/28/2005	13:31:17	0.1328	63.03	-0.015			
2/28/2005	13:31:18	0.1407	63.03	-0.018			
2/28/2005	13:31:18	0.149	63.03	-0.016			
2/28/2005	13:31:19	0.1578	63.03	-2.838			
2/28/2005	13:31:19	0.1672	63	-4.084			
2/28/2005	13:31:20	0.177	63	-2.378			

2/28/2005	13:31:20	0.1875	63	-2.481			
2/28/2005	13:31:21	0.1985	63	-1.449			
2/28/2005	13:31:22	0.2102	62.98	-1.659			
2/28/2005	13:31:23	0.2227	62.98	-2.081		0	1 ho
2/28/2005	13:31:23	0.2358	62.98	-1.784	0.0131	0.85728	
2/28/2005	13:31:24	0.2498	62.98	-1.799	0.0271	0.864488	
2/28/2005	13:31:25	0.2647	62.98	-1.831	0.042	0.879865	
2/28/2005	13:31:26	0.2803	62.98	-1.76	0.0576	0.845747	
2/28/2005	13:31:27	0.297	62.98	-1.759	0.0743	0.845267	
2/28/2005	13:31:28	0.3147	62.98	-1.728	0.092	0.83037	
2/28/2005	13:31:29	0.3333	62.98	-1.708	0.1106	0.820759	
2/28/2005	13:31:30	0.3532	62.98	-1.681	0.1305	0.807785	
2/28/2005	13:31:32	0.3742	62.98	-1.658	0.1515	0.796732	
2/28/2005	13:31:33	0.3963	62.98	-1.641	0.1736	0.788563	
2/28/2005	13:31:34	0.4198	62.98	-1.61	0.1971	0.773667	
2/28/2005	13:31:36	0.4447	62.98	-1.587	0.222	0.762614	
2/28/2005	13:31:37	0.4697	62.98	-1.562	0.247	0.750601	
2/28/2005	13:31:39	0.4963	62.98	-1.535	0.2736	0.737626	
2/28/2005	13:31:41	0.5247	62.98	-1.509	0.302	0.725132	
2/28/2005	13:31:42	0.5547	62.98	-1.48	0.332	0.711197	
2/28/2005	13:31:44	0.5863	63	-1.45	0.3636	0.69678	
2/28/2005	13:31:46	0.6213	62.98	-1.422	0.3986	0.683325	
2/28/2005	13:31:49	0.658	62.98	-1.392	0.4353	0.668909	
2/28/2005	13:31:51	0.6963	63	-1.36	0.4736	0.653532	
2/28/2005	13:31:53	0.738	63	-1.329	0.5153	0.638635	
2/28/2005	13:31:56	0.7813	63	-1.297	0.5586	0.623258	
2/28/2005	13:31:59	0.828	63	-1.264	0.6053	0.6074	
2/28/2005	13:32:02	0.8763	63	-1.232	0.6536	0.592023	
2/28/2005	13:32:05	0.928	63	-1.199	0.7053	0.576165	
2/28/2005	13:32:08	0.983	63	-1.166	0.7603	0.560308	
2/28/2005	13:32:12	1.0413	63	-1.132	0.8186	0.543969	
2/28/2005	13:32:15	1.103	63	-1.099	0.8803	0.528111	
2/28/2005	13:32:19	1.168	63	-1.065	0.9453	0.511773	
2/28/2005	13:32:23	1.238	63	-1.03	1.0153	0.494954	
2/28/2005	13:32:28	1.3113	63	-0.995	1.0886	0.478136	
2/28/2005	13:32:33	1.3897	63	-0.96	1.167	0.461317	
2/28/2005	13:32:38	1.473	63	-0.922	1.2503	0.443056	
2/28/2005	13:32:43	1.5613	63	-0.886	1.3386	0.425757	
2/28/2005	13:32:48	1.6547	63	-0.847	1.432	0.407016	
2/28/2005	13:32:54	1.753	63	-0.811	1.5303	0.389716	
2/28/2005	13:33:01	1.858	63	-0.774	1.6353	0.371937	
2/28/2005	13:33:07	1.968	63	-0.738	1.7453	0.354637	
2/28/2005	13:33:14	2.0847	63	-0.701	1.862	0.336857	
2/28/2005	13:33:22	2.2097	63	-0.665	1.987	0.319558	
2/28/2005	13:33:30	2.3413	63	-0.631	2.1186	0.30322	
2/28/2005	13:33:38	2.4813	63	-0.595	2.2586	0.28592	
2/28/2005	13:33:47	2.6297	62.98	-0.561	2.407	0.269582	
2/28/2005	13:33:56	2.7863	62.98	-0.528	2.5636	0.253724	
2/28/2005	13:34:06	2.953	62.98	-0.495	2.7303	0.237866	
2/28/2005	13:34:17	3.1297	62.98	-0.463	2.907	0.222489	
2/28/2005	13:34:28	3.3163	62.98	-0.433	3.0936	0.208073	
2/28/2005	13:34:40	3.5147	62.98	-0.406	3.292	0.195099	
2/28/2005	13:34:53	3.7247	62.98	-0.381	3.502	0.183085	
2/28/2005	13:35:06	3.9463	62.98	-0.356	3.7236	0.171072	
2/28/2005	13:35:20	4.1813	62.98	-0.33	3.9586	0.158578	
2/28/2005	13:35:35	4.4297	62.98	-0.306	4.207	0.147045	
2/28/2005	13:35:51	4.693	62.96	-0.283	4.4703	0.135992	
2/28/2005	13:36:08	4.973	62.94	-0.259	4.7503	0.124459	
2/28/2005	13:36:25	5.2697	62.91	-0.237	5.047	0.113888	
2/28/2005	13:36:44	5.583	62.89	-0.215	5.3603	0.103316	
2/28/2005	13:37:04	5.9147	62.87	-0.195	5.692	0.093705	
2/28/2005	13:37:25	6.2663	62.87	-0.175	6.0436	0.084094	
2/28/2005	13:37:48	6.6397	62.85	-0.158	6.417	0.075925	
2/28/2005	13:38:11	7.0347	62.85	-0.143	6.812	0.068717	
2/28/2005	13:38:36	7.453	62.82	-0.126	7.2303	0.060548	
2/28/2005	13:39:03	7.8963	62.82	-0.106	7.6736	0.050937	
2/28/2005	13:39:31	8.3663	62.82	-0.091	8.1436	0.043729	
2/28/2005	13:40:01	8.8647	62.82	-0.081	8.642	0.038924	
2/28/2005	13:40:33	9.3913	62.8	-0.078	9.1686	0.037482	
2/28/2005	13:41:06	9.9497	62.8	-0.071	9.727	0.034118	
2/28/2005	13:41:42	10.5413	62.78	-0.057	10.3186	0.027391	
2/28/2005	13:42:19	11.168	62.78	-0.047	10.9453	0.022585	
2/28/2005	13:42:59	11.8313	62.76	-0.038	11.6086	0.01826	
2/28/2005	13:43:41	12.5347	62.73	-0.034	12.312	0.016338	

In-Situ Inc. MiniTroll Pro

Report generated: 3/1/2005 8:59:49
Report from file: ...\SN11262 2005-02-28 134804 17mw17sr.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw17sr

Test defined on: 2/28/2005 12:51:39
Test started on: 2/28/2005 13:48:04
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10.0 Minutes.
Number of data samples: 104

TOTAL DATA SAMPLES 104

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.935 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho
2/28/2005	13:48:04	0	62.67	0		
2/28/2005	13:48:04	0.005	62.71	-0.008		
2/28/2005	13:48:04	0.01	62.73	-0.012		
2/28/2005	13:48:05	0.015	62.73	-0.013		
2/28/2005	13:48:05	0.02	62.73	-0.014		
2/28/2005	13:48:05	0.025	62.73	-0.014		
2/28/2005	13:48:06	0.03	62.76	-0.015		
2/28/2005	13:48:06	0.035	62.76	-0.015		
2/28/2005	13:48:06	0.04	62.76	-0.015		
2/28/2005	13:48:06	0.045	62.76	-0.016		
2/28/2005	13:48:07	0.05	62.76	-0.015		
2/28/2005	13:48:07	0.055	62.76	-0.015		
2/28/2005	13:48:07	0.06	62.76	-0.016		
2/28/2005	13:48:08	0.065	62.76	-0.016		
2/28/2005	13:48:08	0.07	62.76	-0.016		
2/28/2005	13:48:08	0.075	62.76	-0.037		
2/28/2005	13:48:09	0.08	62.76	0.071		
2/28/2005	13:48:09	0.085	62.76	0.738		
2/28/2005	13:48:09	0.09	62.76	5.128		
2/28/2005	13:48:09	0.095	62.76	4.145		
2/28/2005	13:48:10	0.1	62.76	0.578		
2/28/2005	13:48:10	0.1058	62.78	3.572		
2/28/2005	13:48:10	0.112	62.76	1.979		
2/28/2005	13:48:11	0.1185	62.76	2.467		
2/28/2005	13:48:11	0.1255	62.78	2.178		
2/28/2005	13:48:12	0.1328	62.78	2.484		
2/28/2005	13:48:12	0.1407	62.78	2.14		
2/28/2005	13:48:13	0.149	62.78	2.289	0	1 ho
2/28/2005	13:48:13	0.1578	62.78	2.279	0.0088	0.995631
2/28/2005	13:48:14	0.1672	62.73	2.221	0.0182	0.970293
2/28/2005	13:48:14	0.177	62.73	2.205	0.028	0.963303

Plotted data

2/28/2005	13:48:15	0.1875	62.73	2.196	0.0385	0.959371
2/28/2005	13:48:16	0.1985	62.73	2.181	0.0495	0.952818
2/28/2005	13:48:16	0.2102	62.73	2.163	0.0612	0.944954
2/28/2005	13:48:17	0.2227	62.73	2.144	0.0737	0.936654
2/28/2005	13:48:18	0.2358	62.73	2.125	0.0868	0.928353
2/28/2005	13:48:19	0.2498	62.73	2.104	0.1008	0.919179
2/28/2005	13:48:20	0.2647	62.71	2.082	0.1157	0.909567
2/28/2005	13:48:21	0.2803	62.71	2.06	0.1313	0.899956
2/28/2005	13:48:22	0.297	62.71	2.037	0.148	0.889908
2/28/2005	13:48:23	0.3147	62.71	2.015	0.1657	0.880297
2/28/2005	13:48:24	0.3333	62.71	1.991	0.1843	0.869812
2/28/2005	13:48:25	0.3532	62.71	1.966	0.2042	0.85889
2/28/2005	13:48:26	0.3742	62.71	1.941	0.2252	0.847969
2/28/2005	13:48:28	0.3963	62.71	1.915	0.2473	0.83661
2/28/2005	13:48:29	0.4198	62.71	1.888	0.2708	0.824814
2/28/2005	13:48:30	0.4447	62.71	1.86	0.2957	0.812582
2/28/2005	13:48:32	0.4697	62.71	1.832	0.3207	0.800349
2/28/2005	13:48:34	0.4963	62.71	1.803	0.3473	0.78768
2/28/2005	13:48:35	0.5247	62.71	1.773	0.3757	0.774574
2/28/2005	13:48:37	0.5547	62.71	1.744	0.4057	0.761905
2/28/2005	13:48:39	0.5863	62.71	1.712	0.4373	0.747925
2/28/2005	13:48:41	0.6213	62.71	1.679	0.4723	0.733508
2/28/2005	13:48:43	0.658	62.71	1.646	0.509	0.719091
2/28/2005	13:48:46	0.6963	62.71	1.612	0.5473	0.704238
2/28/2005	13:48:48	0.738	62.71	1.577	0.589	0.688947
2/28/2005	13:48:51	0.7813	62.71	1.541	0.6323	0.67322
2/28/2005	13:48:53	0.828	62.71	1.502	0.679	0.656182
2/28/2005	13:48:56	0.8763	62.71	1.466	0.7273	0.640454
2/28/2005	13:48:59	0.928	62.71	1.426	0.779	0.622979
2/28/2005	13:49:03	0.983	62.71	1.387	0.834	0.605941
2/28/2005	13:49:06	1.0413	62.71	1.347	0.8923	0.588467
2/28/2005	13:49:10	1.103	62.71	1.307	0.954	0.570992
2/28/2005	13:49:14	1.168	62.71	1.267	1.019	0.553517
2/28/2005	13:49:18	1.238	62.71	1.225	1.089	0.535168
2/28/2005	13:49:22	1.3113	62.73	1.185	1.1623	0.517693
2/28/2005	13:49:27	1.3897	62.73	1.143	1.2407	0.499345
2/28/2005	13:49:32	1.473	62.73	1.1	1.324	0.480559
2/28/2005	13:49:37	1.5613	62.71	1.058	1.4123	0.462211
2/28/2005	13:49:43	1.6547	62.73	1.017	1.5057	0.444299
2/28/2005	13:49:49	1.753	62.71	0.974	1.604	0.425513
2/28/2005	13:49:55	1.858	62.71	0.934	1.709	0.408038
2/28/2005	13:50:02	1.968	62.71	0.893	1.819	0.390127
2/28/2005	13:50:09	2.0847	62.71	0.854	1.9357	0.373089
2/28/2005	13:50:16	2.2097	62.71	0.814	2.0607	0.355614
2/28/2005	13:50:24	2.3413	62.71	0.776	2.1923	0.339013
2/28/2005	13:50:33	2.4813	62.71	0.738	2.3323	0.322412
2/28/2005	13:50:42	2.6297	62.71	0.701	2.4807	0.306247
2/28/2005	13:50:51	2.7863	62.69	0.663	2.6373	0.289646
2/28/2005	13:51:01	2.953	62.69	0.624	2.804	0.272608
2/28/2005	13:51:12	3.1297	62.69	0.589	2.9807	0.257318
2/28/2005	13:51:23	3.3163	62.67	0.554	3.1673	0.242027
2/28/2005	13:51:35	3.5147	62.67	0.52	3.3657	0.227173
2/28/2005	13:51:47	3.7247	62.64	0.485	3.5757	0.211883
2/28/2005	13:52:01	3.9463	62.64	0.453	3.7973	0.197903
2/28/2005	13:52:15	4.1813	62.64	0.422	4.0323	0.18436
2/28/2005	13:52:30	4.4297	62.62	0.391	4.2807	0.170817
2/28/2005	13:52:45	4.693	62.62	0.364	4.544	0.159021
2/28/2005	13:53:02	4.973	62.62	0.339	4.824	0.1481
2/28/2005	13:53:20	5.2697	62.62	0.314	5.1207	0.137178
2/28/2005	13:53:39	5.583	62.62	0.291	5.434	0.12713
2/28/2005	13:53:59	5.9147	62.62	0.271	5.7657	0.118392
2/28/2005	13:54:20	6.2663	62.62	0.251	6.1173	0.109655
2/28/2005	13:54:42	6.6397	62.62	0.233	6.4907	0.101791
2/28/2005	13:55:06	7.0347	62.62	0.215	6.8857	0.093927
2/28/2005	13:55:31	7.453	62.62	0.199	7.304	0.086938
2/28/2005	13:55:58	7.8963	62.62	0.187	7.7473	0.081695
2/28/2005	13:56:26	8.3663	62.62	0.172	8.2173	0.075142
2/28/2005	13:56:56	8.8647	62.62	0.16	8.7157	0.0699
2/28/2005	13:57:27	9.3913	62.62	0.153	9.2423	0.066841
2/28/2005	13:58:01	9.9497	62.64	0.143	9.8007	0.062473
2/28/2005	13:58:36	10.5413	62.64	0.137	10.3923	0.059851
2/28/2005	13:59:14	11.168	62.64	0.129	11.019	0.056356
2/28/2005	13:59:54	11.8313	62.67	0.116	11.6823	0.050677

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW17I
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By: Sue
Checked By: JJC 5/17/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	0.63 = To

Hydraulic Conductivity (K) :

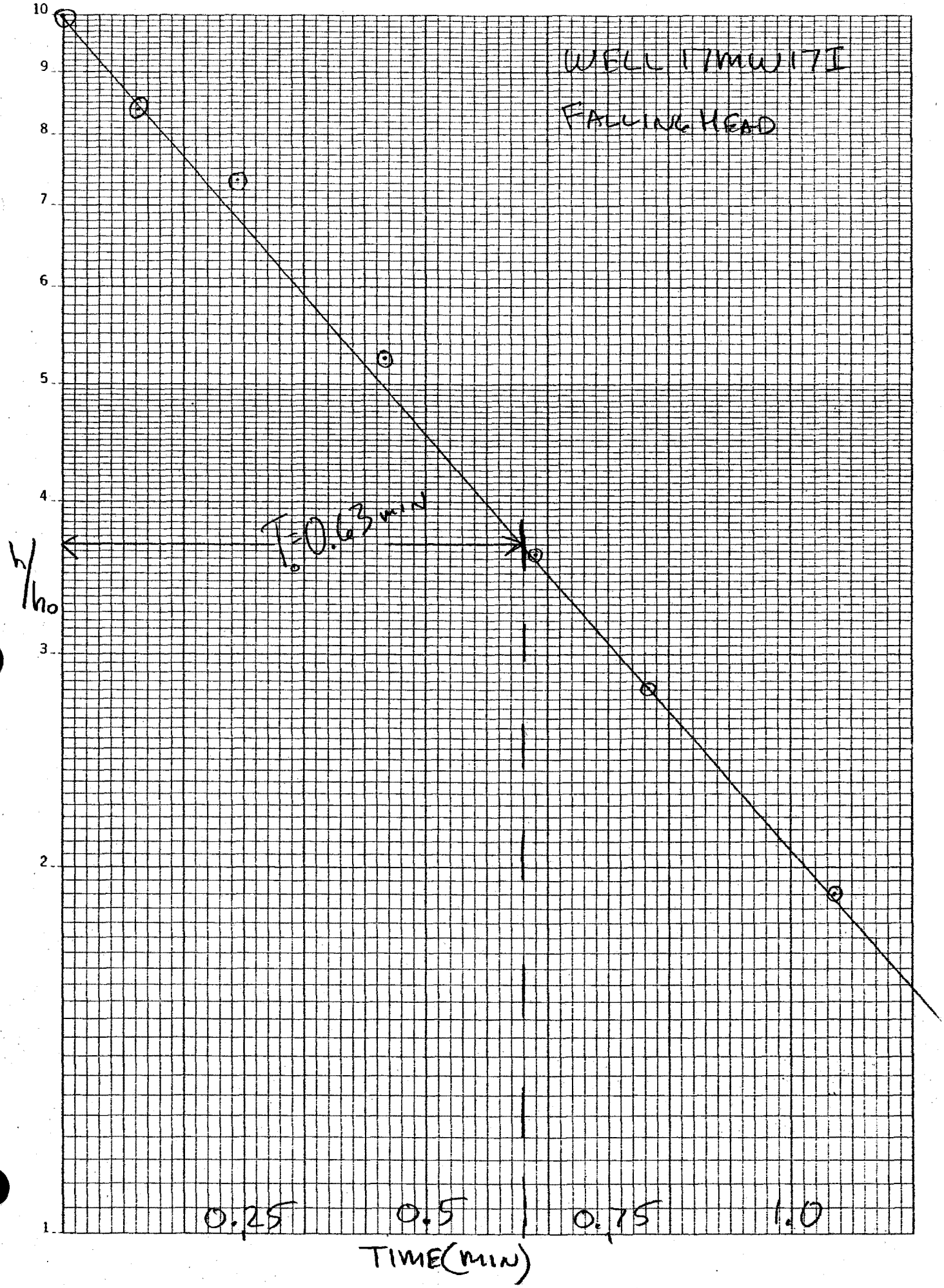
2.64E-03	ft./min.
4.40E-05	ft./sec.
3.80E+00	ft./day
1.34E-03	cm./sec.

3.8 ft/day

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17/MW17I
FALLING HEAD
$T_o = 0.63$ MIN
h/h_o
10
9
8
7
6
5
4
3
2
1
0.25
0.5
0.75
1.0
TIME (MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW17I
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By: JWR
Checked By: JJC 5/17/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	1.27 = To

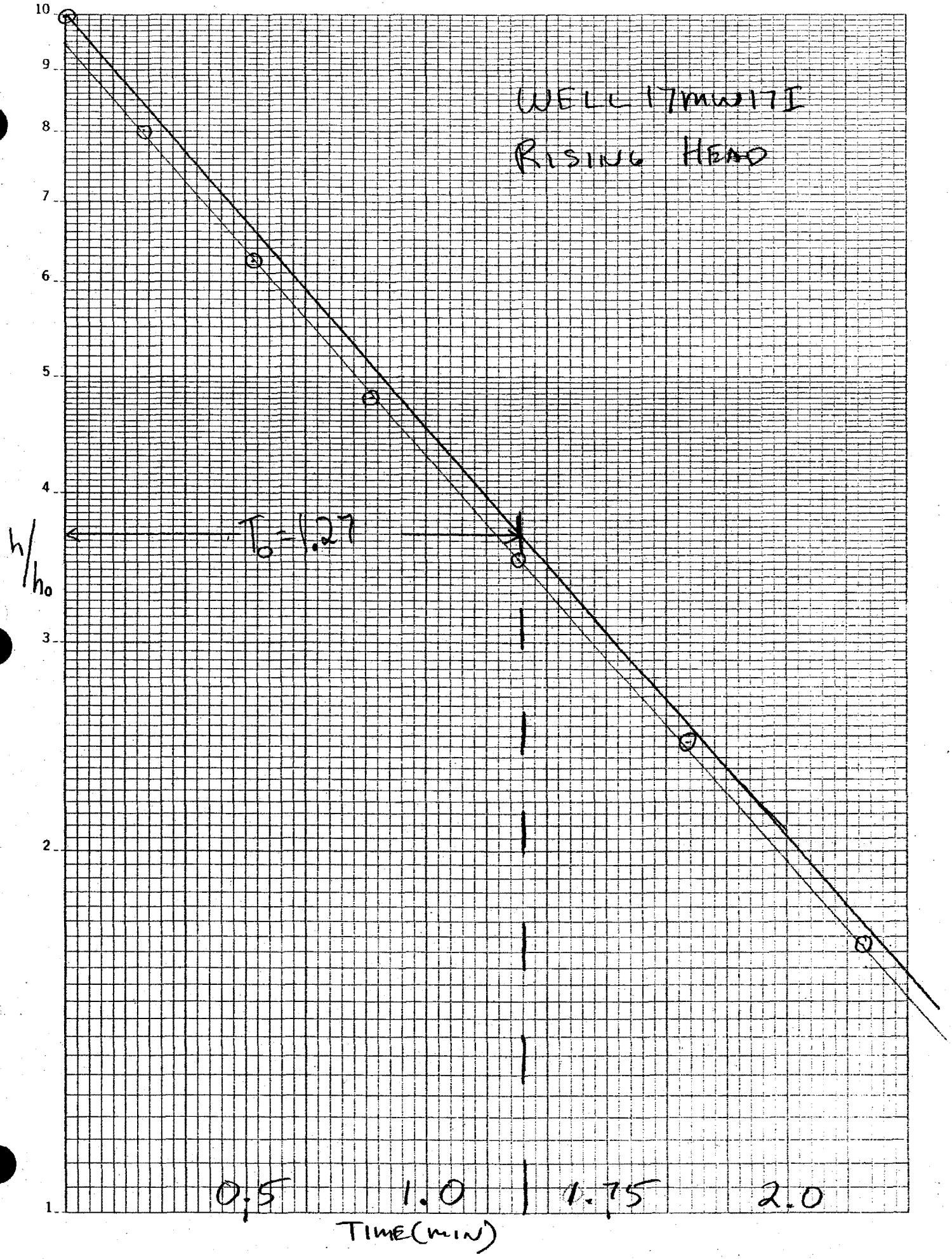
Hydraulic Conductivity (K) :

1.31E-03	ft./min.
2.18E-05	ft./sec.
1.88E+00	ft./day = 1.9 ft/day
6.65E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW17I
RISING HEAD
$T_o = 1.27$
h/h_o
10
9
8
7
6
5
4
3
2
1
0.5
1.0
1.75
2.0
TIME (MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: CHARLESTON NWS WELL/BORING NO.: 17MW171

PROJECT NO.: 0528 GEOLOGIST: FRED W. RAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10, 13-23 TEST NO.: 1 + 2

STATIC WATER LEVEL (Depth/Elevation): 2.70 DATE: 2-28-05

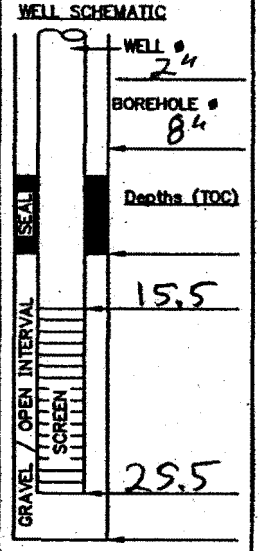
TEST TYPE (Rising/Falling/Constant Head): FALLING + RISING CHECKED: 5/17/05 SJC

METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG PAGE 1 OF 1

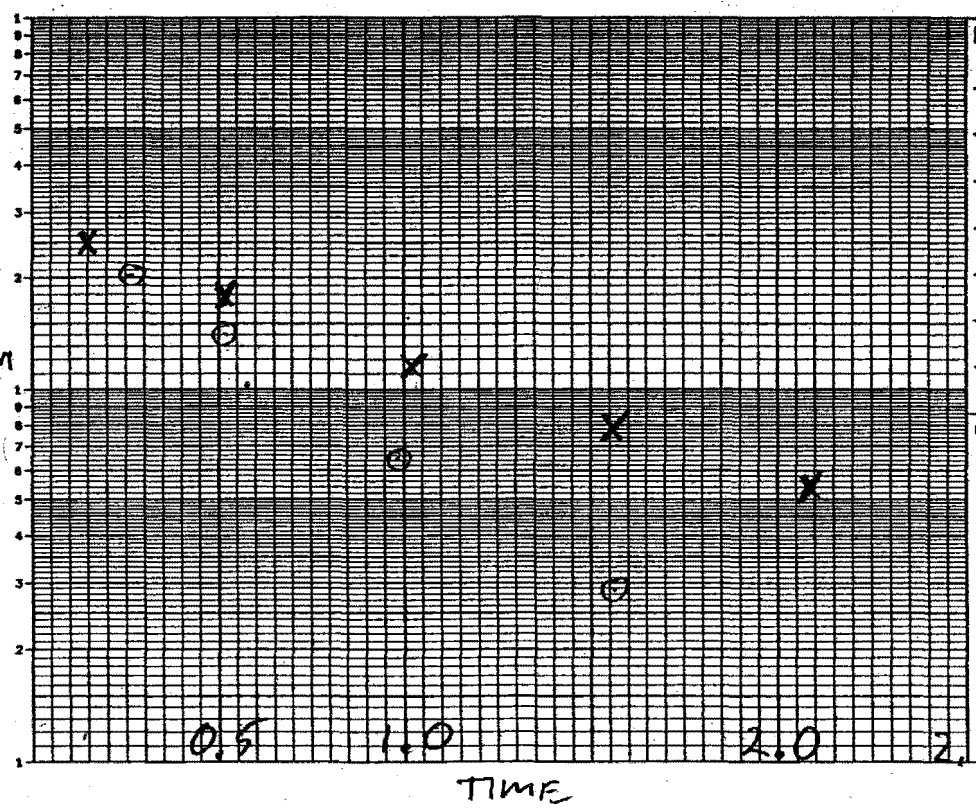
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

FALLING HEAD			RISING HEAD		
ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.2641		2.002	0.1490		2.507
0.3742		1.785	0.3333		2.120
0.5247		1.465	0.5247		1.805
0.6580		1.134	0.7380		1.517
0.8280		0.841	1.0413		1.192
0.9830		0.651	1.3113		0.966
1.2380		0.442	1.5613		0.799
1.5613		0.291	2.0847		0.547
2.6297		0.146	2.9530		0.312
3.5147		0.102	3.9463		0.183
4.4297		0.083	5.2697		0.106
			6.2663		0.082

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

FALLING HEAD:

START: 1414

STOP: 1433

RISING HEAD

STARTED: 1456

STOP: 1506

CALCS, SKETCH MAPS, ETC.:

⊙ = FALL HEAD

X = RISING HEAD

ACAD: FORM_HYDCONTST.dwg 07/06/99 INL

In-Situ Inc. MiniTroll Pro

Report generated: 3/1/2005 9:02:00
Report from file: ...\SN11262 2005-02-28 141426 17mw17if.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw17if

Test defined on: 2/28/2005 12:52:18
Test started on: 2/28/2005 14:14:26
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: Minutes.
Number of data samples: 90

TOTAL DATA SAMPLES 90

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.576 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho
2/28/2005	14:14:26	0	64.51	0		
2/28/2005	14:14:26	0.005	64.56	-0.009		
2/28/2005	14:14:26	0.01	64.58	-0.012		
2/28/2005	14:14:26	0.015	64.58	-0.014		
2/28/2005	14:14:27	0.02	64.58	-0.015		
2/28/2005	14:14:27	0.025	64.6	-0.015		
2/28/2005	14:14:27	0.03	64.6	-0.015		
2/28/2005	14:14:28	0.035	64.6	-0.016		
2/28/2005	14:14:28	0.04	64.6	-0.017		
2/28/2005	14:14:28	0.045	64.6	-0.017		
2/28/2005	14:14:29	0.05	64.6	-0.017		
2/28/2005	14:14:29	0.055	64.6	-0.017		
2/28/2005	14:14:29	0.06	64.63	-0.017		
2/28/2005	14:14:29	0.065	64.63	-0.017		
2/28/2005	14:14:30	0.07	64.63	-0.017		
2/28/2005	14:14:30	0.075	64.63	-0.018		
2/28/2005	14:14:30	0.08	64.63	-0.017		
2/28/2005	14:14:31	0.085	64.63	-0.018		
2/28/2005	14:14:31	0.09	64.63	-0.02		
2/28/2005	14:14:31	0.095	64.63	-0.022		
2/28/2005	14:14:32	0.1	64.63	-0.021		
2/28/2005	14:14:32	0.1058	64.63	-0.018		
2/28/2005	14:14:32	0.112	64.63	-0.021		
2/28/2005	14:14:33	0.1185	64.63	-0.017		
2/28/2005	14:14:33	0.1255	64.63	-2.619		
2/28/2005	14:14:34	0.1328	64.63	-4.526		
2/28/2005	14:14:34	0.1407	64.63	-3.098		
2/28/2005	14:14:34	0.149	64.65	-1.322		
2/28/2005	14:14:35	0.1578	64.65	-1.887		
2/28/2005	14:14:36	0.1672	64.6	-2.52		
2/28/2005	14:14:36	0.177	64.6	-2.316	0	1 ho

Plotted data

2/28/2005	14:14:37	0.1875	64.58	-2.082	0.0105	0.898964
2/28/2005	14:14:37	0.1985	64.58	-2.099	0.0215	0.906304
2/28/2005	14:14:38	0.2102	64.58	-1.868	0.0332	0.806563
2/28/2005	14:14:39	0.2227	64.58	-2.375	0.0457	1.025475
2/28/2005	14:14:40	0.2358	64.58	-1.985	0.0588	0.857081
2/28/2005	14:14:41	0.2498	64.58	-2.034	0.0728	0.878238
2/28/2005	14:14:41	0.2647	64.56	-2.002	0.0877	0.864421
2/28/2005	14:14:42	0.2803	64.56	-1.964	0.1033	0.848014
2/28/2005	14:14:43	0.297	64.56	-1.932	0.12	0.834197
2/28/2005	14:14:44	0.3147	64.56	-1.896	0.1377	0.818653
2/28/2005	14:14:46	0.3333	64.54	-1.859	0.1563	0.802677
2/28/2005	14:14:47	0.3532	64.54	-1.822	0.1762	0.786701
2/28/2005	14:14:48	0.3742	64.51	-1.785	0.1972	0.770725
2/28/2005	14:14:49	0.3963	64.51	-1.742	0.2193	0.752159
2/28/2005	14:14:51	0.4198	64.49	-1.704	0.2428	0.735751
2/28/2005	14:14:52	0.4447	64.49	-1.661	0.2677	0.717185
2/28/2005	14:14:54	0.4697	64.47	-1.623	0.2927	0.700777
2/28/2005	14:14:55	0.4963	64.47	-1.558	0.3193	0.672712
2/28/2005	14:14:57	0.5247	64.42	-1.465	0.3477	0.632556
2/28/2005	14:14:59	0.5547	64.42	-1.379	0.3777	0.595423
2/28/2005	14:15:01	0.5863	64.4	-1.297	0.4093	0.560017
2/28/2005	14:15:03	0.6213	64.36	-1.214	0.4443	0.524418
2/28/2005	14:15:05	0.658	64.33	-1.134	0.481	0.489637
2/28/2005	14:15:07	0.6963	64.31	-1.059	0.5193	0.457254
2/28/2005	14:15:10	0.738	64.27	-0.983	0.561	0.424439
2/28/2005	14:15:12	0.7813	64.24	-0.911	0.6043	0.393351
2/28/2005	14:15:15	0.828	64.2	-0.841	0.651	0.363126
2/28/2005	14:15:18	0.8763	64.15	-0.775	0.6993	0.334629
2/28/2005	14:15:21	0.928	64.11	-0.71	0.751	0.306563
2/28/2005	14:15:25	0.983	64.04	-0.651	0.806	0.281088
2/28/2005	14:15:28	1.0413	64	-0.591	0.8643	0.255181
2/28/2005	14:15:32	1.103	63.93	-0.537	0.926	0.231865
2/28/2005	14:15:36	1.168	63.86	-0.487	0.991	0.210276
2/28/2005	14:15:40	1.238	63.79	-0.442	1.061	0.190846
2/28/2005	14:15:44	1.3113	63.73	-0.398	1.1343	0.171848
2/28/2005	14:15:49	1.3897	63.68	-0.36	1.2127	0.15544
2/28/2005	14:15:54	1.473	63.59	-0.324	1.296	0.139896
2/28/2005	14:15:59	1.5613	63.52	-0.291	1.3843	0.125648
2/28/2005	14:16:05	1.6547	63.45	-0.262	1.4777	0.113126
2/28/2005	14:16:11	1.753	63.39	-0.237	1.576	0.102332
2/28/2005	14:16:17	1.858	63.32	-0.215	1.681	0.092832
2/28/2005	14:16:24	1.968	63.25	-0.195	1.791	0.084197
2/28/2005	14:16:31	2.0847	63.18	-0.241	1.9077	0.104059
2/28/2005	14:16:38	2.2097	63.12	-0.21	2.0327	0.090674
2/28/2005	14:16:46	2.3413	63.07	-0.182	2.1643	0.078584
2/28/2005	14:16:54	2.4813	63	-0.163	2.3043	0.07038
2/28/2005	14:17:03	2.6297	62.94	-0.146	2.4527	0.06304
2/28/2005	14:17:13	2.7863	62.89	-0.133	2.6093	0.057427
2/28/2005	14:17:23	2.953	62.85	-0.122	2.776	0.052677
2/28/2005	14:17:33	3.1297	62.8	-0.116	2.9527	0.050086
2/28/2005	14:17:45	3.3163	62.76	-0.107	3.1393	0.0462
2/28/2005	14:17:56	3.5147	62.71	-0.102	3.3377	0.044041
2/28/2005	14:18:09	3.7247	62.67	-0.096	3.5477	0.041451
2/28/2005	14:18:22	3.9463	62.62	-0.092	3.7693	0.039724
2/28/2005	14:18:36	4.1813	62.6	-0.088	4.0043	0.037997
2/28/2005	14:18:51	4.4297	62.58	-0.083	4.2527	0.035838
2/28/2005	14:19:07	4.693	62.58	-0.078	4.516	0.033679
2/28/2005	14:19:24	4.973	62.55	-0.075	4.796	0.032383
2/28/2005	14:19:42	5.2697	62.53	-0.073	5.0927	0.03152

In-Situ Inc. MiniTroll Pro

Report generated: 3/1/2005 9:04:14
Report from file: ...\SN11262 2005-02-28 145615 17mw17irh.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw17irh

Test defined on: 2/28/2005 13:22:10
Test started on: 2/28/2005 14:56:15
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10. Minutes.
Number of data samples: 97

TOTAL DATA SAMPLES 97

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.645 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho
2/28/2005	14:56:15	0	62.76	0		
2/28/2005	14:56:15	0.005	62.8	-0.008		
2/28/2005	14:56:16	0.01	62.82	-0.01		
2/28/2005	14:56:16	0.015	62.82	-0.012		
2/28/2005	14:56:16	0.02	62.82	-0.013		
2/28/2005	14:56:17	0.025	62.85	-0.014		
2/28/2005	14:56:17	0.03	62.85	-0.015		
2/28/2005	14:56:17	0.035	62.85	-0.015		
2/28/2005	14:56:17	0.04	62.85	-0.014		
2/28/2005	14:56:18	0.045	62.85	-0.015		
2/28/2005	14:56:18	0.05	62.85	-0.015		
2/28/2005	14:56:18	0.055	62.87	-0.015		
2/28/2005	14:56:19	0.06	62.87	-0.015		
2/28/2005	14:56:19	0.065	62.87	-0.015		
2/28/2005	14:56:19	0.07	62.87	-0.016		
2/28/2005	14:56:20	0.075	62.87	-0.016		
2/28/2005	14:56:20	0.08	62.87	-0.016		
2/28/2005	14:56:20	0.085	62.87	-0.015		
2/28/2005	14:56:20	0.09	62.87	1.021		
2/28/2005	14:56:21	0.095	62.87	3.856		
2/28/2005	14:56:21	0.1	62.87	3.986		
2/28/2005	14:56:21	0.1058	62.87	2.168		
2/28/2005	14:56:22	0.112	62.87	2.779		
2/28/2005	14:56:22	0.1185	62.87	2.727		
2/28/2005	14:56:23	0.1255	62.87	2.507		
2/28/2005	14:56:23	0.1328	62.87	2.591	0	1
2/28/2005	14:56:23	0.1407	62.87	2.515	0.0079	0.970668
2/28/2005	14:56:24	0.149	62.87	2.507	0.0162	0.96758
2/28/2005	14:56:24	0.1578	62.87	2.479	0.025	0.956773
2/28/2005	14:56:25	0.1672	62.85	2.459	0.0344	0.949054
2/28/2005	14:56:26	0.177	62.85	2.435	0.0442	0.939792

Plotted data

ho

2/28/2005	14:56:26	0.1875	62.85	2.413	0.0547	0.931301
2/28/2005	14:56:27	0.1985	62.85	2.388	0.0657	0.921652
2/28/2005	14:56:28	0.2102	62.85	2.363	0.0774	0.912003
2/28/2005	14:56:28	0.2227	62.85	2.335	0.0899	0.901196
2/28/2005	14:56:29	0.2358	62.85	2.308	0.103	0.890776
2/28/2005	14:56:30	0.2498	62.87	2.279	0.117	0.879583
2/28/2005	14:56:31	0.2647	62.87	2.249	0.1319	0.868005
2/28/2005	14:56:32	0.2803	62.87	2.219	0.1475	0.856426
2/28/2005	14:56:33	0.297	62.87	2.187	0.1642	0.844076
2/28/2005	14:56:34	0.3147	62.89	2.154	0.1819	0.831339
2/28/2005	14:56:35	0.3333	62.89	2.12	0.2005	0.818217
2/28/2005	14:56:36	0.3532	62.91	2.083	0.2204	0.803937
2/28/2005	14:56:37	0.3742	62.94	2.047	0.2414	0.790042
2/28/2005	14:56:39	0.3963	62.96	2.007	0.2635	0.774604
2/28/2005	14:56:40	0.4198	62.96	1.969	0.287	0.759938
2/28/2005	14:56:42	0.4447	62.98	1.928	0.3119	0.744114
2/28/2005	14:56:43	0.4697	63	1.888	0.3369	0.728676
2/28/2005	14:56:45	0.4963	63.03	1.846	0.3635	0.712466
2/28/2005	14:56:46	0.5247	63.07	1.805	0.3919	0.696642
2/28/2005	14:56:48	0.5547	63.09	1.761	0.4219	0.67966
2/28/2005	14:56:50	0.5863	63.12	1.716	0.4535	0.662293
2/28/2005	14:56:52	0.6213	63.14	1.668	0.4885	0.643767
2/28/2005	14:56:54	0.658	63.18	1.62	0.5252	0.625241
2/28/2005	14:56:57	0.6963	63.21	1.57	0.5635	0.605944
2/28/2005	14:56:59	0.738	63.23	1.517	0.6052	0.585488
2/28/2005	14:57:02	0.7813	63.27	1.466	0.6485	0.565805
2/28/2005	14:57:05	0.828	63.3	1.412	0.6952	0.544963
2/28/2005	14:57:08	0.8763	63.34	1.359	0.7435	0.524508
2/28/2005	14:57:11	0.928	63.39	1.303	0.7952	0.502895
2/28/2005	14:57:14	0.983	63.43	1.248	0.8502	0.481667
2/28/2005	14:57:17	1.0413	63.45	1.192	0.9085	0.460054
2/28/2005	14:57:21	1.103	63.5	1.135	0.9702	0.438055
2/28/2005	14:57:25	1.168	63.54	1.08	1.0352	0.416827
2/28/2005	14:57:29	1.238	63.57	1.022	1.1052	0.394442
2/28/2005	14:57:34	1.3113	63.61	0.966	1.1785	0.372829
2/28/2005	14:57:38	1.3897	63.66	0.91	1.2569	0.351216
2/28/2005	14:57:43	1.473	63.7	0.855	1.3402	0.329988
2/28/2005	14:57:49	1.5613	63.75	0.799	1.4285	0.308375
2/28/2005	14:57:54	1.6547	63.79	0.746	1.5219	0.28792
2/28/2005	14:58:00	1.753	63.84	0.694	1.6202	0.26785
2/28/2005	14:58:06	1.858	63.88	0.644	1.7252	0.248556
2/28/2005	14:58:13	1.968	63.93	0.593	1.8352	0.228869
2/28/2005	14:58:20	2.0847	63.95	0.547	1.9519	0.211115
2/28/2005	14:58:28	2.2097	64	0.502	2.0769	0.193748
2/28/2005	14:58:35	2.3413	64.04	0.459	2.2085	0.177152
2/28/2005	14:58:44	2.4813	64.06	0.419	2.3485	0.161714
2/28/2005	14:58:53	2.6297	64.11	0.381	2.4969	0.147047
2/28/2005	14:59:02	2.7863	64.13	0.345	2.6535	0.133153
2/28/2005	14:59:12	2.953	64.15	0.312	2.8202	0.120417
2/28/2005	14:59:23	3.1297	64.2	0.281	2.9969	0.108452
2/28/2005	14:59:34	3.3163	64.22	0.254	3.1835	0.098032
2/28/2005	14:59:46	3.5147	64.27	0.229	3.3819	0.088383
2/28/2005	14:59:58	3.7247	64.29	0.205	3.5919	0.07912
2/28/2005	15:00:12	3.9463	64.33	0.183	3.8135	0.070629
2/28/2005	15:00:26	4.1813	64.36	0.164	4.0485	0.063296
2/28/2005	15:00:41	4.4297	64.38	0.145	4.2969	0.055963
2/28/2005	15:00:57	4.693	64.4	0.131	4.5602	0.05056
2/28/2005	15:01:13	4.973	64.45	0.118	4.8402	0.045542
2/28/2005	15:01:31	5.2697	64.47	0.106	5.1369	0.040911
2/28/2005	15:01:50	5.583	64.49	0.096	5.4502	0.037051
2/28/2005	15:02:10	5.9147	64.51	0.089	5.7819	0.03435
2/28/2005	15:02:31	6.2663	64.54	0.082	6.1335	0.031648
2/28/2005	15:02:53	6.6397	64.56	0.074	6.5069	0.02856
2/28/2005	15:03:17	7.0347	64.58	0.07	6.9019	0.027017
2/28/2005	15:03:42	7.453	64.6	0.066	7.3202	0.025473
2/28/2005	15:04:09	7.8963	64.63	0.063	7.7635	0.024315

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW17D
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By: [illegible]
Checked By: SJC 5/17/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	0.17 = To

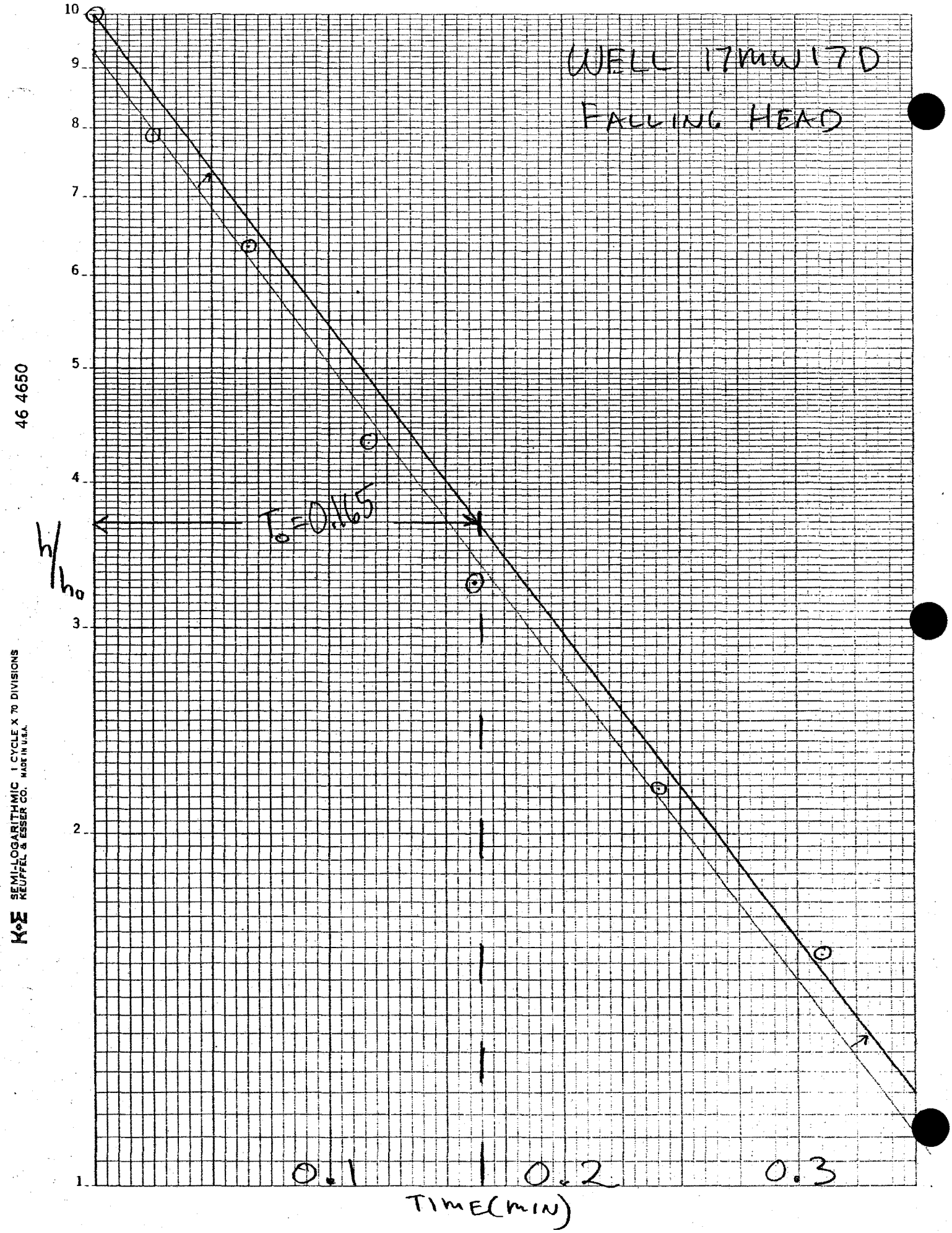
Hydraulic Conductivity (K) :

1.01E-02	ft./min.
1.68E-04	ft./sec.
1.45E+01	ft./day = 15 ft/day
5.12E-03	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW17D
FALLING HEAD
$T_0 = 0.165$
h/h_0
10
9
8
7
6
5
4
3
2
1
0.1
0.2
0.3
TIME(MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW17D
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By: JWR
Checked By: SJC 5/17/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	0.15 = To

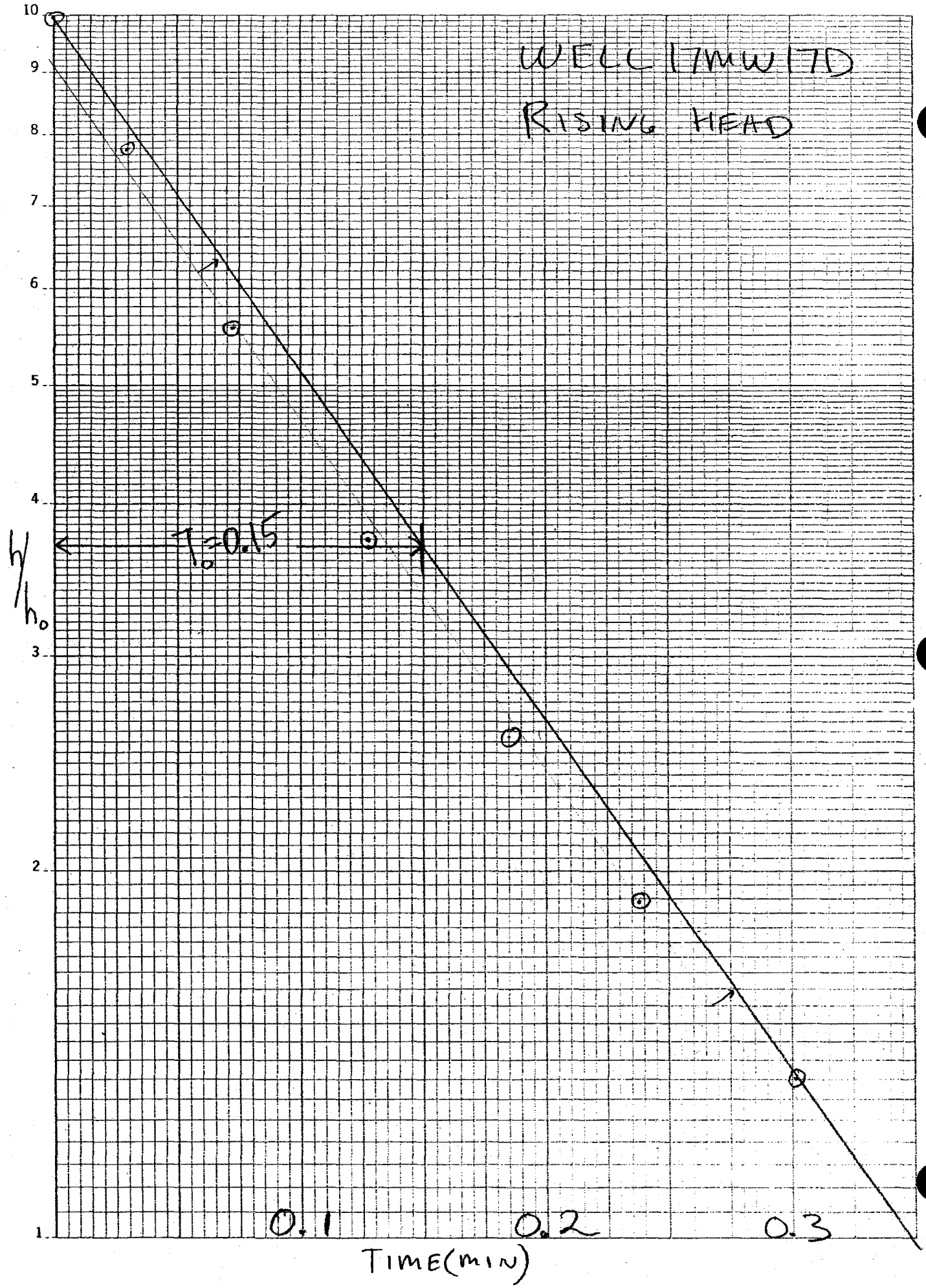
Hydraulic Conductivity (K) :

1.11E-02	ft./min.
1.85E-04	ft./sec.
1.60E+01	ft./day = 16 ft/day
5.63E-03	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW17D
RISING HEAD
10
9
8
7
6
5
4
3
2
1
h/h0
T0=0.15
0.1
0.2
0.3
TIME(MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: CHARLESTON NWS SWMU 17 WELL/BORING NO.: 17MW17D*

PROJECT NO.: 0528 GEOLOGIST: FRED W RAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10, 27-37 TEST NO.:

STATIC WATER LEVEL (Depth/Elevation): 2.55 DATE: 2-28-05

TEST TYPE (Rising/Falling/Constant Head): FALLING + RISING CHECKED: SJC 5/17/05

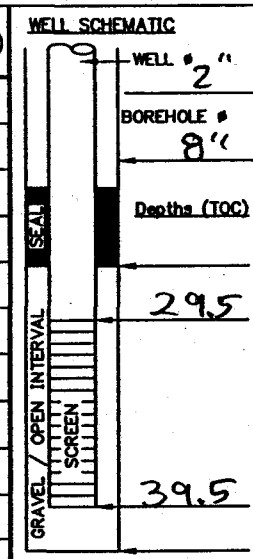
METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

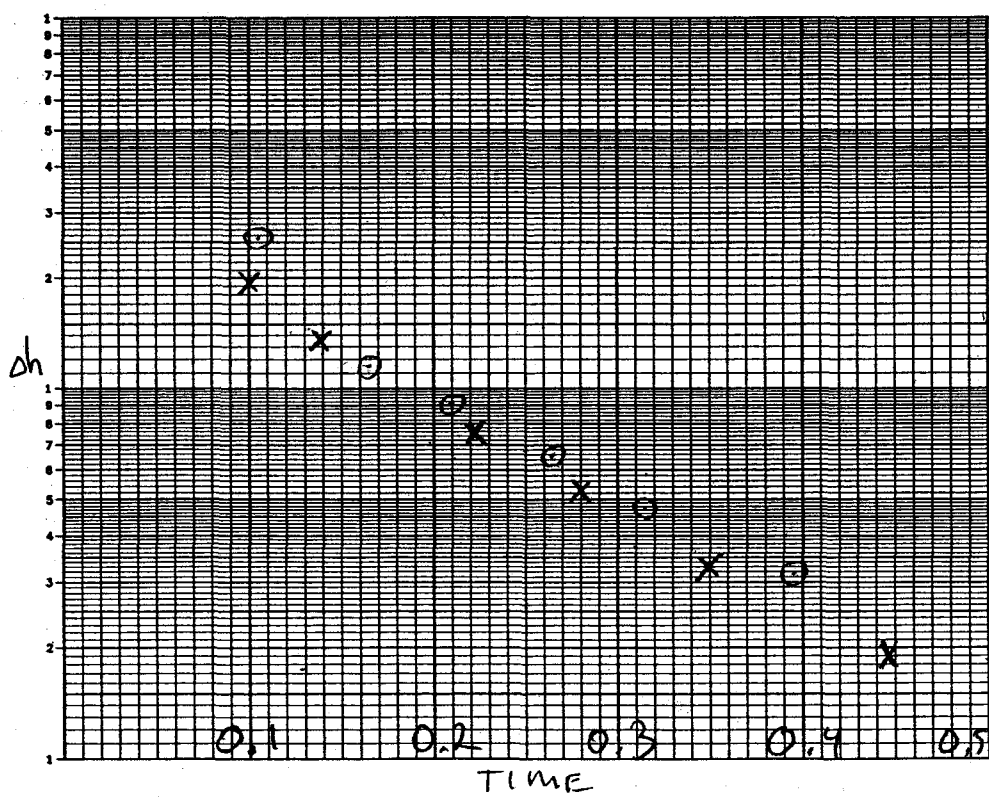
← FALLING HEAD → | ← RISING HEAD →

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.1058		2.571	0.080		3.299
0.1328		1.637	0.085		2.625
0.1407		1.269	0.090		2.203
0.1672		1.155	0.100		1.946
0.1875		1.070	0.1058		1.870
0.2102		0.907	0.1255		1.569
0.2358		0.772	0.1407		1.382
0.2647		0.664	0.1770		1.047
0.3147		0.489	0.2227		0.757
0.3963		0.323	0.2803		0.520
0.5863		0.154	0.3532		0.341
0.8280		0.084	0.4697		0.194

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

FALLING HEAD:
START: 1256
END: 1305
RISING HEAD:
START: 1307
END: 1319
⊙ = FALLING HEAD
X = RISING HEAD

CALCS, SKETCH MAPS, ETC.:

TEST FOR FALLING HEAD NAMED:
** 17mw17ir **

TEST FOR RISING HEAD NAMED:
** 17mw17df **

ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

In-Situ Inc. MiniTroll Pro

Report generated: 3/1/2005 8:34:36
Report from file: ...\SN11262 2005-02-28 125607 17mw17ir.bin
Win-Situ Version 4.51

******this falling head test was renamed 17mw17df when exported to excel******

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw17df

Test defined on: 2/28/2005 12:53:06
Test started on: 2/28/2005 12:56:07
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10.0000 Minutes.
Number of data samples: 75

TOTAL DATA SAMPLES 75

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.649 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/28/2005	12:56:07	0	63.82	0			Plotted data
2/28/2005	12:56:08	0.005	63.86	-0.009			
2/28/2005	12:56:08	0.01	63.88	-0.012			
2/28/2005	12:56:08	0.015	63.88	-0.013			
2/28/2005	12:56:09	0.02	63.88	-0.014			
2/28/2005	12:56:09	0.025	63.88	-0.015			
2/28/2005	12:56:09	0.03	63.91	-0.015			
2/28/2005	12:56:09	0.035	63.91	-0.016			
2/28/2005	12:56:10	0.04	63.91	-0.016			
2/28/2005	12:56:10	0.045	63.91	-0.016			
2/28/2005	12:56:10	0.05	63.91	-0.016			
2/28/2005	12:56:11	0.055	63.91	-0.015			
2/28/2005	12:56:11	0.06	63.91	-0.017			
2/28/2005	12:56:11	0.065	63.91	-0.016			
2/28/2005	12:56:12	0.07	63.91	-0.022			
2/28/2005	12:56:12	0.075	63.91	-0.027			
2/28/2005	12:56:12	0.08	63.91	-0.032			
2/28/2005	12:56:12	0.085	63.91	-0.031			
2/28/2005	12:56:13	0.09	63.91	-0.029			
2/28/2005	12:56:13	0.095	63.91	-0.027			
2/28/2005	12:56:13	0.1	63.91	-2.739			
2/28/2005	12:56:14	0.1058	63.91	-2.571			
2/28/2005	12:56:14	0.112	63.91	-3.152			
2/28/2005	12:56:14	0.1185	63.93	-2.628			
2/28/2005	12:56:15	0.1255	63.93	-2.095			
2/28/2005	12:56:15	0.1328	63.93	-1.637	0	1	ho
2/28/2005	12:56:16	0.1407	63.93	-1.269	0.0079	0.775199	
2/28/2005	12:56:16	0.149	63.93	-1.253	0.0162	0.765425	
2/28/2005	12:56:17	0.1578	63.93	-1.133	0.025	0.69212	
2/28/2005	12:56:17	0.1672	63.88	-1.155	0.0344	0.705559	
2/28/2005	12:56:18	0.177	63.88	-1.135	0.0442	0.693341	

2/28/2005	12:56:19	0.1875	63.88	-1.07	0.0547	0.653635
2/28/2005	12:56:19	0.1985	63.86	-1.038	0.0657	0.634087
2/28/2005	12:56:20	0.2102	63.86	-0.907	0.0774	0.554062
2/28/2005	12:56:21	0.2227	63.86	-0.833	0.0899	0.508858
2/28/2005	12:56:21	0.2358	63.86	-0.772	0.103	0.471594
2/28/2005	12:56:22	0.2498	63.84	-0.711	0.117	0.434331
2/28/2005	12:56:23	0.2647	63.84	-0.664	0.1319	0.40562
2/28/2005	12:56:24	0.2803	63.84	-0.589	0.1475	0.359805
2/28/2005	12:56:25	0.297	63.82	-0.538	0.1642	0.32865
2/28/2005	12:56:26	0.3147	63.82	-0.489	0.1819	0.298717
2/28/2005	12:56:27	0.3333	63.79	-0.443	0.2005	0.270617
2/28/2005	12:56:29	0.3532	63.79	-0.4	0.2204	0.244349
2/28/2005	12:56:30	0.3742	63.77	-0.36	0.2414	0.219914
2/28/2005	12:56:31	0.3963	63.75	-0.323	0.2635	0.197312
2/28/2005	12:56:33	0.4198	63.73	-0.29	0.287	0.177153
2/28/2005	12:56:34	0.4447	63.7	-0.26	0.3119	0.158827
2/28/2005	12:56:36	0.4697	63.68	-0.234	0.3369	0.142944
2/28/2005	12:56:37	0.4963	63.66	-0.209	0.3635	0.127673
2/28/2005	12:56:39	0.5247	63.63	-0.189	0.3919	0.115455
2/28/2005	12:56:41	0.5547	63.61	-0.17	0.4219	0.103849
2/28/2005	12:56:43	0.5863	63.59	-0.154	0.4535	0.094075
2/28/2005	12:56:45	0.6213	63.57	-0.138	0.4885	0.084301
2/28/2005	12:56:47	0.658	63.54	-0.124	0.5252	0.075748
2/28/2005	12:56:49	0.6963	63.52	-0.112	0.5635	0.068418
2/28/2005	12:56:52	0.738	63.48	-0.101	0.6052	0.061698
2/28/2005	12:56:54	0.7813	63.48	-0.091	0.6485	0.055589
2/28/2005	12:56:57	0.828	63.43	-0.084	0.6952	0.051313
2/28/2005	12:57:00	0.8763	63.43	-0.077	0.7435	0.047037
2/28/2005	12:57:03	0.928	63.41	-0.069	0.7952	0.04215
2/28/2005	12:57:06	0.983	63.39	-0.065	0.8502	0.039707
2/28/2005	12:57:10	1.0413	63.36	-0.061	0.9085	0.037263
2/28/2005	12:57:14	1.103	63.34	-0.058	0.9702	0.035431
2/28/2005	12:57:17	1.168	63.34	-0.055	1.0352	0.033598
2/28/2005	12:57:22	1.238	63.32	-0.051	1.1052	0.031155
2/28/2005	12:57:26	1.3113	63.3	-0.049	1.1785	0.029933
2/28/2005	12:57:31	1.3897	63.27	-0.046	1.2569	0.0281
2/28/2005	12:57:36	1.473	63.27	-0.043	1.3402	0.026268
2/28/2005	12:57:41	1.5613	63.25	-0.042	1.4285	0.025657
2/28/2005	12:57:47	1.6547	63.23	-0.04	1.5219	0.024435
2/28/2005	12:57:53	1.753	63.21	-0.039	1.6202	0.023824
2/28/2005	12:57:59	1.858	63.18	-0.038	1.7252	0.023213
2/28/2005	12:58:05	1.968	63.18	-0.036	1.8352	0.021991
2/28/2005	12:58:12	2.0847	63.16	-0.036	1.9519	0.021991
2/28/2005	12:58:20	2.2097	63.14	-0.035	2.0769	0.021381

In-Situ Inc. MiniTroll Pro

Report generated: 3/1/2005 8:46:04
Report from file: ...\SN11262 2005-02-28 130750 17mw17df.bin
Win-Situ Version 4.51
*****this rising head test was renamed 17mw17dr when exported to excel*******
Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw17dr

Test defined on: 2/28/2005 12:49:04
Test started on: 2/28/2005 13:07:50
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10.00 Minutes.
Number of data samples: 87

TOTAL DATA SAMPLES 87

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.674 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/28/2005	13:07:50	0	62.96	0			Plotted data
2/28/2005	13:07:50	0.005	63	-0.008			
2/28/2005	13:07:50	0.01	63.03	-0.012			
2/28/2005	13:07:51	0.015	63.03	-0.014			
2/28/2005	13:07:51	0.02	63.03	-0.014			
2/28/2005	13:07:51	0.025	63.03	-0.014			
2/28/2005	13:07:51	0.03	63.03	-0.014			
2/28/2005	13:07:52	0.035	63.05	-0.014			
2/28/2005	13:07:52	0.04	63.05	-0.015			
2/28/2005	13:07:52	0.045	63.05	-0.014			
2/28/2005	13:07:53	0.05	63.05	-0.015			
2/28/2005	13:07:53	0.055	63.05	-0.014			
2/28/2005	13:07:53	0.06	63.05	-0.015			
2/28/2005	13:07:54	0.065	63.05	-0.011			
2/28/2005	13:07:54	0.07	63.05	3.009			
2/28/2005	13:07:54	0.075	63.05	3.319			
2/28/2005	13:07:54	0.08	63.05	3.299			
2/28/2005	13:07:55	0.085	63.05	2.625			
2/28/2005	13:07:55	0.09	63.05	2.203			
2/28/2005	13:07:55	0.095	63.05	2.014	0	1	ho
2/28/2005	13:07:56	0.1	63.05	1.946	0.005	0.966236	
2/28/2005	13:07:56	0.1058	63.07	1.87	0.0108	0.9285	
2/28/2005	13:07:56	0.112	63.05	1.772	0.017	0.879841	
2/28/2005	13:07:57	0.1185	63.07	1.669	0.0235	0.828699	
2/28/2005	13:07:57	0.1255	63.07	1.569	0.0305	0.779047	
2/28/2005	13:07:58	0.1328	63.07	1.473	0.0378	0.73138	
2/28/2005	13:07:58	0.1407	63.07	1.382	0.0457	0.686197	
2/28/2005	13:07:59	0.149	63.07	1.292	0.054	0.641509	
2/28/2005	13:07:59	0.1578	63.07	1.205	0.0628	0.598312	
2/28/2005	13:08:00	0.1672	63.05	1.126	0.0722	0.559086	
2/28/2005	13:08:00	0.177	63.03	1.047	0.082	0.519861	

2/28/2005	13:08:01	0.1875	63.03	0.968	0.0925	0.480636
2/28/2005	13:08:02	0.1985	63.03	0.896	0.1035	0.444886
2/28/2005	13:08:02	0.2102	63.03	0.825	0.1152	0.409633
2/28/2005	13:08:03	0.2227	63.03	0.757	0.1277	0.375869
2/28/2005	13:08:04	0.2358	63.05	0.693	0.1408	0.344091
2/28/2005	13:08:05	0.2498	63.05	0.632	0.1548	0.313803
2/28/2005	13:08:06	0.2647	63.05	0.574	0.1697	0.285005
2/28/2005	13:08:06	0.2803	63.05	0.52	0.1853	0.256193
2/28/2005	13:08:07	0.297	63.05	0.469	0.202	0.23287
2/28/2005	13:08:09	0.3147	63.07	0.423	0.2197	0.21003
2/28/2005	13:08:10	0.3333	63.07	0.381	0.2383	0.189176
2/28/2005	13:08:11	0.3532	63.09	0.341	0.2582	0.169315
2/28/2005	13:08:12	0.3742	63.09	0.305	0.2792	0.15144
2/28/2005	13:08:13	0.3963	63.12	0.273	0.3013	0.135551
2/28/2005	13:08:15	0.4198	63.12	0.243	0.3248	0.120655
2/28/2005	13:08:16	0.4447	63.14	0.216	0.3497	0.107249
2/28/2005	13:08:18	0.4697	63.16	0.194	0.3747	0.096326
2/28/2005	13:08:19	0.4963	63.16	0.174	0.4013	0.086395
2/28/2005	13:08:21	0.5247	63.18	0.155	0.4297	0.076961
2/28/2005	13:08:23	0.5547	63.21	0.14	0.4597	0.069513
2/28/2005	13:08:25	0.5863	63.23	0.125	0.4913	0.062066
2/28/2005	13:08:27	0.6213	63.23	0.112	0.5263	0.055611
2/28/2005	13:08:29	0.658	63.25	0.1	0.563	0.049652
2/28/2005	13:08:31	0.6963	63.27	0.092	0.6013	0.04568
2/28/2005	13:08:34	0.738	63.3	0.085	0.643	0.042205
2/28/2005	13:08:37	0.7813	63.32	0.076	0.6863	0.037736
2/28/2005	13:08:39	0.828	63.34	0.07	0.733	0.034757
2/28/2005	13:08:42	0.8763	63.36	0.064	0.7813	0.031778
2/28/2005	13:08:45	0.928	63.39	0.059	0.833	0.029295
2/28/2005	13:08:49	0.983	63.41	0.055	0.888	0.027309
2/28/2005	13:08:52	1.0413	63.43	0.053	0.9463	0.026316
2/28/2005	13:08:56	1.103	63.45	0.049	1.008	0.02433
2/28/2005	13:09:00	1.168	63.48	0.046	1.073	0.02284
2/28/2005	13:09:04	1.238	63.5	0.044	1.143	0.021847
2/28/2005	13:09:08	1.3113	63.52	0.04	1.2163	0.019861
2/28/2005	13:09:13	1.3897	63.54	0.036	1.2947	0.017875
2/28/2005	13:09:18	1.473	63.57	0.036	1.378	0.017875
2/28/2005	13:09:23	1.5613	63.59	0.034	1.4663	0.016882
2/28/2005	13:09:29	1.6547	63.61	0.033	1.5597	0.016385
2/28/2005	13:09:35	1.753	63.63	0.03	1.658	0.014896
2/28/2005	13:09:41	1.858	63.66	0.03	1.763	0.014896
2/28/2005	13:09:48	1.968	63.7	0.028	1.873	0.013903
2/28/2005	13:09:55	2.0847	63.7	0.028	1.9897	0.013903
2/28/2005	13:10:02	2.2097	63.75	0.029	2.1147	0.014399
2/28/2005	13:10:10	2.3413	63.77	0.027	2.2463	0.013406
2/28/2005	13:10:19	2.4813	63.79	0.026	2.3863	0.01291
2/28/2005	13:10:27	2.6297	63.82	0.025	2.5347	0.012418
2/28/2005	13:10:37	2.7863	63.84	0.024	2.6913	0.011917
2/28/2005	13:10:47	2.953	63.88	0.023	2.858	0.01142
2/28/2005	13:10:57	3.1297	63.91	0.022	3.0347	0.010924
2/28/2005	13:11:09	3.3163	63.93	0.023	3.2213	0.01142
2/28/2005	13:11:21	3.5147	63.93	0.021	3.4197	0.010427
2/28/2005	13:11:33	3.7247	63.95	0.022	3.6297	0.010924
2/28/2005	13:11:46	3.9463	63.97	0.021	3.8513	0.010427
2/28/2005	13:12:01	4.1813	64	0.021	4.0863	0.010427
2/28/2005	13:12:15	4.4297	64	0.02	4.3347	0.00993

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW18S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By: JLR
Checked By: SJC 5/18/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	3.37 = To

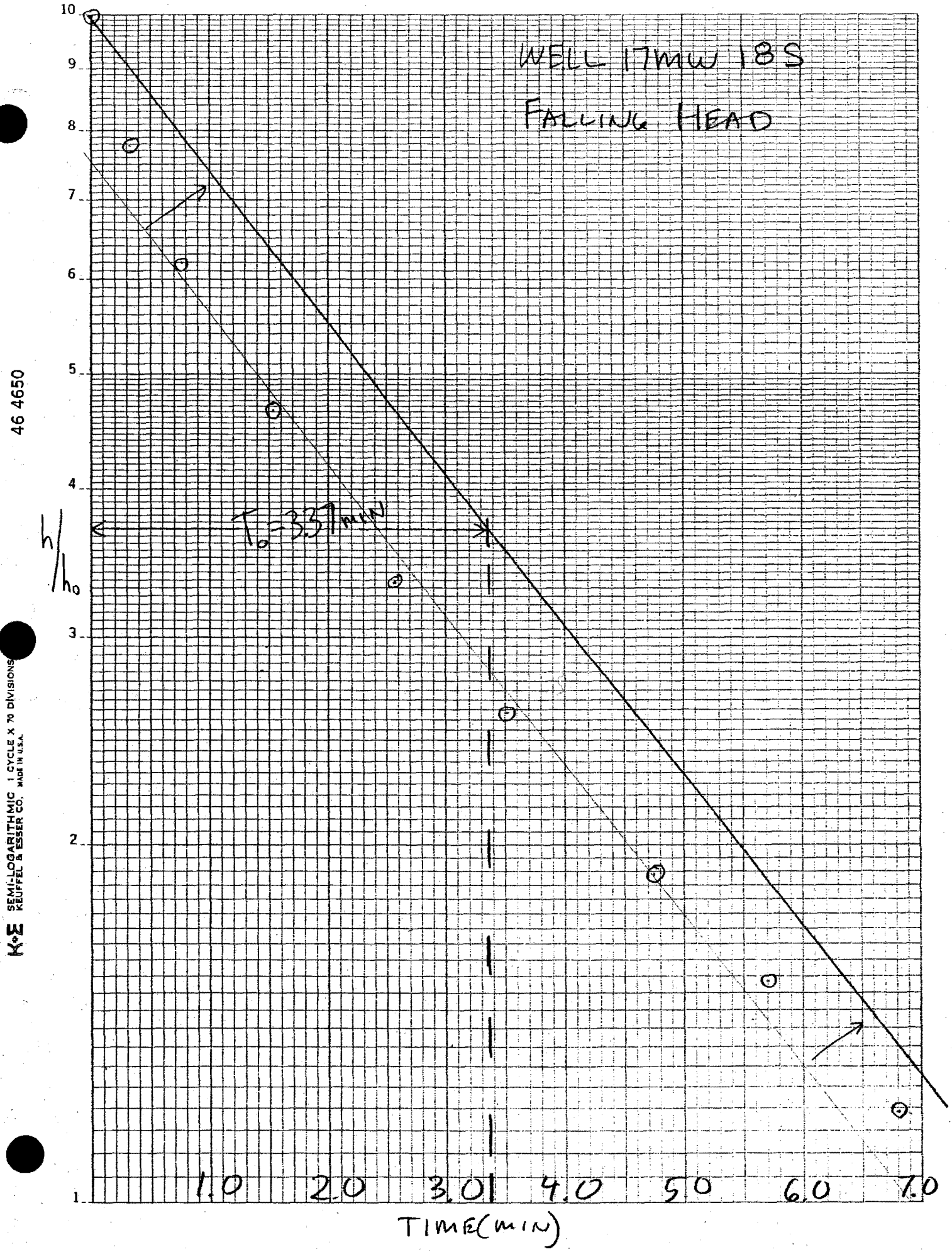
Hydraulic Conductivity (K) :

4.93E-04	ft./min.
8.22E-06	ft./sec.
7.10E-01	ft./day = .7 ft/day
2.51E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW 18S
FALLING HEAD
T_o=337min
h/h0
10
9
8
7
6
5
4
3
2
1
1.0
2.0
3.0
4.0
5.0
6.0
7.0
TIME(MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW18S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By: FWR
Checked By: SJC 5/19/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	2.11 = To

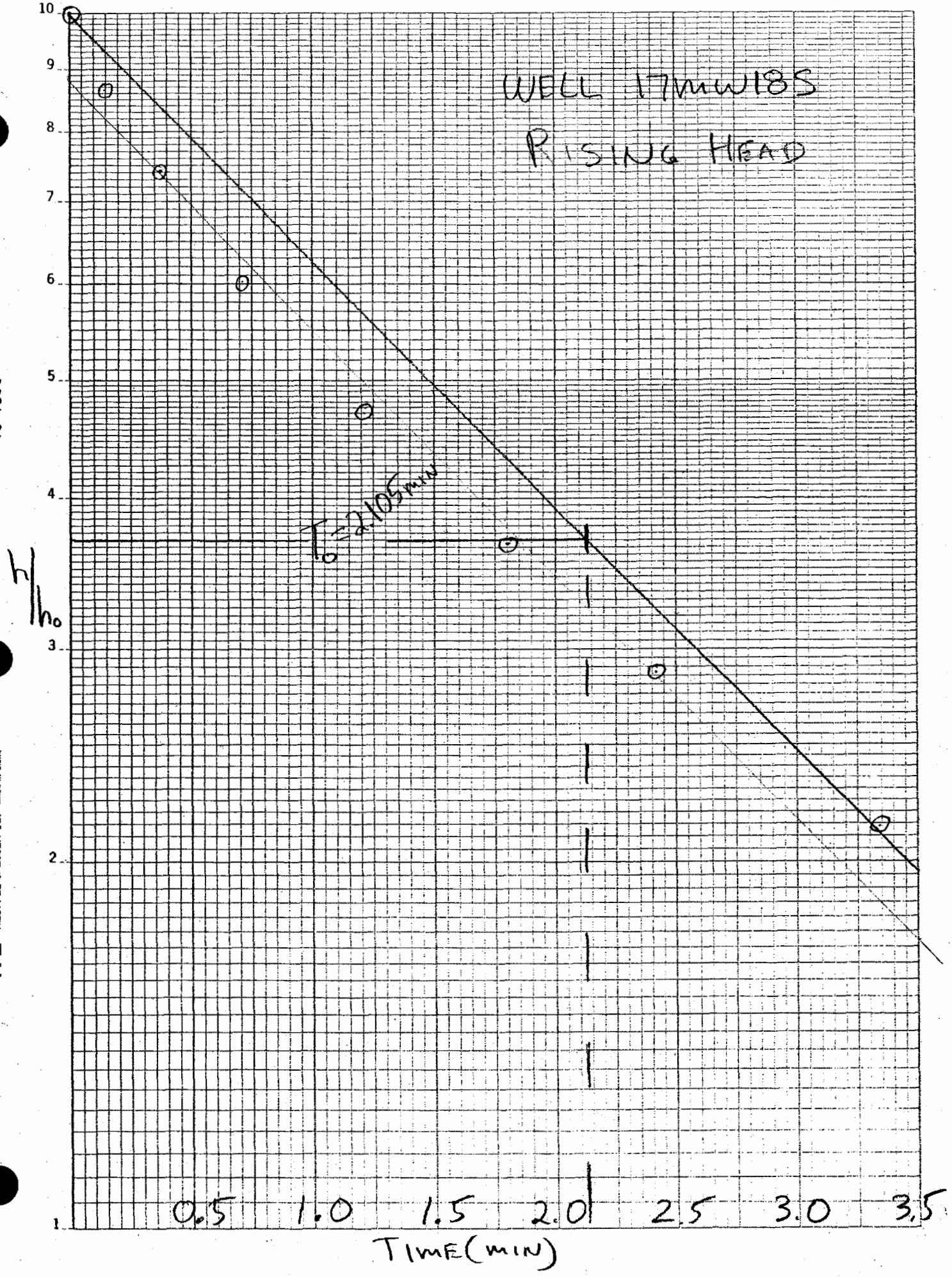
Hydraulic Conductivity (K) :

7.90E-04	ft./min.
1.32E-05	ft./sec.
1.14E+00	ft./day ≈ 1.1 ft/day
4.01E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******



K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISION KEUFFEL & ESSER CO. MADE IN U.S.A. 46 4650

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: CHARLESTON NWS SUMM 16/17 WELL/BORING NO.: 17MW18S

PROJECT NO.: 0528 GEOLOGIST: FRED WRAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10', 4-14 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 1.94 DATE: 2-25-05

TEST TYPE (Rising/Falling/Constant Head): FALLING CHECKED: SJC 5/18/05

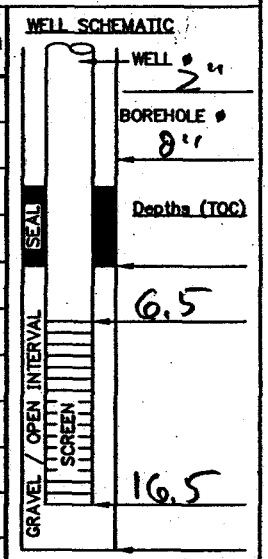
METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG 4.9' x 0.13' PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

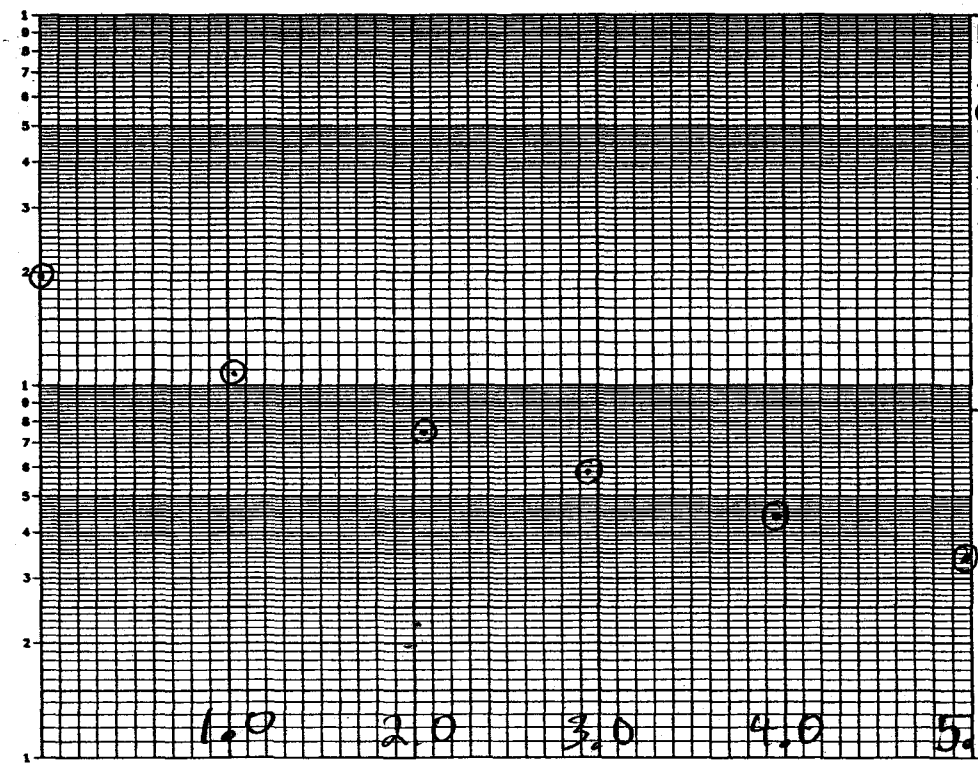
ACAD:FORM...HYDCONTST.dwg 07/06/99 INL

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.1770		1.970	10.54		0.117
0.2498		1.708	13.279		0.073
0.5247		1.398	15.79		0.054
0.7813		1.222			
1.0413		1.091			
1.5613		0.898			
2.2097		0.725			
3.1297		0.552			
4.18		0.414			
5.26		0.321			
7.45		0.197			
9.39		0.134			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

X-D SET @ 10.785' BELOW WATER SURFACE

START TEST @ 1320HRS

STOP TEST @ 1337HRS

TEST NAME = 17MW14S C 1 1 1

CALCS, SKETCH MAPS, ETC.:

In-Situ Inc. MiniTroll Pro

Report generated: 2/25/2005 20:52:21
Report from file: ...\SN11262 2005-02-25 132016 17mw14sf.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw18sf

Test defined on: 2/25/2005 13:12:37
Test started on: 2/25/2005 13:20:16
Test stopped on: 2/25/2005 13:37:15

Data gathered using Logarithmic testing
Maximum time between data points: 10. Minutes.
Number of data samples: 110

TOTAL DATA SAMPLES 110

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 10.782 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/25/2005	13:20:16	0	61.85	0			Plotted data
2/25/2005	13:20:16	0.005	61.9	-0.007			
2/25/2005	13:20:16	0.01	61.9	-0.011			
2/25/2005	13:20:16	0.015	61.9	-0.012			
2/25/2005	13:20:17	0.02	61.92	-0.013			
2/25/2005	13:20:17	0.025	61.92	-0.014			
2/25/2005	13:20:17	0.03	61.92	-0.013			
2/25/2005	13:20:18	0.035	61.92	-0.015			
2/25/2005	13:20:18	0.04	61.92	-0.014			
2/25/2005	13:20:18	0.045	61.92	-0.015			
2/25/2005	13:20:19	0.05	61.92	-0.015			
2/25/2005	13:20:19	0.055	61.92	-0.017			
2/25/2005	13:20:19	0.06	61.92	-0.014			
2/25/2005	13:20:19	0.065	61.92	-0.015			
2/25/2005	13:20:20	0.07	61.95	-0.015			
2/25/2005	13:20:20	0.075	61.95	-0.015			
2/25/2005	13:20:20	0.08	61.95	-0.016			
2/25/2005	13:20:21	0.085	61.95	-0.017			
2/25/2005	13:20:21	0.09	61.95	-0.019			
2/25/2005	13:20:21	0.095	61.95	-0.019			
2/25/2005	13:20:22	0.1	61.95	-0.012			
2/25/2005	13:20:22	0.1058	61.95	-0.016			
2/25/2005	13:20:22	0.112	61.95	-0.067			
2/25/2005	13:20:23	0.1185	61.95	-2.903			
2/25/2005	13:20:23	0.1255	61.95	-4.805			
2/25/2005	13:20:24	0.1328	61.95	-2.519			
2/25/2005	13:20:24	0.1407	61.95	-1.641			
2/25/2005	13:20:24	0.149	61.95	-1.861			
2/25/2005	13:20:25	0.1578	61.95	-1.514			
2/25/2005	13:20:26	0.1672	61.9	-1.93			
2/25/2005	13:20:26	0.177	61.9	-1.97			
2/25/2005	13:20:27	0.1875	61.9	-1.749			
2/25/2005	13:20:27	0.1985	61.9	-1.774			
2/25/2005	13:20:28	0.2102	61.9	-1.804	0	1	ho
2/25/2005	13:20:29	0.2227	61.88	-1.736	0.0125	0.962306	
2/25/2005	13:20:30	0.2358	61.88	-1.728	0.0256	0.957871	

2/25/2005	13:20:31	0.2498	61.88	-1.708	0.0396	0.946785
2/25/2005	13:20:31	0.2647	61.88	-1.681	0.0545	0.931818
2/25/2005	13:20:32	0.2803	61.88	-1.661	0.0701	0.920732
2/25/2005	13:20:33	0.297	61.85	-1.636	0.0868	0.906874
2/25/2005	13:20:34	0.3147	61.85	-1.614	0.1045	0.894678
2/25/2005	13:20:36	0.3333	61.85	-1.59	0.1231	0.881375
2/25/2005	13:20:37	0.3532	61.83	-1.566	0.143	0.868071
2/25/2005	13:20:38	0.3742	61.83	-1.543	0.164	0.855322
2/25/2005	13:20:39	0.3963	61.83	-1.518	0.1861	0.841463
2/25/2005	13:20:41	0.4198	61.83	-1.493	0.2096	0.827605
2/25/2005	13:20:42	0.4447	61.81	-1.469	0.2345	0.814302
2/25/2005	13:20:44	0.4697	61.79	-1.446	0.2595	0.801552
2/25/2005	13:20:45	0.4963	61.79	-1.423	0.2861	0.788803
2/25/2005	13:20:47	0.5247	61.79	-1.396	0.3145	0.774945
2/25/2005	13:20:49	0.5547	61.76	-1.373	0.3445	0.761086
2/25/2005	13:20:51	0.5863	61.76	-1.349	0.3761	0.747783
2/25/2005	13:20:53	0.6213	61.74	-1.323	0.4111	0.73337
2/25/2005	13:20:55	0.658	61.74	-1.297	0.4478	0.718958
2/25/2005	13:20:57	0.6963	61.72	-1.273	0.4861	0.705654
2/25/2005	13:21:00	0.738	61.72	-1.248	0.5278	0.691796
2/25/2005	13:21:02	0.7813	61.7	-1.222	0.5711	0.677384
2/25/2005	13:21:05	0.828	61.7	-1.196	0.6178	0.662971
2/25/2005	13:21:08	0.8763	61.67	-1.171	0.6661	0.649113
2/25/2005	13:21:11	0.928	61.67	-1.143	0.7178	0.633592
2/25/2005	13:21:15	0.983	61.65	-1.118	0.7728	0.619734
2/25/2005	13:21:18	1.0413	61.65	-1.091	0.8311	0.604767
2/25/2005	13:21:22	1.103	61.65	-1.066	0.8928	0.590909
2/25/2005	13:21:26	1.168	61.65	-1.039	0.9578	0.575942
2/25/2005	13:21:30	1.238	61.65	-1.011	1.0278	0.560421
2/25/2005	13:21:34	1.3113	61.63	-0.983	1.1011	0.5449
2/25/2005	13:21:39	1.3897	61.63	-0.956	1.1795	0.529933
2/25/2005	13:21:44	1.473	61.63	-0.927	1.2628	0.513858
2/25/2005	13:21:49	1.5613	61.63	-0.898	1.3511	0.497783
2/25/2005	13:21:55	1.6547	61.61	-0.87	1.4445	0.482262
2/25/2005	13:22:01	1.753	61.61	-0.841	1.5428	0.466186
2/25/2005	13:22:07	1.858	61.61	-0.811	1.6478	0.449557
2/25/2005	13:22:14	1.968	61.61	-0.782	1.7578	0.433481
2/25/2005	13:22:21	2.0847	61.61	-0.754	1.8745	0.41796
2/25/2005	13:22:28	2.2097	61.61	-0.725	1.9995	0.401885
2/25/2005	13:22:36	2.3413	61.61	-0.696	2.1311	0.385809
2/25/2005	13:22:44	2.4813	61.61	-0.669	2.2711	0.370843
2/25/2005	13:22:53	2.6297	61.61	-0.638	2.4195	0.353659
2/25/2005	13:23:03	2.7863	61.61	-0.609	2.5761	0.337583
2/25/2005	13:23:13	2.953	61.58	-0.581	2.7428	0.322062
2/25/2005	13:23:23	3.1297	61.56	-0.552	2.9195	0.305987
2/25/2005	13:23:35	3.3163	61.54	-0.524	3.1061	0.290466
2/25/2005	13:23:46	3.5147	61.52	-0.497	3.3045	0.275499
2/25/2005	13:23:59	3.7247	61.47	-0.469	3.5145	0.259978
2/25/2005	13:24:12	3.9463	61.45	-0.44	3.7361	0.243902
2/25/2005	13:24:26	4.1813	61.43	-0.414	3.9711	0.22949
2/25/2005	13:24:41	4.4297	61.43	-0.388	4.2195	0.215078
2/25/2005	13:24:57	4.693	61.43	-0.364	4.4828	0.201774
2/25/2005	13:25:14	4.973	61.4	-0.341	4.7628	0.189024
2/25/2005	13:25:32	5.2697	61.38	-0.321	5.0595	0.177938
2/25/2005	13:25:51	5.583	61.4	-0.301	5.3728	0.166851
2/25/2005	13:26:10	5.9147	61.4	-0.278	5.7045	0.154102
2/25/2005	13:26:32	6.2663	61.4	-0.256	6.0561	0.141907
2/25/2005	13:26:54	6.6397	61.4	-0.234	6.4295	0.129712
2/25/2005	13:27:18	7.0347	61.43	-0.216	6.8245	0.119734
2/25/2005	13:27:43	7.453	61.45	-0.197	7.2428	0.109202
2/25/2005	13:28:09	7.8963	61.43	-0.18	7.6861	0.099778
2/25/2005	13:28:38	8.3663	61.4	-0.164	8.1561	0.090909
2/25/2005	13:29:07	8.8647	61.36	-0.148	8.6545	0.08204
2/25/2005	13:29:39	9.3913	61.29	-0.134	9.1811	0.074279
2/25/2005	13:30:13	9.9497	61.27	-0.122	9.7395	0.067627
2/25/2005	13:30:48	10.5413	61.27	-0.117	10.3311	0.064856
2/25/2005	13:31:26	11.168	61.25	-0.105	10.9578	0.058204
2/25/2005	13:32:05	11.8313	61.25	-0.092	11.6211	0.050998
2/25/2005	13:32:48	12.5347	61.25	-0.082	12.3245	0.045455
2/25/2005	13:33:32	13.2797	61.25	-0.073	13.0695	0.040466
2/25/2005	13:34:20	14.0697	61.2	-0.069	13.8595	0.038248
2/25/2005	13:35:10	14.9063	61.27	-0.059	14.6961	0.032705
2/25/2005	13:36:03	15.7913	61.29	-0.054	15.5811	0.029933
2/25/2005	13:36:59	16.7297	61.34	-0.048	16.5195	0.026608

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: CHARLESTON NWS WELL/BORING NO.: 17MW18S

PROJECT NO.: 0528 GEOLOGIST: FRED URAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10', 4-14 TEST NO.: 2

STATIC WATER LEVEL (Depth/Elevation): 1.94 DATE: 2-25-05

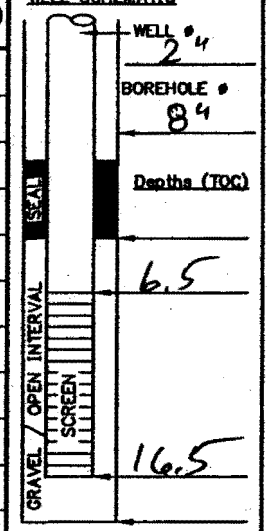
TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED: SJC 5/18/05

METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG 4.9' x 0.13' PAGE 1 OF 1

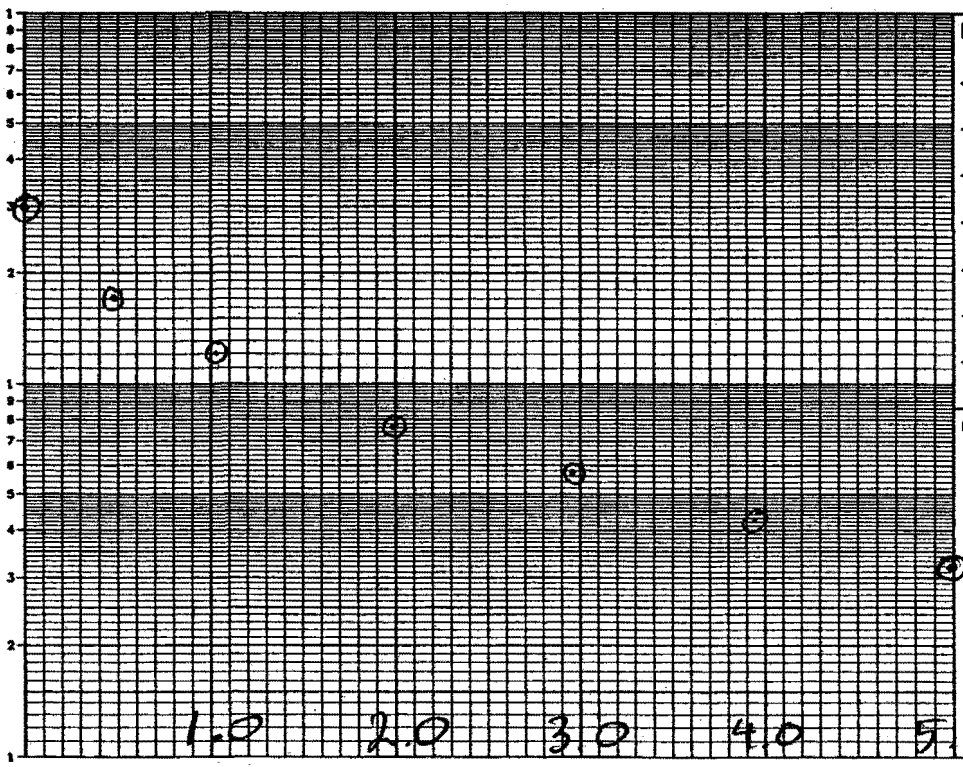
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.1180	3.309				
0.2227	2.080				
0.5547	1.639				
1.103	1.204				
2.2097	0.742				
3.1297	0.539				
4.1813	0.398				
5.58	0.276				
6.266	0.24				
7.45	0.195				
8.86	0.155				

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

XD SKIP @ 10.829 MT

START TIME 1341

STOP @ 1355

TEST NAME IS

17mw14sr !!!

CALCS, SKETCH MAPS, ETC.:

ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

In-Situ Inc. MiniTroll Pro

Report generated: 2/25/2005 20:58:24
Report from file: ...\SN11262 2005-02-25 134112 17mw14sr.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw14sr

Test defined on: 2/25/2005 13:14:44
Test started on: 2/25/2005 13:41:12
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: Minutes.
Number of data samples: 99

TOTAL DATA SAMPLES 99

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 10.819 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/25/2005	13:41:12	0	61.43	0			Plotted data
2/25/2005	13:41:13	0.005	61.47	-0.008			
2/25/2005	13:41:13	0.01	61.49	-0.01			
2/25/2005	13:41:13	0.015	61.49	-0.012			
2/25/2005	13:41:14	0.02	61.49	-0.013			
2/25/2005	13:41:14	0.025	61.49	-0.013			
2/25/2005	13:41:14	0.03	61.52	-0.014			
2/25/2005	13:41:15	0.035	61.52	-0.012			
2/25/2005	13:41:15	0.04	61.52	-0.014			
2/25/2005	13:41:15	0.045	61.52	-0.015			
2/25/2005	13:41:15	0.05	61.52	-0.015			
2/25/2005	13:41:16	0.055	61.52	-0.015			
2/25/2005	13:41:16	0.06	61.52	-0.015			
2/25/2005	13:41:16	0.065	61.52	-0.015			
2/25/2005	13:41:17	0.07	61.52	-0.015			
2/25/2005	13:41:17	0.075	61.52	-0.016			
2/25/2005	13:41:17	0.08	61.52	-0.016			
2/25/2005	13:41:18	0.085	61.52	-0.015			
2/25/2005	13:41:18	0.09	61.52	-0.015			
2/25/2005	13:41:18	0.095	61.52	-0.015			
2/25/2005	13:41:18	0.1	61.54	0.917			
2/25/2005	13:41:19	0.1058	61.54	4.858			
2/25/2005	13:41:19	0.112	61.52	1.233			
2/25/2005	13:41:20	0.1185	61.52	3.309			
2/25/2005	13:41:20	0.1255	61.52	1.714			
2/25/2005	13:41:20	0.1328	61.52	2.556			
2/25/2005	13:41:21	0.1407	61.54	2.331			
2/25/2005	13:41:21	0.149	61.54	2.084			

2/25/2005	13:41:22	0.1578	61.52	2.191			
2/25/2005	13:41:22	0.1672	61.49	2.229	0	1	ho
2/25/2005	13:41:23	0.177	61.49	2.194	0.0098	0.984298	
2/25/2005	13:41:24	0.1875	61.49	2.156	0.0203	0.96725	
2/25/2005	13:41:24	0.1985	61.49	2.128	0.0313	0.954688	
2/25/2005	13:41:25	0.2102	61.49	2.103	0.043	0.943472	
2/25/2005	13:41:26	0.2227	61.49	2.08	0.0555	0.933154	
2/25/2005	13:41:27	0.2358	61.49	2.055	0.0686	0.921938	
2/25/2005	13:41:27	0.2498	61.49	2.032	0.0826	0.91162	
2/25/2005	13:41:28	0.2647	61.49	2.007	0.0975	0.900404	
2/25/2005	13:41:29	0.2803	61.49	1.983	0.1131	0.889637	
2/25/2005	13:41:30	0.297	61.49	1.956	0.1298	0.877524	
2/25/2005	13:41:31	0.3147	61.49	1.931	0.1475	0.866308	
2/25/2005	13:41:32	0.3333	61.49	1.905	0.1661	0.854643	
2/25/2005	13:41:34	0.3532	61.49	1.877	0.186	0.842082	
2/25/2005	13:41:35	0.3742	61.49	1.85	0.207	0.829969	
2/25/2005	13:41:36	0.3963	61.49	1.821	0.2291	0.816958	
2/25/2005	13:41:38	0.4198	61.49	1.792	0.2526	0.803948	
2/25/2005	13:41:39	0.4447	61.49	1.762	0.2775	0.790489	
2/25/2005	13:41:41	0.4697	61.49	1.732	0.3025	0.77703	
2/25/2005	13:41:42	0.4963	61.49	1.703	0.3291	0.76402	
2/25/2005	13:41:44	0.5247	61.49	1.671	0.3575	0.749664	
2/25/2005	13:41:46	0.5547	61.49	1.639	0.3875	0.735307	
2/25/2005	13:41:48	0.5863	61.49	1.608	0.4191	0.7214	
2/25/2005	13:41:50	0.6213	61.49	1.573	0.4541	0.705698	
2/25/2005	13:41:52	0.658	61.47	1.537	0.4908	0.689547	
2/25/2005	13:41:54	0.6963	61.47	1.502	0.5291	0.673845	
2/25/2005	13:41:57	0.738	61.47	1.466	0.5708	0.657694	
2/25/2005	13:41:59	0.7813	61.47	1.43	0.6141	0.641543	
2/25/2005	13:42:02	0.828	61.47	1.393	0.6608	0.624944	
2/25/2005	13:42:05	0.8763	61.47	1.356	0.7091	0.608345	
2/25/2005	13:42:08	0.928	61.47	1.318	0.7608	0.591297	
2/25/2005	13:42:11	0.983	61.45	1.28	0.8158	0.574249	
2/25/2005	13:42:15	1.0413	61.45	1.242	0.8741	0.557201	
2/25/2005	13:42:19	1.103	61.45	1.204	0.9358	0.540153	
2/25/2005	13:42:23	1.168	61.45	1.165	1.0008	0.522656	
2/25/2005	13:42:27	1.238	61.45	1.125	1.0708	0.504711	
2/25/2005	13:42:31	1.3113	61.45	1.086	1.1441	0.487214	
2/25/2005	13:42:36	1.3897	61.45	1.049	1.2225	0.470615	
2/25/2005	13:42:41	1.473	61.45	1.009	1.3058	0.452669	
2/25/2005	13:42:46	1.5613	61.45	0.969	1.3941	0.434724	
2/25/2005	13:42:52	1.6547	61.47	0.931	1.4875	0.417676	
2/25/2005	13:42:58	1.753	61.47	0.891	1.5858	0.399731	
2/25/2005	13:43:04	1.858	61.47	0.852	1.6908	0.382234	
2/25/2005	13:43:11	1.968	61.47	0.816	1.8008	0.366083	
2/25/2005	13:43:18	2.0847	61.49	0.779	1.9175	0.349484	
2/25/2005	13:43:25	2.2097	61.49	0.742	2.0425	0.332885	
2/25/2005	13:43:33	2.3413	61.49	0.706	2.1741	0.316734	
2/25/2005	13:43:41	2.4813	61.49	0.671	2.3141	0.301032	
2/25/2005	13:43:50	2.6297	61.49	0.638	2.4625	0.286227	
2/25/2005	13:44:00	2.7863	61.52	0.604	2.6191	0.270974	
2/25/2005	13:44:10	2.953	61.52	0.573	2.7858	0.257066	
2/25/2005	13:44:20	3.1297	61.52	0.539	2.9625	0.241812	
2/25/2005	13:44:31	3.3163	61.52	0.509	3.1491	0.228354	
2/25/2005	13:44:43	3.5147	61.52	0.479	3.3475	0.214895	
2/25/2005	13:44:56	3.7247	61.54	0.451	3.5575	0.202333	
2/25/2005	13:45:09	3.9463	61.54	0.424	3.7791	0.19022	
2/25/2005	13:45:23	4.1813	61.56	0.398	4.0141	0.178555	
2/25/2005	13:45:38	4.4297	61.58	0.372	4.2625	0.166891	
2/25/2005	13:45:54	4.693	61.61	0.346	4.5258	0.155227	
2/25/2005	13:46:11	4.973	61.63	0.32	4.8058	0.143562	
2/25/2005	13:46:29	5.2697	61.61	0.296	5.1025	0.132795	
2/25/2005	13:46:47	5.583	61.58	0.276	5.4158	0.123822	
2/25/2005	13:47:07	5.9147	61.54	0.257	5.7475	0.115298	
2/25/2005	13:47:28	6.2663	61.52	0.24	6.0991	0.107672	
2/25/2005	13:47:51	6.6397	61.47	0.224	6.4725	0.100493	
2/25/2005	13:48:15	7.0347	61.45	0.209	6.8675	0.093764	
2/25/2005	13:48:40	7.453	61.43	0.195	7.2858	0.087483	
2/25/2005	13:49:06	7.8963	61.45	0.181	7.7291	0.081202	
2/25/2005	13:49:34	8.3663	61.49	0.167	8.1991	0.074921	
2/25/2005	13:50:04	8.8647	61.47	0.155	8.6975	0.069538	

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW18D
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By: JLL
Checked By: SJC 5/18/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	7 = L
Time for 37% head change (min.) :	0.85 = To

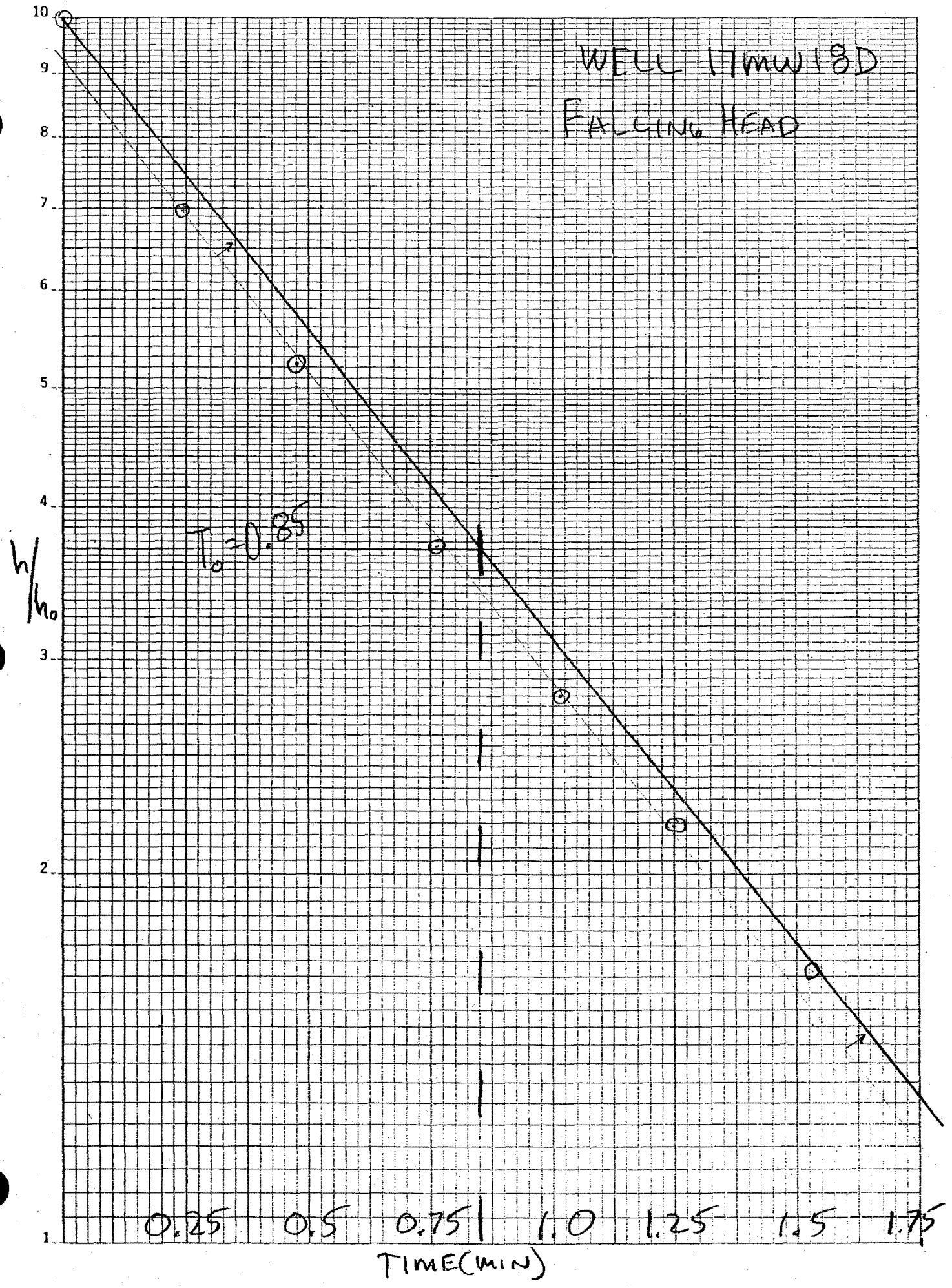
Hydraulic Conductivity (K) :

2.59E-03	ft./min.
4.31E-05	ft./sec.
3.72E+00	ft./day
1.31E-03	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******



46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW18D
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By: FWR
Checked By: SJC 5/18/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	7 = L
Time for 37% head change (min.) :	0.95 = To

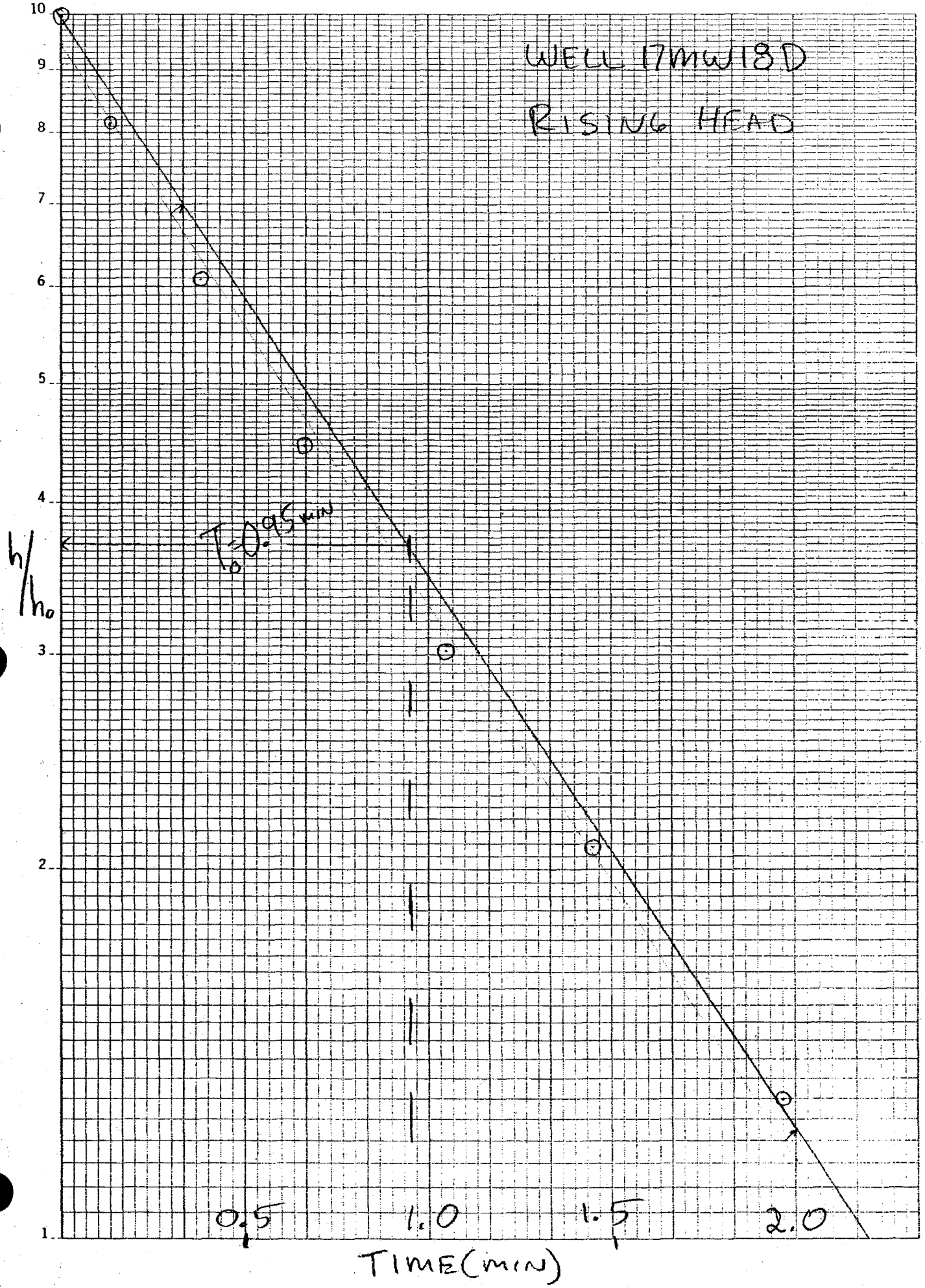
Hydraulic Conductivity (K) :

2.31E-03	ft./min.
3.86E-05	ft./sec.
3.33E+00	ft./day
1.18E-03	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******



K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS KEUFFEL & ESSER CO. MADE IN U.S.A. 46 4650

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: CHARLESTON NWS WELL/BORING NO.: 17MW18D

PROJECT NO.: 0528 GEOLOGIST: PRADUR RAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 17, 15-22 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 2.38 DATE: 2-25-05

TEST TYPE (Rising/Falling/Constant Head): FALLING HEAD CHECKED: SJC 5/18/05

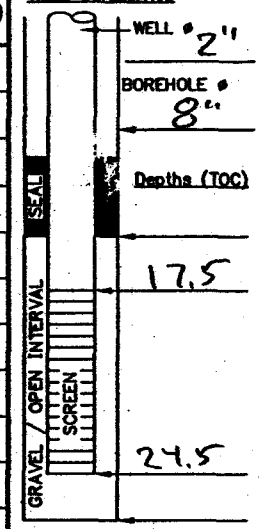
METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

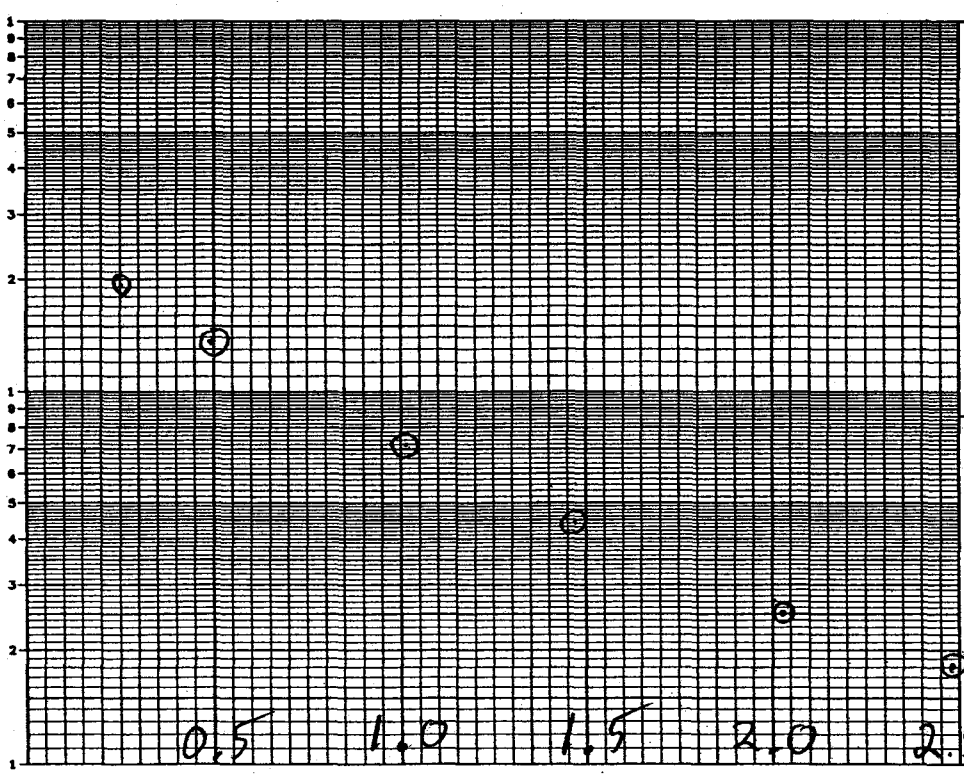
ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.1985		2.209			
0.4198		1.516			
0.738		1.006			
0.983		0.753			
1.238		0.568			
1.5613		0.408			
2.0847		0.251			
2.6297		0.160			
3.1297		0.112			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

TEST NAME IS 17MW14DF!! (WELL 17MW18D)
STARTED 1422
STOPPED @ 1432

CALCS, SKETCH MAPS, ETC.:

In-Situ Inc. MiniTroll Pro

Report generated: 2/25/2005 21:00:51
Report from file: ...\SN11262 2005-02-25 142214 17mw14df.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw18df

Test defined on: 2/25/2005 13:57:11
Test started on: 2/25/2005 14:22:14
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 1Minutes.
Number of data samples: 101

TOTAL DATA SAMPLES 101

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 9.122 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/25/2005	14:22:14	0	60.84	0			Plotted data
2/25/2005	14:22:14	0.005	60.89	-0.008			
2/25/2005	14:22:14	0.01	60.91	-0.009			
2/25/2005	14:22:15	0.015	60.91	-0.012			
2/25/2005	14:22:15	0.02	60.91	-0.012			
2/25/2005	14:22:15	0.025	60.91	-0.012			
2/25/2005	14:22:16	0.03	60.91	-0.013			
2/25/2005	14:22:16	0.035	60.93	-0.012			
2/25/2005	14:22:16	0.04	60.93	-0.014			
2/25/2005	14:22:17	0.045	60.93	-0.014			
2/25/2005	14:22:17	0.05	60.93	-0.014			
2/25/2005	14:22:17	0.055	60.93	-0.014			
2/25/2005	14:22:17	0.06	60.93	-0.014			
2/25/2005	14:22:18	0.065	60.93	-0.014			
2/25/2005	14:22:18	0.07	60.93	-0.015			
2/25/2005	14:22:18	0.075	60.93	-0.014			
2/25/2005	14:22:19	0.08	60.93	-0.015			
2/25/2005	14:22:19	0.085	60.93	-0.014			
2/25/2005	14:22:19	0.09	60.93	-0.017			
2/25/2005	14:22:20	0.095	60.93	-0.017			
2/25/2005	14:22:20	0.1	60.93	-0.021			
2/25/2005	14:22:20	0.1058	60.95	-0.016			
2/25/2005	14:22:21	0.112	60.95	-0.149			
2/25/2005	14:22:21	0.1185	60.95	-1.619			
2/25/2005	14:22:21	0.1255	60.95	-2.581			
2/25/2005	14:22:22	0.1328	60.95	-2.781			
2/25/2005	14:22:22	0.1407	60.95	-2.656			
2/25/2005	14:22:23	0.149	60.95	-3.017			
2/25/2005	14:22:23	0.1578	60.95	-3.096			
2/25/2005	14:22:24	0.1672	60.93	-2.613			
2/25/2005	14:22:25	0.177	60.93	-1.811			

2/25/2005	14:22:25	0.1875	60.93	-2.041			
2/25/2005	14:22:26	0.1985	60.91	-2.209			
2/25/2005	14:22:27	0.2102	60.91	-2.001			
2/25/2005	14:22:27	0.2227	60.91	-2.028		0	1 ho
2/25/2005	14:22:28	0.2358	60.91	-1.969		0.0131	0.970907
2/25/2005	14:22:29	0.2498	60.91	-1.933		0.0271	0.953156
2/25/2005	14:22:30	0.2647	60.91	-1.889		0.042	0.93146
2/25/2005	14:22:31	0.2803	60.91	-1.848		0.0576	0.911243
2/25/2005	14:22:32	0.297	60.91	-1.802		0.0743	0.88856
2/25/2005	14:22:33	0.3147	60.91	-1.757		0.092	0.866371
2/25/2005	14:22:34	0.3333	60.89	-1.711		0.1106	0.843688
2/25/2005	14:22:35	0.3532	60.89	-1.664		0.1305	0.820513
2/25/2005	14:22:36	0.3742	60.89	-1.615		0.1515	0.796351
2/25/2005	14:22:38	0.3963	60.89	-1.566		0.1736	0.772189
2/25/2005	14:22:39	0.4198	60.89	-1.516		0.1971	0.747535
2/25/2005	14:22:41	0.4447	60.86	-1.467		0.222	0.723373
2/25/2005	14:22:42	0.4697	60.86	-1.419		0.247	0.699704
2/25/2005	14:22:44	0.4963	60.84	-1.37		0.2736	0.675542
2/25/2005	14:22:45	0.5247	60.84	-1.318		0.302	0.649901
2/25/2005	14:22:47	0.5547	60.84	-1.268		0.332	0.625247
2/25/2005	14:22:49	0.5863	60.82	-1.218		0.3636	0.600592
2/25/2005	14:22:51	0.6213	60.8	-1.164		0.3986	0.573964
2/25/2005	14:22:53	0.658	60.8	-1.112		0.4353	0.548323
2/25/2005	14:22:56	0.6963	60.77	-1.06		0.4736	0.522682
2/25/2005	14:22:58	0.738	60.75	-1.006		0.5153	0.496055
2/25/2005	14:23:01	0.7813	60.73	-0.954		0.5586	0.470414
2/25/2005	14:23:04	0.828	60.71	-0.902		0.6053	0.444773
2/25/2005	14:23:06	0.8763	60.68	-0.852		0.6536	0.420118
2/25/2005	14:23:10	0.928	60.66	-0.803		0.7053	0.395957
2/25/2005	14:23:13	0.983	60.64	-0.753		0.7603	0.371302
2/25/2005	14:23:16	1.0413	60.62	-0.705		0.8186	0.347633
2/25/2005	14:23:20	1.103	60.57	-0.658		0.8803	0.324458
2/25/2005	14:23:24	1.168	60.57	-0.611		0.9453	0.301282
2/25/2005	14:23:28	1.238	60.53	-0.568		1.0153	0.280079
2/25/2005	14:23:33	1.3113	60.53	-0.525		1.0886	0.258876
2/25/2005	14:23:37	1.3897	60.5	-0.484		1.167	0.238659
2/25/2005	14:23:42	1.473	60.46	-0.445		1.2503	0.219426
2/25/2005	14:23:48	1.5613	60.44	-0.408		1.3386	0.201183
2/25/2005	14:23:53	1.6547	60.41	-0.373		1.432	0.183925
2/25/2005	14:23:59	1.753	60.39	-0.338		1.5303	0.166667
2/25/2005	14:24:05	1.858	60.37	-0.306		1.6353	0.150888
2/25/2005	14:24:12	1.968	60.34	-0.277		1.7453	0.136588
2/25/2005	14:24:19	2.0847	60.3	-0.251		1.862	0.123767
2/25/2005	14:24:26	2.2097	60.28	-0.226		1.987	0.11144
2/25/2005	14:24:34	2.3413	60.23	-0.202		2.1186	0.099606
2/25/2005	14:24:43	2.4813	60.16	-0.182		2.2586	0.089744
2/25/2005	14:24:52	2.6297	60.12	-0.16		2.407	0.078895
2/25/2005	14:25:01	2.7863	60.05	-0.142		2.5636	0.07002
2/25/2005	14:25:11	2.953	60.01	-0.127		2.7303	0.062623
2/25/2005	14:25:22	3.1297	59.96	-0.112		2.907	0.055227
2/25/2005	14:25:33	3.3163	59.92	-0.1		3.0936	0.04931
2/25/2005	14:25:45	3.5147	59.87	-0.09		3.292	0.044379
2/25/2005	14:25:57	3.7247	59.83	-0.082		3.502	0.040434
2/25/2005	14:26:11	3.9463	59.78	-0.074		3.7236	0.036489
2/25/2005	14:26:25	4.1813	59.74	-0.067		3.9586	0.033037
2/25/2005	14:26:40	4.4297	59.71	-0.061		4.207	0.030079
2/25/2005	14:26:55	4.693	59.67	-0.056		4.4703	0.027613
2/25/2005	14:27:12	4.973	59.65	-0.053		4.7503	0.026134
2/25/2005	14:27:30	5.2697	59.62	-0.05		5.047	0.024655
2/25/2005	14:27:49	5.583	59.6	-0.046		5.3603	0.022682
2/25/2005	14:28:09	5.9147	59.6	-0.042		5.692	0.02071
2/25/2005	14:28:30	6.2663	59.6	-0.039		6.0436	0.019231
2/25/2005	14:28:52	6.6397	59.6	-0.035		6.417	0.017258
2/25/2005	14:29:16	7.0347	59.58	-0.033		6.812	0.016272
2/25/2005	14:29:41	7.453	59.58	-0.034		7.2303	0.016765
2/25/2005	14:30:08	7.8963	59.62	-0.036		7.6736	0.017751
2/25/2005	14:30:36	8.3663	59.62	-0.035		8.1436	0.017258
2/25/2005	14:31:06	8.8647	59.62	-0.033		8.642	0.016272
2/25/2005	14:31:37	9.3913	59.65	-0.032		9.1686	0.015779
2/25/2005	14:32:11	9.9497	59.65	-0.03		9.727	0.014793

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: CHARLESTON NWS WELL/BORING NO.: 17MW18D

PROJECT NO.: 0528 GEOLOGIST: FRED WRAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 7, 15-22 TEST NO.: 2

STATIC WATER LEVEL (Depth/Elevation): 2.38 DATE: 2-25-05

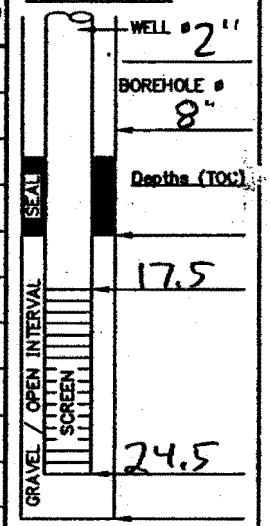
TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED: SJC 5/18/05

METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG PAGE 1 OF 1

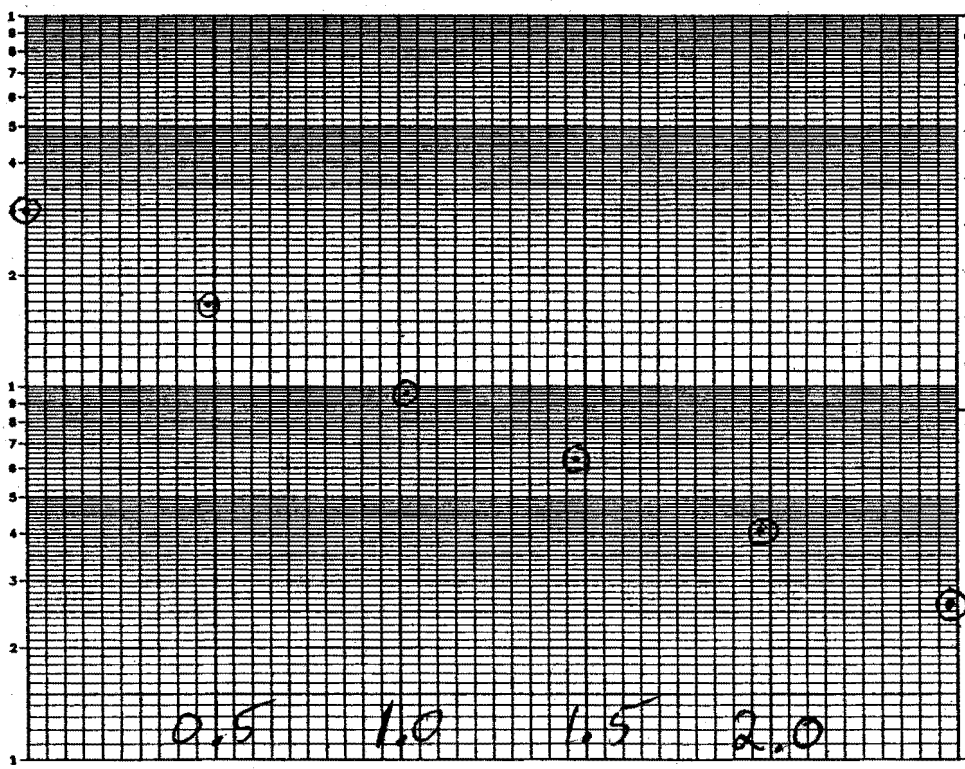
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.1985		2.389			
0.3333		2.029			
0.5247		1.637			
0.7813		1.243			
1.103		0.898			
1.5613		0.581			
2.0847		0.367			
2.6297		0.237			
3.1297		0.169			
4.1813		0.095			
5.2697		0.065			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:
START @ 1435
STOPPED @ 1449

CALCS, SKETCH MAPS, ETC.:

ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

In-Situ Inc. MiniTroll Pro

Report generated: 2/25/2005 21:03:49
Report from file: ...\SN11262 2005-02-25 143509 17mw18dr.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw18dr

Test defined on: 2/25/2005 14:33:57
Test started on: 2/25/2005 14:35:09
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10.000 Minutes.
Number of data samples: 107

TOTAL DATA SAMPLES 107

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 9.147 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/25/2005	14:35:09	0	59.69	0			Plotted data
2/25/2005	14:35:10	0.005	59.71	-0.008			
2/25/2005	14:35:10	0.01	59.74	-0.011			
2/25/2005	14:35:10	0.015	59.74	-0.012			
2/25/2005	14:35:11	0.02	59.76	-0.013			
2/25/2005	14:35:11	0.025	59.76	-0.014			
2/25/2005	14:35:11	0.03	59.76	-0.014			
2/25/2005	14:35:11	0.035	59.76	-0.014			
2/25/2005	14:35:12	0.04	59.76	-0.014			
2/25/2005	14:35:12	0.045	59.76	-0.015			
2/25/2005	14:35:12	0.05	59.76	-0.014			
2/25/2005	14:35:13	0.055	59.76	-0.015			
2/25/2005	14:35:13	0.06	59.76	-0.015			
2/25/2005	14:35:13	0.065	59.76	-0.015			
2/25/2005	14:35:14	0.07	59.78	-0.015			
2/25/2005	14:35:14	0.075	59.78	-0.016			
2/25/2005	14:35:14	0.08	59.78	-0.015			
2/25/2005	14:35:14	0.085	59.78	-0.014			
2/25/2005	14:35:15	0.09	59.78	0.526			
2/25/2005	14:35:15	0.095	59.78	2.92			
2/25/2005	14:35:15	0.1	59.78	3.536			
2/25/2005	14:35:16	0.1058	59.78	2.585			
2/25/2005	14:35:16	0.112	59.78	2.775	0	1	ho
2/25/2005	14:35:16	0.1185	59.78	2.71	0.0065	0.976577	
2/25/2005	14:35:17	0.1255	59.78	2.654	0.0135	0.956396	
2/25/2005	14:35:17	0.1328	59.78	2.619	0.0208	0.943784	
2/25/2005	14:35:18	0.1407	59.78	2.588	0.0287	0.932613	
2/25/2005	14:35:18	0.149	59.78	2.555	0.037	0.920721	
2/25/2005	14:35:19	0.1578	59.78	2.519	0.0458	0.907748	
2/25/2005	14:35:19	0.1672	59.76	2.491	0.0552	0.897658	
2/25/2005	14:35:20	0.177	59.76	2.457	0.065	0.885405	
2/25/2005	14:35:21	0.1875	59.76	2.422	0.0755	0.872793	

2/25/2005	14:35:21	0.1985	59.76	2.389	0.0865	0.860901
2/25/2005	14:35:22	0.2102	59.76	2.353	0.0982	0.847928
2/25/2005	14:35:23	0.2227	59.74	2.315	0.1107	0.834234
2/25/2005	14:35:23	0.2358	59.76	2.278	0.1238	0.820901
2/25/2005	14:35:24	0.2498	59.76	2.24	0.1378	0.807207
2/25/2005	14:35:25	0.2647	59.76	2.2	0.1527	0.792793
2/25/2005	14:35:26	0.2803	59.76	2.159	0.1683	0.778018
2/25/2005	14:35:27	0.297	59.76	2.116	0.185	0.762523
2/25/2005	14:35:28	0.3147	59.76	2.074	0.2027	0.747387
2/25/2005	14:35:29	0.3333	59.78	2.029	0.2213	0.731171
2/25/2005	14:35:31	0.3532	59.78	1.983	0.2412	0.714595
2/25/2005	14:35:32	0.3742	59.78	1.937	0.2622	0.698018
2/25/2005	14:35:33	0.3963	59.8	1.888	0.2843	0.68036
2/25/2005	14:35:35	0.4198	59.8	1.839	0.3078	0.662703
2/25/2005	14:35:36	0.4447	59.83	1.788	0.3327	0.644324
2/25/2005	14:35:38	0.4697	59.83	1.739	0.3577	0.626667
2/25/2005	14:35:39	0.4963	59.85	1.688	0.3843	0.608288
2/25/2005	14:35:41	0.5247	59.87	1.637	0.4127	0.58991
2/25/2005	14:35:43	0.5547	59.87	1.583	0.4427	0.57045
2/25/2005	14:35:45	0.5863	59.89	1.53	0.4743	0.551351
2/25/2005	14:35:47	0.6213	59.92	1.473	0.5093	0.530811
2/25/2005	14:35:49	0.658	59.94	1.417	0.546	0.510631
2/25/2005	14:35:51	0.6963	59.96	1.36	0.5843	0.49009
2/25/2005	14:35:54	0.738	59.98	1.3	0.626	0.468468
2/25/2005	14:35:56	0.7813	60.01	1.243	0.6693	0.447928
2/25/2005	14:35:59	0.828	60.03	1.185	0.716	0.427027
2/25/2005	14:36:02	0.8763	60.05	1.126	0.7643	0.405766
2/25/2005	14:36:05	0.928	60.1	1.07	0.816	0.385586
2/25/2005	14:36:08	0.983	60.12	1.011	0.871	0.364324
2/25/2005	14:36:12	1.0413	60.16	0.953	0.9293	0.343423
2/25/2005	14:36:18	1.103	60.19	0.898	0.991	0.323604
2/25/2005	14:36:19	1.188	60.21	0.841	1.056	0.303063
2/25/2005	14:36:24	1.238	60.25	0.786	1.126	0.283243
2/25/2005	14:36:28	1.3113	60.28	0.734	1.1993	0.264505
2/25/2005	14:36:33	1.3897	60.32	0.682	1.2777	0.245766
2/25/2005	14:36:38	1.473	60.34	0.63	1.361	0.227027
2/25/2005	14:36:43	1.5613	60.37	0.581	1.4493	0.209369
2/25/2005	14:36:49	1.6547	60.41	0.535	1.5427	0.192793
2/25/2005	14:36:55	1.753	60.46	0.489	1.641	0.176216
2/25/2005	14:37:01	1.858	60.53	0.445	1.746	0.16036
2/25/2005	14:37:07	1.968	60.59	0.405	1.856	0.145946
2/25/2005	14:37:14	2.0847	60.66	0.367	1.9727	0.132252
2/25/2005	14:37:22	2.2097	60.73	0.33	2.0977	0.118919
2/25/2005	14:37:30	2.3413	60.82	0.297	2.2293	0.107027
2/25/2005	14:37:38	2.4813	60.89	0.266	2.3693	0.095856
2/25/2005	14:37:47	2.6297	60.95	0.237	2.5177	0.085405
2/25/2005	14:37:57	2.7863	61.02	0.212	2.6743	0.076396
2/25/2005	14:38:07	2.953	61.07	0.189	2.841	0.068108
2/25/2005	14:38:17	3.1297	61.13	0.169	3.0177	0.060901
2/25/2005	14:38:28	3.3163	61.18	0.149	3.2043	0.053694
2/25/2005	14:38:40	3.5147	61.25	0.134	3.4027	0.048288
2/25/2005	14:38:53	3.7247	61.29	0.119	3.8127	0.042883
2/25/2005	14:39:06	3.9463	61.34	0.107	3.8343	0.038559
2/25/2005	14:39:20	4.1813	61.38	0.095	4.0693	0.034234
2/25/2005	14:39:35	4.4297	61.43	0.085	4.3177	0.030631
2/25/2005	14:39:51	4.693	61.47	0.077	4.581	0.027748
2/25/2005	14:40:08	4.973	61.49	0.07	4.861	0.025225
2/25/2005	14:40:28	5.2697	61.49	0.065	5.1577	0.023423
2/25/2005	14:40:44	5.583	61.52	0.059	5.471	0.021261
2/25/2005	14:41:04	5.9147	61.49	0.055	5.8027	0.01982
2/25/2005	14:41:25	6.2663	61.49	0.051	6.1543	0.018378
2/25/2005	14:41:48	6.6397	61.52	0.051	6.5277	0.018378
2/25/2005	14:42:11	7.0347	61.49	0.05	6.9227	0.018018
2/25/2005	14:42:37	7.453	61.49	0.05	7.341	0.018018
2/25/2005	14:43:03	7.8963	61.49	0.048	7.7843	0.017297
2/25/2005	14:43:31	8.3663	61.47	0.046	8.2543	0.016577
2/25/2005	14:44:01	8.8647	61.47	0.045	8.7527	0.016216
2/25/2005	14:44:33	9.3913	61.49	0.043	9.2793	0.015495
2/25/2005	14:45:06	9.9497	61.56	0.044	9.8377	0.015856
2/25/2005	14:45:42	10.5413	61.56	0.042	10.4293	0.015135
2/25/2005	14:46:19	11.168	61.58	0.042	11.056	0.015135
2/25/2005	14:46:59	11.8313	61.58	0.039	11.7193	0.014054
2/25/2005	14:47:41	12.5347	61.56	0.04	12.4227	0.014414
2/25/2005	14:48:26	13.2797	61.54	0.041	13.1677	0.014775
2/25/2005	14:49:14	14.0697	61.47	0.042	13.9577	0.015135

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW19S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By: JCR
Checked By: SJC 5/18/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	1.55 = To

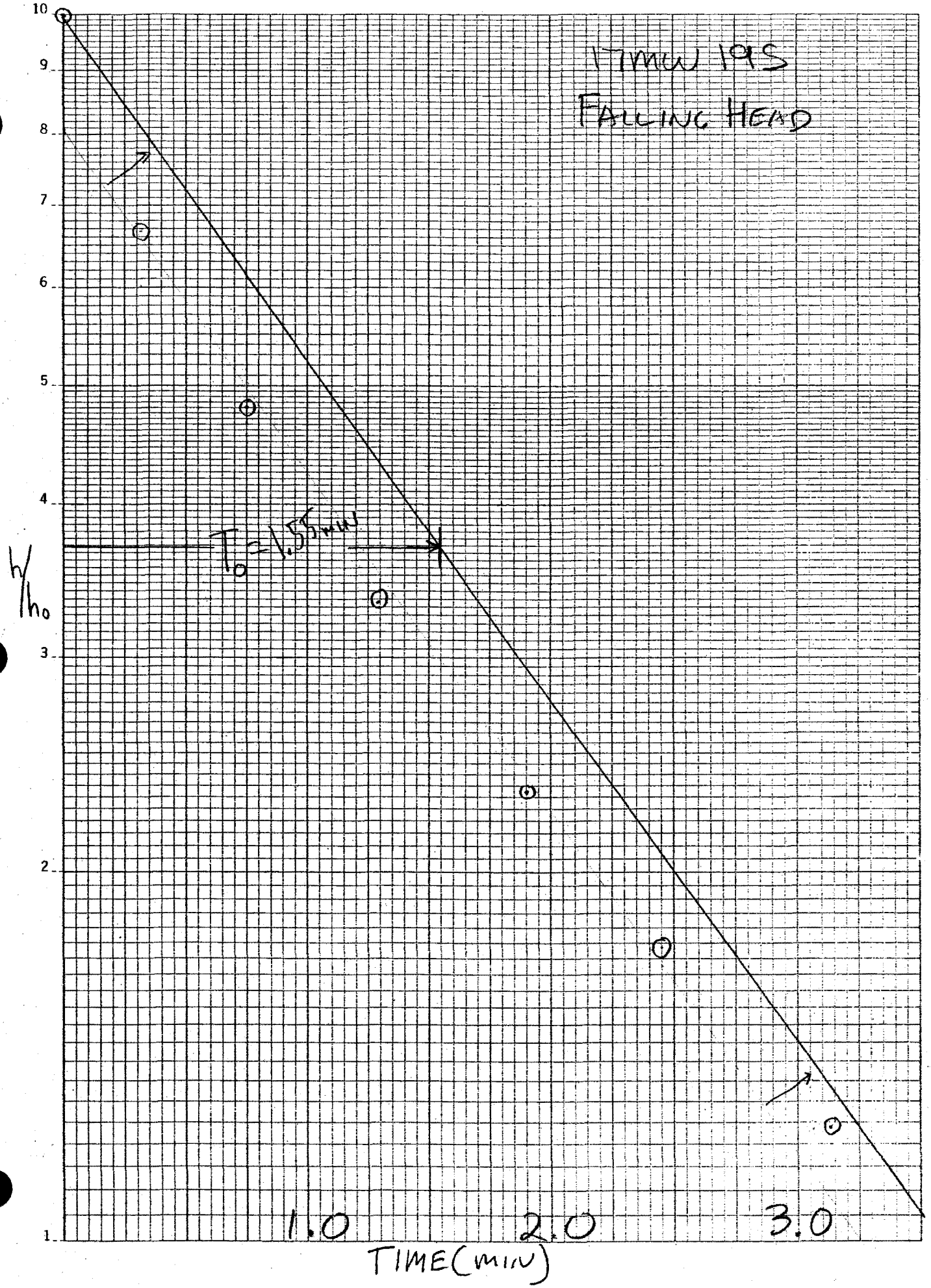
Hydraulic Conductivity (K) :

1.07E-03	ft./min.
1.79E-05	ft./sec.
1.54E+00	ft./day = 1.5 ft/day
5.45E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


17MW 19S
FALLING HEAD
$T_0 = 1.55$ min
h/h_0
10
9
8
7
6
5
4
3
2
1
1.0
2.0
3.0
TIME (min)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW19S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By:
Checked By: SJC 5/18/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	1.07 = To

Hydraulic Conductivity (K) :

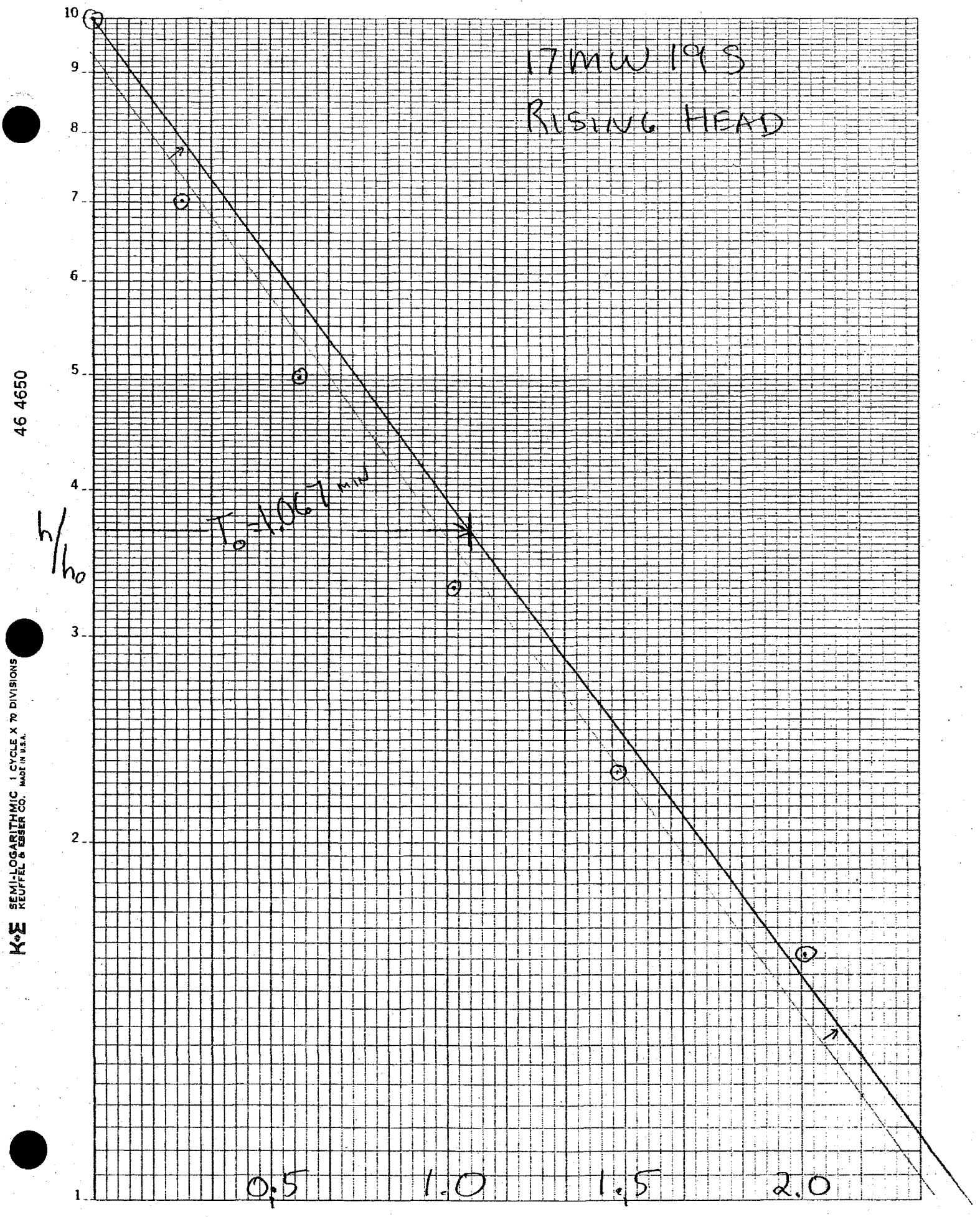
1.56E-03	ft./min.
2.60E-05	ft./sec.
2.24E+00	ft./day =
7.91E-04	cm./sec.

2.2 ft/day

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


17MW 19S
RISING HEAD
$T_o = 1.067$ mw
h/h₀
10
9
8
7
6
5
4
3
2
1
0.5
1.0
1.5
2.0
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

32

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: CHARLESTON NWS SWMU16/17 WELL/BORING NO.: 17MW19S

PROJECT NO.: 0528 GEOLOGIST: FRED W RAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10', 8-18 TEST NO.: 1+2

STATIC WATER LEVEL (Depth/Elevation): 3.73 DATE: 2-27-05

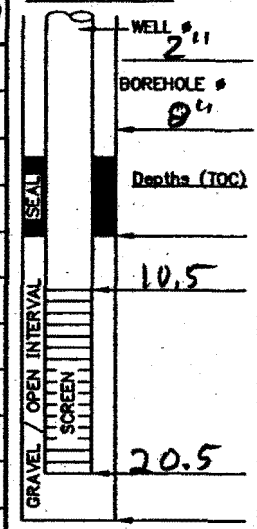
TEST TYPE (Rising/Falling/Constant Head): FALLING + RISING CHECKED: SJC 5/18/05

METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG PAGE 1 OF 1

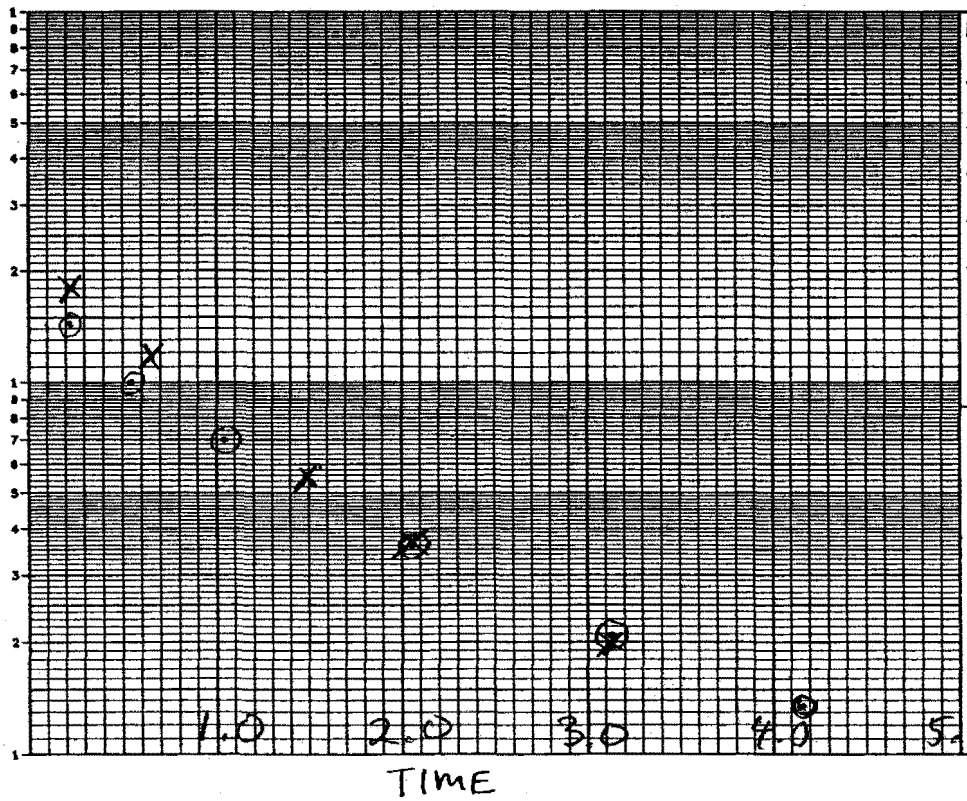
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

FALLING HEAD			RISING		
ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.1407		1.838	0.070		2.562
0.2102		1.420	0.095		2.263
0.3532		1.200	0.1255		2.076
0.5547		1.003	0.2102		1.862
0.7813		0.842	0.4447		1.425
1.0413		0.700	0.6580		1.145
1.5613		0.499	1.0413		0.806
2.0847		0.366	1.4730		0.567
3.1297		0.213	2.0847		0.368
4.1813		0.135	3.1297		0.202
5.2697		0.092	4.6930		0.107
6.6397		0.065	5.5830		0.082

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS: FALLING HEAD:
STARTED: 1235
END: 1245
RISING HEAD:
STARTED: 1247
END: 1257
⊙ = FALLING HEAD
X = RISING HEAD

CALCS, SKETCH MAPS, ETC.:

ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 18:06:19
Report from file: ...\SN11262 2005-02-27 123525 17mw19sf.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw19sf

Test defined on: 2/27/2005 12:33:16
Test started on: 2/27/2005 12:35:25
Test stopped on: N/A N/A

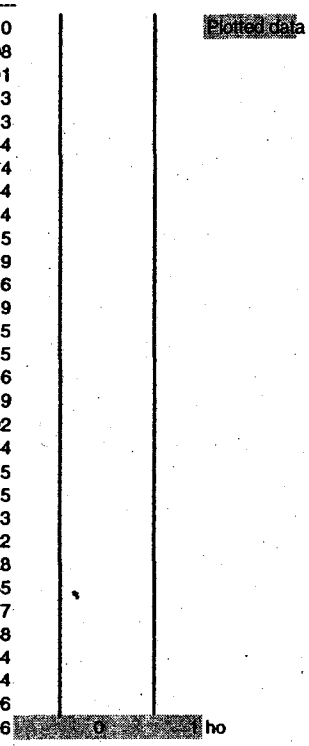
Data gathered using Logarithmic testing
Maximum time between data points: 10.0000 Minutes.
Number of data samples: 101

TOTAL DATA SAMPLES 101

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 12.513 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min h/ho
2/27/2005	12:35:25	0	64.06	0	
2/27/2005	12:35:26	0.005	64.11	-0.008	
2/27/2005	12:35:26	0.01	64.13	-0.01	
2/27/2005	12:35:26	0.015	64.13	-0.013	
2/27/2005	12:35:27	0.02	64.13	-0.013	
2/27/2005	12:35:27	0.025	64.13	-0.014	
2/27/2005	12:35:27	0.03	64.13	-0.014	
2/27/2005	12:35:27	0.035	64.13	-0.014	
2/27/2005	12:35:28	0.04	64.15	-0.014	
2/27/2005	12:35:28	0.045	64.15	-0.015	
2/27/2005	12:35:28	0.05	64.15	-0.019	
2/27/2005	12:35:29	0.055	64.15	-0.016	
2/27/2005	12:35:29	0.06	64.15	-0.019	
2/27/2005	12:35:29	0.065	64.15	-0.015	
2/27/2005	12:35:30	0.07	64.15	-0.015	
2/27/2005	12:35:30	0.075	64.15	-0.016	
2/27/2005	12:35:30	0.08	64.15	-0.019	
2/27/2005	12:35:30	0.085	64.18	-0.02	
2/27/2005	12:35:31	0.09	64.15	-0.014	
2/27/2005	12:35:31	0.095	64.18	-0.025	
2/27/2005	12:35:31	0.1	64.18	-0.025	
2/27/2005	12:35:32	0.1058	64.18	-0.3	
2/27/2005	12:35:32	0.112	64.18	-2.302	
2/27/2005	12:35:32	0.1185	64.18	-3.628	
2/27/2005	12:35:33	0.1255	64.18	-2.65	
2/27/2005	12:35:33	0.1328	64.18	-1.557	
2/27/2005	12:35:34	0.1407	64.18	-1.838	
2/27/2005	12:35:34	0.149	64.18	-1.464	
2/27/2005	12:35:35	0.1578	64.18	-1.154	
2/27/2005	12:35:35	0.1672	64.15	-1.496	
2/27/2005	12:35:36	0.177	64.13	-1.576	



2/27/2005	12:35:37	0.1875	64.13	-1.465	0.0105	0.929569
2/27/2005	12:35:37	0.1985	64.13	-1.412	0.0215	0.895939
2/27/2005	12:35:38	0.2102	64.13	-1.42	0.0332	0.901015
2/27/2005	12:35:39	0.2227	64.13	-1.399	0.0457	0.88769
2/27/2005	12:35:39	0.2358	64.13	-1.367	0.0588	0.867386
2/27/2005	12:35:40	0.2498	64.13	-1.346	0.0728	0.854061
2/27/2005	12:35:41	0.2647	64.11	-1.323	0.0877	0.839467
2/27/2005	12:35:42	0.2803	64.11	-1.297	0.1033	0.82297
2/27/2005	12:35:43	0.297	64.11	-1.274	0.12	0.808376
2/27/2005	12:35:44	0.3147	64.11	-1.249	0.1377	0.792513
2/27/2005	12:35:45	0.3333	64.11	-1.224	0.1563	0.77665
2/27/2005	12:35:46	0.3532	64.11	-1.2	0.1762	0.761421
2/27/2005	12:35:48	0.3742	64.09	-1.175	0.1972	0.745558
2/27/2005	12:35:49	0.3963	64.09	-1.152	0.2193	0.730964
2/27/2005	12:35:50	0.4198	64.09	-1.127	0.2428	0.715102
2/27/2005	12:35:52	0.4447	64.09	-1.102	0.2677	0.699239
2/27/2005	12:35:53	0.4697	64.06	-1.078	0.2927	0.68401
2/27/2005	12:35:55	0.4963	64.06	-1.053	0.3193	0.668147
2/27/2005	12:35:57	0.5247	64.06	-1.028	0.3477	0.652284
2/27/2005	12:35:59	0.5547	64.06	-1.003	0.3777	0.636421
2/27/2005	12:36:00	0.5863	64.04	-0.979	0.4093	0.621193
2/27/2005	12:36:03	0.6213	64.04	-0.951	0.4443	0.603426
2/27/2005	12:36:05	0.658	64.04	-0.925	0.481	0.586929
2/27/2005	12:36:07	0.6963	64.04	-0.898	0.5193	0.569797
2/27/2005	12:36:10	0.738	64.02	-0.869	0.561	0.551396
2/27/2005	12:36:12	0.7813	64.02	-0.842	0.6043	0.534264
2/27/2005	12:36:15	0.828	64	-0.813	0.651	0.515863
2/27/2005	12:36:18	0.8763	64	-0.786	0.6993	0.498731
2/27/2005	12:36:21	0.928	64	-0.757	0.751	0.48033
2/27/2005	12:36:24	0.983	63.97	-0.729	0.806	0.462563
2/27/2005	12:36:28	1.0413	63.97	-0.7	0.8643	0.444162
2/27/2005	12:36:31	1.103	63.97	-0.671	0.926	0.425761
2/27/2005	12:36:35	1.168	63.95	-0.644	0.991	0.408629
2/27/2005	12:36:40	1.238	63.95	-0.614	1.061	0.389594
2/27/2005	12:36:44	1.3113	63.95	-0.584	1.1343	0.370558
2/27/2005	12:36:49	1.3897	63.93	-0.556	1.2127	0.352792
2/27/2005	12:36:54	1.473	63.93	-0.527	1.296	0.334391
2/27/2005	12:36:59	1.5613	63.93	-0.499	1.3843	0.316624
2/27/2005	12:37:05	1.6547	63.93	-0.47	1.4777	0.298223
2/27/2005	12:37:10	1.753	63.91	-0.445	1.576	0.28236
2/27/2005	12:37:17	1.858	63.91	-0.415	1.681	0.263325
2/27/2005	12:37:23	1.968	63.91	-0.39	1.791	0.247462
2/27/2005	12:37:30	2.0847	63.93	-0.366	1.9077	0.232234
2/27/2005	12:37:38	2.2097	63.93	-0.34	2.0327	0.215736
2/27/2005	12:37:46	2.3413	63.93	-0.316	2.1643	0.200508
2/27/2005	12:37:54	2.4813	63.93	-0.295	2.3043	0.187183
2/27/2005	12:38:03	2.6297	63.93	-0.274	2.4527	0.173858
2/27/2005	12:38:12	2.7863	63.91	-0.254	2.6093	0.161168
2/27/2005	12:38:22	2.953	63.91	-0.232	2.776	0.147208
2/27/2005	12:38:33	3.1297	63.88	-0.213	2.9527	0.135152
2/27/2005	12:38:44	3.3163	63.88	-0.195	3.1393	0.123731
2/27/2005	12:38:56	3.5147	63.86	-0.18	3.3377	0.114213
2/27/2005	12:39:09	3.7247	63.86	-0.164	3.5477	0.104061
2/27/2005	12:39:22	3.9463	63.84	-0.148	3.7693	0.093909
2/27/2005	12:39:36	4.1813	63.84	-0.135	4.0043	0.08566
2/27/2005	12:39:51	4.4297	63.84	-0.123	4.2527	0.078046
2/27/2005	12:40:07	4.693	63.79	-0.111	4.516	0.070431
2/27/2005	12:40:24	4.973	63.77	-0.102	4.796	0.064721
2/27/2005	12:40:41	5.2697	63.73	-0.092	5.0927	0.058376
2/27/2005	12:41:00	5.583	63.73	-0.085	5.406	0.053934
2/27/2005	12:41:20	5.9147	63.73	-0.077	5.7377	0.048858
2/27/2005	12:41:41	6.2663	63.73	-0.07	6.0893	0.044416
2/27/2005	12:42:04	6.6397	63.73	-0.065	6.4627	0.041244
2/27/2005	12:42:27	7.0347	63.7	-0.059	6.8577	0.037437
2/27/2005	12:42:52	7.453	63.68	-0.057	7.276	0.036168
2/27/2005	12:43:19	7.8963	63.66	-0.051	7.7193	0.03236
2/27/2005	12:43:47	8.3663	63.66	-0.047	8.1893	0.029822
2/27/2005	12:44:17	8.8647	63.7	-0.044	8.6877	0.027919
2/27/2005	12:44:49	9.3913	63.7	-0.041	9.2143	0.026015
2/27/2005	12:45:22	9.9497	63.7	-0.038	9.7727	0.024112

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 18:08:14
Report from file: ...\SN11262 2005-02-27 124747 17mw19sr.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw19sr

Test defined on: 2/27/2005 12:34:30
Test started on: 2/27/2005 12:47:47
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10.0000 Minutes.
Number of data samples: 98

TOTAL DATA SAMPLES 98

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 12.546 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho
2/27/2005	12:47:47	0	63.77	0		
2/27/2005	12:47:48	0.005	63.82	-0.007		
2/27/2005	12:47:48	0.01	63.82	-0.009		
2/27/2005	12:47:48	0.015	63.82	-0.011		
2/27/2005	12:47:49	0.02	63.84	-0.012		
2/27/2005	12:47:49	0.025	63.84	-0.013		
2/27/2005	12:47:49	0.03	63.84	-0.013		
2/27/2005	12:47:50	0.035	63.84	-0.013		
2/27/2005	12:47:50	0.04	63.84	0.62		
2/27/2005	12:47:50	0.045	63.86	5.474		
2/27/2005	12:47:50	0.05	63.84	2.11		
2/27/2005	12:47:51	0.055	63.86	1.599		
2/27/2005	12:47:51	0.06	63.86	3.505		
2/27/2005	12:47:51	0.065	63.86	1.7		
2/27/2005	12:47:52	0.07	63.86	2.562		
2/27/2005	12:47:52	0.075	63.86	2.295	0	1 ho
2/27/2005	12:47:52	0.08	63.86	2.117	0.005	0.92244
2/27/2005	12:47:53	0.085	63.86	2.385	0.01	1.039216
2/27/2005	12:47:53	0.09	63.86	2.086	0.015	0.908932
2/27/2005	12:47:53	0.095	63.86	2.263	0.02	0.986057
2/27/2005	12:47:53	0.1	63.86	2.141	0.025	0.932898
2/27/2005	12:47:54	0.1058	63.86	2.168	0.0308	0.944662
2/27/2005	12:47:54	0.112	63.86	2.116	0.037	0.922004
2/27/2005	12:47:55	0.1185	63.88	2.12	0.0435	0.923747
2/27/2005	12:47:55	0.1255	63.86	2.076	0.0505	0.904575
2/27/2005	12:47:55	0.1328	63.88	2.066	0.0578	0.900218
2/27/2005	12:47:56	0.1407	63.86	2.037	0.0657	0.887582
2/27/2005	12:47:56	0.149	63.88	2.012	0.074	0.876688
2/27/2005	12:47:57	0.1578	63.88	1.989	0.0828	0.866667
2/27/2005	12:47:57	0.1672	63.84	1.968	0.0922	0.857516
2/27/2005	12:47:58	0.177	63.84	1.943	0.102	0.846623

Plotted data

2/27/2005	12:47:59	0.1875	63.84	1.917	0.1125	0.835294
2/27/2005	12:47:59	0.1985	63.84	1.889	0.1235	0.823094
2/27/2005	12:48:00	0.2102	63.84	1.862	0.1352	0.811329
2/27/2005	12:48:01	0.2227	63.84	1.834	0.1477	0.799129
2/27/2005	12:48:02	0.2358	63.84	1.806	0.1608	0.786928
2/27/2005	12:48:02	0.2498	63.84	1.774	0.1748	0.772985
2/27/2005	12:48:03	0.2647	63.84	1.743	0.1897	0.759477
2/27/2005	12:48:04	0.2803	63.84	1.711	0.2053	0.745534
2/27/2005	12:48:05	0.297	63.84	1.678	0.222	0.731155
2/27/2005	12:48:06	0.3147	63.84	1.645	0.2397	0.716776
2/27/2005	12:48:07	0.3333	63.84	1.61	0.2583	0.701525
2/27/2005	12:48:09	0.3532	63.84	1.575	0.2782	0.686275
2/27/2005	12:48:10	0.3742	63.84	1.537	0.2992	0.669717
2/27/2005	12:48:11	0.3963	63.84	1.501	0.3213	0.654031
2/27/2005	12:48:13	0.4198	63.84	1.464	0.3448	0.637908
2/27/2005	12:48:14	0.4447	63.84	1.425	0.3697	0.620915
2/27/2005	12:48:16	0.4697	63.84	1.388	0.3947	0.604793
2/27/2005	12:48:17	0.4963	63.84	1.349	0.4213	0.5878
2/27/2005	12:48:19	0.5247	63.84	1.31	0.4497	0.570806
2/27/2005	12:48:21	0.5547	63.84	1.27	0.4797	0.553377
2/27/2005	12:48:23	0.5863	63.84	1.229	0.5113	0.535512
2/27/2005	12:48:25	0.6213	63.84	1.188	0.5463	0.517647
2/27/2005	12:48:27	0.658	63.84	1.145	0.583	0.498911
2/27/2005	12:48:29	0.6963	63.84	1.103	0.6213	0.48061
2/27/2005	12:48:32	0.738	63.84	1.061	0.663	0.462309
2/27/2005	12:48:34	0.7813	63.84	1.019	0.7063	0.444009
2/27/2005	12:48:37	0.828	63.84	0.976	0.753	0.425272
2/27/2005	12:48:40	0.8763	63.84	0.932	0.8013	0.4061
2/27/2005	12:48:43	0.928	63.84	0.89	0.853	0.3878
2/27/2005	12:48:46	0.983	63.84	0.847	0.908	0.369063
2/27/2005	12:48:50	1.0413	63.86	0.806	0.9663	0.351198
2/27/2005	12:48:54	1.103	63.86	0.764	1.028	0.332898
2/27/2005	12:48:58	1.168	63.86	0.723	1.093	0.315033
2/27/2005	12:49:02	1.238	63.86	0.681	1.163	0.296732
2/27/2005	12:49:06	1.3113	63.86	0.644	1.2363	0.28061
2/27/2005	12:49:11	1.3897	63.86	0.605	1.3147	0.263617
2/27/2005	12:49:16	1.473	63.88	0.567	1.398	0.247059
2/27/2005	12:49:21	1.5613	63.88	0.531	1.4863	0.231573
2/27/2005	12:49:27	1.6547	63.88	0.495	1.5797	0.215686
2/27/2005	12:49:33	1.753	63.88	0.462	1.678	0.201307
2/27/2005	12:49:39	1.858	63.88	0.428	1.783	0.186492
2/27/2005	12:49:46	1.968	63.91	0.399	1.893	0.173856
2/27/2005	12:49:53	2.0847	63.91	0.368	2.0097	0.160949
2/27/2005	12:50:00	2.2097	63.93	0.34	2.1347	0.148148
2/27/2005	12:50:08	2.3413	63.93	0.312	2.2663	0.135948
2/27/2005	12:50:16	2.4813	63.95	0.287	2.4063	0.125054
2/27/2005	12:50:25	2.6297	63.97	0.265	2.5547	0.115468
2/27/2005	12:50:35	2.7863	64	0.242	2.7113	0.105447
2/27/2005	12:50:45	2.953	64.02	0.222	2.878	0.096732
2/27/2005	12:50:55	3.1297	64.04	0.202	3.0547	0.088017
2/27/2005	12:51:06	3.3163	64.06	0.185	3.2413	0.08061
2/27/2005	12:51:18	3.5147	64.06	0.168	3.4397	0.073203
2/27/2005	12:51:31	3.7247	64.09	0.153	3.6497	0.066667
2/27/2005	12:51:44	3.9463	64.11	0.138	3.8713	0.060131
2/27/2005	12:51:58	4.1813	64.13	0.126	4.1063	0.054902
2/27/2005	12:52:13	4.4297	64.13	0.115	4.3547	0.050109
2/27/2005	12:52:29	4.693	64.13	0.107	4.618	0.046623
2/27/2005	12:52:46	4.973	64.13	0.097	4.898	0.042266
2/27/2005	12:53:04	5.2697	64.11	0.09	5.1947	0.039216
2/27/2005	12:53:22	5.583	64.11	0.082	5.508	0.03573
2/27/2005	12:53:42	5.9147	64.13	0.075	5.8397	0.03268
2/27/2005	12:54:03	6.2663	64.13	0.069	6.1913	0.030065
2/27/2005	12:54:26	6.6397	64.13	0.065	6.5647	0.028322
2/27/2005	12:54:50	7.0347	64.13	0.061	6.9597	0.02658
2/27/2005	12:55:15	7.453	64.15	0.057	7.378	0.024837
2/27/2005	12:55:41	7.8963	64.15	0.052	7.8213	0.022658
2/27/2005	12:56:09	8.3663	64.18	0.048	8.2913	0.020915

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW20S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By: JWR
Checked By: SJC 5/18/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	1.80 = To

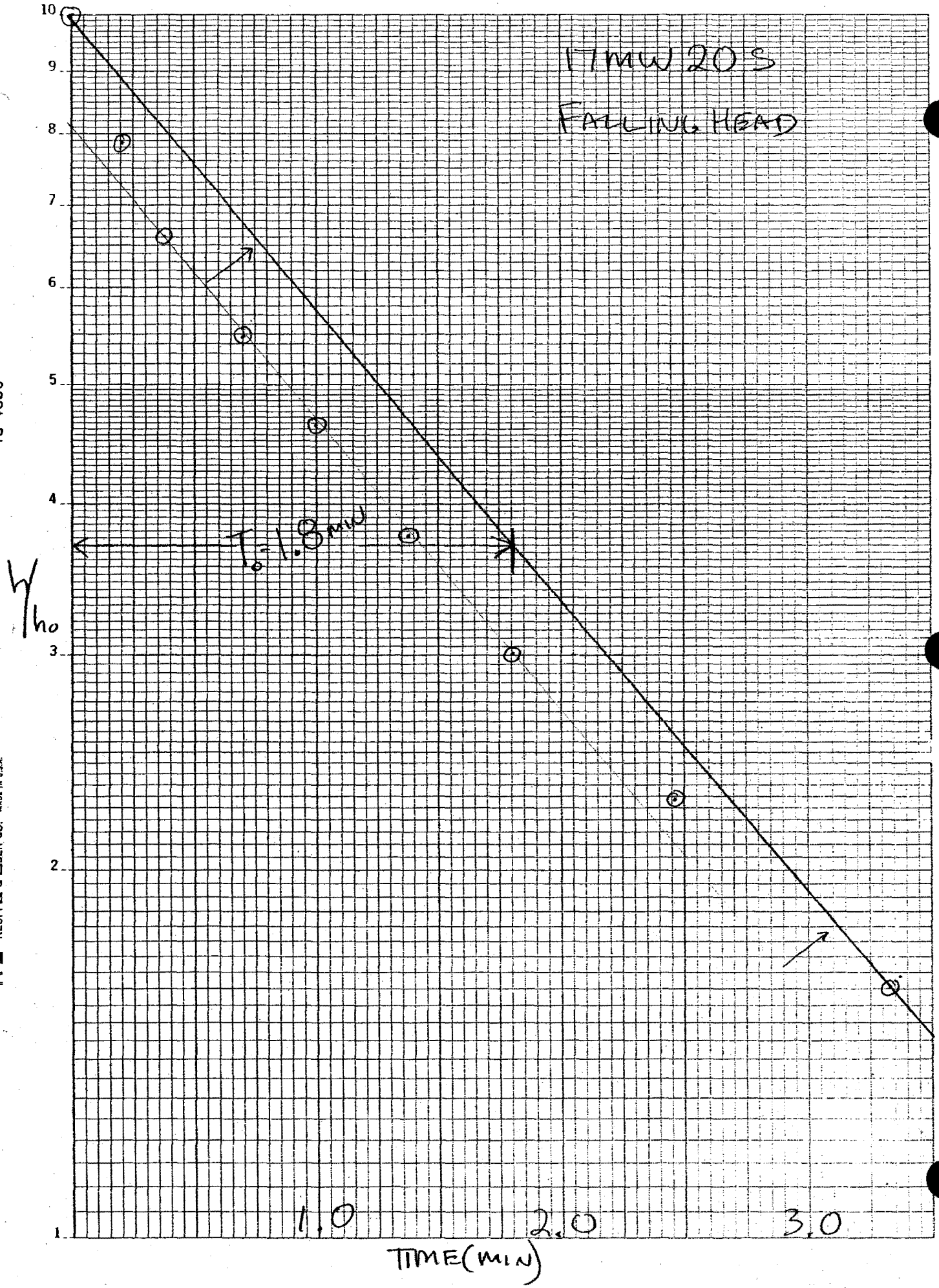
Hydraulic Conductivity (K) :

9.24E-04	ft./min.
1.54E-05	ft./sec.
1.33E+00	ft./day
4.69E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


17MW 20S
FALLING HEAD
$T_o = 1.8$ MW
y/h_o
10
9
8
7
6
5
4
3
2
1
1.0
2.0
3.0
TIME (MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW20S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By: SWR
Checked By: SJC 5/18/05

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	1.30 = To

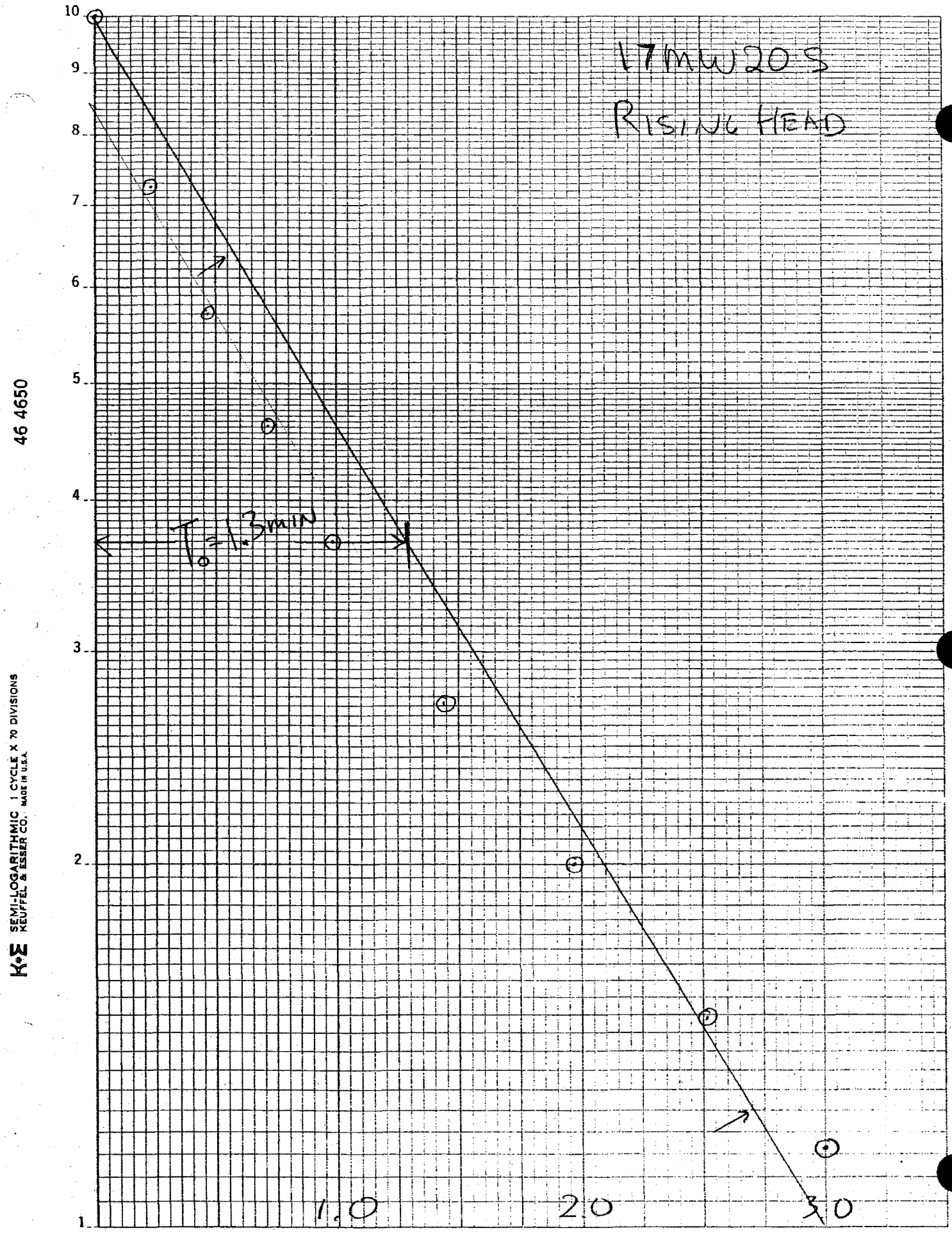
Hydraulic Conductivity (K) :

1.28E-03	ft./min.
2.13E-05	ft./sec.
1.84E+00	ft./day
6.50E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


17MW20S
RISING HEAD
T_0 = 1.3 MIN
10
9
8
7
6
5
4
3
2
1
10
20
30
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: CHARLESTON NWS SWMU 16/17 WELL/BORING NO.: 17MW205

PROJECT NO.: 0528 GEOLOGIST: FRED W RAMSFER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10, 4-14' TEST NO.: 1+2

STATIC WATER LEVEL (Depth/Elevation): 2.95 DATE: 2-28-05

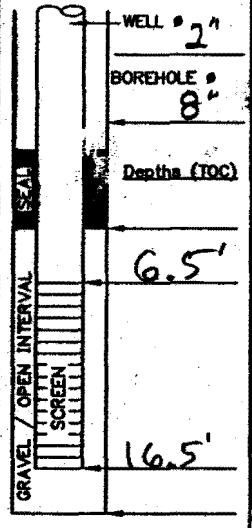
TEST TYPE (Rising/Falling/Constant Head): FALLING + RISING CHECKED: SJC 5/18/05

METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG (0.13 x 4.9') PAGE 1 OF 1

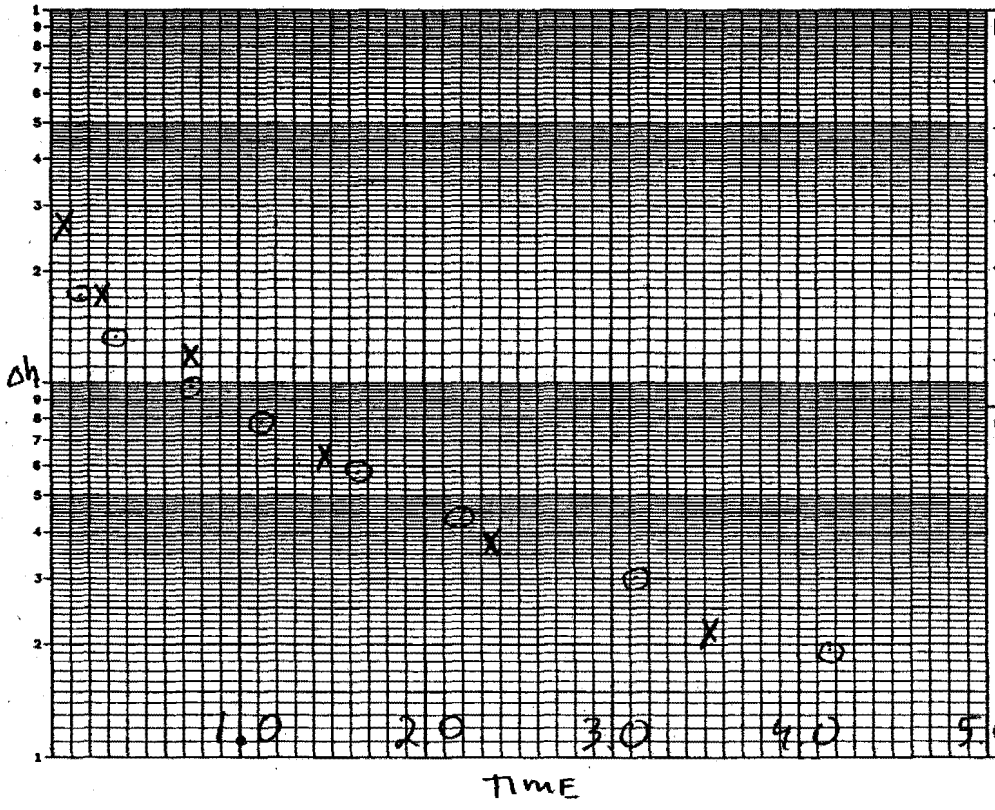
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

FALLING HEAD			RISING HEAD		
ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.1578		1.747	0.080		2.710
0.3333		1.326	0.1407		2.116
0.5247		1.122	0.2803		1.753
0.7380		0.967	0.4963		1.387
1.1030		0.779	0.7380		1.109
1.6547		0.584	0.9830		0.905
2.2097		0.448	1.4730		0.641
3.1297		0.301	1.8580		0.507
4.1813		0.198	2.3413		0.386
5.2697		0.136	3.5147		0.219
6.2663		0.100	5.5830		0.107
7.4530		0.073	7.4530		0.070

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS: FALLING HEAD: STARTED 1130
END: 1140
RISING HEAD:
START: 1142
END: 1152

CALCS, SKETCH MAPS, ETC.:
⊙ = FALLING
X = RISING

ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

In-Situ Inc. MiniTroll Pro

Report generated: 3/1/2005 8:28:20
Report from file: ...\SN11262 2005-02-28 113025 17mw20sf.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw20sf

Test defined on: 2/28/2005 11:27:39
Test started on: 2/28/2005 11:30:25
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10.0000 Minutes.
Number of data samples: 98

TOTAL DATA SAMPLES 98

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.264 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/28/2005	11:30:25	0	63.66	0			Plotted data
2/28/2005	11:30:26	0.005	63.7	-0.009			
2/28/2005	11:30:26	0.01	63.73	-0.013			
2/28/2005	11:30:26	0.015	63.73	-0.014			
2/28/2005	11:30:26	0.02	63.75	-0.015			
2/28/2005	11:30:27	0.025	63.75	-0.015			
2/28/2005	11:30:27	0.03	63.75	-0.017			
2/28/2005	11:30:27	0.035	63.75	-0.017			
2/28/2005	11:30:28	0.04	63.75	-0.017			
2/28/2005	11:30:28	0.045	63.75	-0.017			
2/28/2005	11:30:28	0.05	63.77	-0.017			
2/28/2005	11:30:29	0.055	63.77	-0.018			
2/28/2005	11:30:29	0.06	63.75	-0.02			
2/28/2005	11:30:29	0.065	63.77	-0.02			
2/28/2005	11:30:29	0.07	63.77	-0.021			
2/28/2005	11:30:30	0.075	63.77	-0.025			
2/28/2005	11:30:30	0.08	63.77	-0.012			
2/28/2005	11:30:30	0.085	63.77	-0.023			
2/28/2005	11:30:31	0.09	63.77	-0.016			
2/28/2005	11:30:31	0.095	63.77	-0.022			
2/28/2005	11:30:31	0.1	63.77	-1.491			
2/28/2005	11:30:32	0.1058	63.77	-3.369			
2/28/2005	11:30:32	0.112	63.77	-4.541			
2/28/2005	11:30:32	0.1185	63.77	-3.005			
2/28/2005	11:30:33	0.1255	63.77	-1.28			
2/28/2005	11:30:33	0.1328	63.77	-1.716			
2/28/2005	11:30:34	0.1407	63.77	-1.314			
2/28/2005	11:30:34	0.149	63.77	-1.637			
2/28/2005	11:30:35	0.1578	63.79	-1.747			
2/28/2005	11:30:35	0.1672	63.75	-1.616	0	1	ho
2/28/2005	11:30:36	0.177	63.75	-1.534	0.0098	0.949257	

2/28/2005	11:30:36	0.1875	63.75	-1.559	0.0203	0.964728
2/28/2005	11:30:37	0.1985	63.75	-1.559	0.0313	0.964728
2/28/2005	11:30:38	0.2102	63.75	-1.518	0.043	0.939356
2/28/2005	11:30:39	0.2227	63.73	-1.489	0.0555	0.921411
2/28/2005	11:30:39	0.2358	63.75	-1.474	0.0686	0.912129
2/28/2005	11:30:40	0.2498	63.73	-1.477	0.0826	0.913985
2/28/2005	11:30:41	0.2647	63.73	-1.414	0.0975	0.875
2/28/2005	11:30:42	0.2803	63.73	-1.402	0.1131	0.867574
2/28/2005	11:30:43	0.297	63.73	-1.376	0.1298	0.851485
2/28/2005	11:30:44	0.3147	63.73	-1.349	0.1475	0.834777
2/28/2005	11:30:45	0.3333	63.73	-1.326	0.1661	0.820545
2/28/2005	11:30:46	0.3532	63.73	-1.299	0.186	0.803837
2/28/2005	11:30:48	0.3742	63.73	-1.274	0.207	0.788366
2/28/2005	11:30:49	0.3963	63.73	-1.25	0.2291	0.773515
2/28/2005	11:30:50	0.4198	63.73	-1.223	0.2526	0.756807
2/28/2005	11:30:52	0.4447	63.73	-1.197	0.2775	0.740718
2/28/2005	11:30:53	0.4697	63.73	-1.172	0.3025	0.725248
2/28/2005	11:30:55	0.4963	63.75	-1.148	0.3291	0.710396
2/28/2005	11:30:57	0.5247	63.73	-1.122	0.3575	0.694307
2/28/2005	11:30:59	0.5547	63.73	-1.099	0.3875	0.680074
2/28/2005	11:31:00	0.5863	63.73	-1.072	0.4191	0.663366
2/28/2005	11:31:03	0.6213	63.73	-1.046	0.4541	0.647277
2/28/2005	11:31:05	0.658	63.73	-1.02	0.4908	0.631188
2/28/2005	11:31:07	0.6963	63.75	-0.993	0.5291	0.61448
2/28/2005	11:31:10	0.738	63.73	-0.967	0.5708	0.598391
2/28/2005	11:31:12	0.7813	63.73	-0.94	0.6141	0.581683
2/28/2005	11:31:15	0.828	63.73	-0.914	0.6608	0.565594
2/28/2005	11:31:18	0.8763	63.73	-0.888	0.7091	0.549505
2/28/2005	11:31:21	0.928	63.73	-0.861	0.7608	0.532797
2/28/2005	11:31:24	0.983	63.73	-0.834	0.8158	0.516089
2/28/2005	11:31:28	1.0413	63.73	-0.806	0.8741	0.498762
2/28/2005	11:31:31	1.103	63.73	-0.779	0.9358	0.482054
2/28/2005	11:31:35	1.168	63.73	-0.75	1.0008	0.464109
2/28/2005	11:31:40	1.238	63.7	-0.723	1.0708	0.447401
2/28/2005	11:31:44	1.3113	63.7	-0.696	1.1441	0.430693
2/28/2005	11:31:49	1.3897	63.7	-0.667	1.2225	0.412748
2/28/2005	11:31:54	1.473	63.7	-0.64	1.3058	0.39604
2/28/2005	11:31:59	1.5613	63.68	-0.611	1.3941	0.378094
2/28/2005	11:32:05	1.6547	63.68	-0.584	1.4875	0.361386
2/28/2005	11:32:10	1.753	63.68	-0.555	1.5858	0.343441
2/28/2005	11:32:17	1.858	63.68	-0.528	1.6908	0.326733
2/28/2005	11:32:23	1.968	63.66	-0.5	1.8008	0.309406
2/28/2005	11:32:30	2.0847	63.66	-0.474	1.9175	0.293317
2/28/2005	11:32:38	2.2097	63.66	-0.448	2.0425	0.277228
2/28/2005	11:32:46	2.3413	63.66	-0.422	2.1741	0.261139
2/28/2005	11:32:54	2.4813	63.66	-0.396	2.3141	0.24505
2/28/2005	11:33:03	2.6297	63.66	-0.371	2.4625	0.229579
2/28/2005	11:33:12	2.7863	63.63	-0.347	2.6191	0.214728
2/28/2005	11:33:22	2.953	63.63	-0.325	2.7858	0.201114
2/28/2005	11:33:33	3.1297	63.66	-0.301	2.9625	0.186262
2/28/2005	11:33:44	3.3163	63.63	-0.279	3.1491	0.172649
2/28/2005	11:33:56	3.5147	63.63	-0.259	3.3475	0.160272
2/28/2005	11:34:09	3.7247	63.61	-0.237	3.5575	0.146658
2/28/2005	11:34:22	3.9463	63.61	-0.218	3.7791	0.134901
2/28/2005	11:34:36	4.1813	63.59	-0.198	4.0141	0.122525
2/28/2005	11:34:51	4.4297	63.54	-0.18	4.2625	0.111386
2/28/2005	11:35:07	4.693	63.52	-0.167	4.5258	0.103342
2/28/2005	11:35:24	4.973	63.5	-0.151	4.8058	0.093441
2/28/2005	11:35:41	5.2697	63.5	-0.136	5.1025	0.084158
2/28/2005	11:36:00	5.583	63.48	-0.121	5.4158	0.074876
2/28/2005	11:36:20	5.9147	63.48	-0.109	5.7475	0.06745
2/28/2005	11:36:41	6.2663	63.45	-0.1	6.0991	0.061881
2/28/2005	11:37:04	6.6397	63.45	-0.09	6.4725	0.055693
2/28/2005	11:37:27	7.0347	63.45	-0.08	6.8675	0.049505
2/28/2005	11:37:52	7.453	63.43	-0.073	7.2858	0.045173
2/28/2005	11:38:19	7.8963	63.41	-0.066	7.7291	0.040842
2/28/2005	11:38:47	8.3663	63.41	-0.06	8.1991	0.037129

In-Situ Inc. MiniTroll Pro

Report generated: 3/1/2005 8:31:00
Report from file: ...\SN11262 2005-02-28 114225 17mw20sr.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw20sr

Test defined on: 2/28/2005 11:29:34
Test started on: 2/28/2005 11:42:25
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10.0000 Minutes.
Number of data samples: 97

TOTAL DATA SAMPLES 97

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.299 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho
2/28/2005	11:42:25	0	63.39	0		
2/28/2005	11:42:25	0.005	63.43	-0.008		
2/28/2005	11:42:25	0.01	63.45	-0.012		
2/28/2005	11:42:26	0.015	63.45	-0.013		
2/28/2005	11:42:26	0.02	63.45	-0.014		
2/28/2005	11:42:26	0.025	63.48	-0.014		
2/28/2005	11:42:27	0.03	63.48	-0.015		
2/28/2005	11:42:27	0.035	63.48	-0.015		
2/28/2005	11:42:27	0.04	63.48	-0.015		
2/28/2005	11:42:27	0.045	63.48	-0.015		
2/28/2005	11:42:28	0.05	63.48	-0.016		
2/28/2005	11:42:28	0.055	63.48	0.146		
2/28/2005	11:42:28	0.06	63.48	1.213		
2/28/2005	11:42:29	0.065	63.48	4.685		
2/28/2005	11:42:29	0.07	63.48	1.863		
2/28/2005	11:42:29	0.075	63.48	2.222		
2/28/2005	11:42:30	0.08	63.48	2.71		
2/28/2005	11:42:30	0.085	63.48	2.079		
2/28/2005	11:42:30	0.09	63.48	2.471		
2/28/2005	11:42:30	0.095	63.48	2.17		
2/28/2005	11:42:31	0.1	63.5	2.313		
2/28/2005	11:42:31	0.1058	63.48	2.199		
2/28/2005	11:42:31	0.112	63.5	2.228	0	1
2/28/2005	11:42:32	0.1185	63.5	2.186	0.0065	0.981149
2/28/2005	11:42:32	0.1255	63.5	2.167	0.0135	0.972621
2/28/2005	11:42:33	0.1328	63.5	2.145	0.0208	0.962747
2/28/2005	11:42:33	0.1407	63.5	2.116	0.0287	0.949731
2/28/2005	11:42:34	0.149	63.5	2.086	0.037	0.936266
2/28/2005	11:42:34	0.1578	63.5	2.057	0.0458	0.92325
2/28/2005	11:42:35	0.1672	63.45	2.032	0.0552	0.912029
2/28/2005	11:42:35	0.177	63.45	2.004	0.065	0.899461

Plotted data

ho

2/28/2005	11:42:36	0.1875	63.45	1.974	0.0755	0.885996
2/28/2005	11:42:37	0.1985	63.45	1.945	0.0865	0.87298
2/28/2005	11:42:37	0.2102	63.45	1.914	0.0982	0.859066
2/28/2005	11:42:38	0.2227	63.45	1.883	0.1107	0.845153
2/28/2005	11:42:39	0.2358	63.45	1.852	0.1238	0.831239
2/28/2005	11:42:40	0.2498	63.45	1.819	0.1378	0.816427
2/28/2005	11:42:41	0.2647	63.45	1.787	0.1527	0.802065
2/28/2005	11:42:42	0.2803	63.43	1.753	0.1683	0.786804
2/28/2005	11:42:43	0.297	63.43	1.719	0.185	0.771544
2/28/2005	11:42:44	0.3147	63.45	1.685	0.2027	0.756284
2/28/2005	11:42:45	0.3333	63.43	1.649	0.2213	0.740126
2/28/2005	11:42:46	0.3532	63.43	1.613	0.2412	0.723968
2/28/2005	11:42:47	0.3742	63.43	1.576	0.2622	0.707361
2/28/2005	11:42:49	0.3963	63.43	1.538	0.2843	0.690305
2/28/2005	11:42:50	0.4198	63.43	1.501	0.3078	0.673698
2/28/2005	11:42:51	0.4447	63.43	1.461	0.3327	0.655745
2/28/2005	11:42:53	0.4697	63.43	1.425	0.3577	0.639587
2/28/2005	11:42:55	0.4963	63.43	1.387	0.3843	0.622531
2/28/2005	11:42:56	0.5247	63.43	1.349	0.4127	0.605476
2/28/2005	11:42:58	0.5547	63.43	1.31	0.4427	0.587971
2/28/2005	11:43:00	0.5863	63.43	1.271	0.4743	0.570467
2/28/2005	11:43:02	0.6213	63.43	1.23	0.5093	0.552065
2/28/2005	11:43:04	0.658	63.43	1.19	0.546	0.534111
2/28/2005	11:43:07	0.6963	63.43	1.15	0.5843	0.516158
2/28/2005	11:43:09	0.738	63.43	1.109	0.626	0.497756
2/28/2005	11:43:12	0.7813	63.43	1.068	0.6693	0.479354
2/28/2005	11:43:14	0.828	63.43	1.027	0.716	0.460952
2/28/2005	11:43:17	0.8763	63.43	0.987	0.7643	0.442998
2/28/2005	11:43:20	0.928	63.43	0.945	0.816	0.424147
2/28/2005	11:43:24	0.983	63.43	0.905	0.871	0.406194
2/28/2005	11:43:27	1.0413	63.41	0.865	0.9293	0.388241
2/28/2005	11:43:31	1.103	63.41	0.827	0.991	0.371185
2/28/2005	11:43:35	1.168	63.41	0.787	1.056	0.353232
2/28/2005	11:43:39	1.238	63.41	0.749	1.126	0.336176
2/28/2005	11:43:43	1.3113	63.41	0.712	1.1993	0.319569
2/28/2005	11:43:48	1.3897	63.41	0.676	1.2777	0.303411
2/28/2005	11:43:53	1.473	63.41	0.641	1.361	0.287702
2/28/2005	11:43:58	1.5613	63.39	0.605	1.4493	0.271544
2/28/2005	11:44:04	1.6547	63.39	0.573	1.5427	0.257181
2/28/2005	11:44:10	1.753	63.39	0.539	1.641	0.241921
2/28/2005	11:44:16	1.858	63.39	0.507	1.746	0.227558
2/28/2005	11:44:23	1.968	63.39	0.475	1.856	0.213196
2/28/2005	11:44:30	2.0847	63.39	0.446	1.9727	0.20048
2/28/2005	11:44:37	2.2097	63.39	0.414	2.0977	0.185817
2/28/2005	11:44:45	2.3413	63.39	0.386	2.2293	0.17325
2/28/2005	11:44:54	2.4813	63.39	0.358	2.3693	0.160682
2/28/2005	11:45:03	2.6297	63.39	0.332	2.5177	0.149013
2/28/2005	11:45:12	2.7863	63.39	0.307	2.6743	0.137792
2/28/2005	11:45:22	2.953	63.39	0.283	2.841	0.12702
2/28/2005	11:45:33	3.1297	63.36	0.259	3.0177	0.116248
2/28/2005	11:45:44	3.3163	63.36	0.239	3.2043	0.107271
2/28/2005	11:45:56	3.5147	63.36	0.219	3.4027	0.098294
2/28/2005	11:46:08	3.7247	63.34	0.2	3.6127	0.089767
2/28/2005	11:46:22	3.9463	63.34	0.183	3.8343	0.082136
2/28/2005	11:46:36	4.1813	63.32	0.168	4.0693	0.075404
2/28/2005	11:46:51	4.4297	63.32	0.154	4.3177	0.06912
2/28/2005	11:47:06	4.693	63.3	0.14	4.581	0.062837
2/28/2005	11:47:23	4.973	63.3	0.129	4.861	0.057899
2/28/2005	11:47:41	5.2697	63.3	0.116	5.1577	0.052065
2/28/2005	11:48:00	5.583	63.3	0.107	5.471	0.048025
2/28/2005	11:48:20	5.9147	63.3	0.099	5.8027	0.044434
2/28/2005	11:48:41	6.2663	63.27	0.09	6.1543	0.040395
2/28/2005	11:49:03	6.6397	63.3	0.081	6.5277	0.036355
2/28/2005	11:49:27	7.0347	63.27	0.075	6.9227	0.033662
2/28/2005	11:49:52	7.453	63.27	0.07	7.341	0.031418
2/28/2005	11:50:19	7.8963	63.27	0.065	7.7843	0.029174

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW21S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By: SWR
Checked By: CD

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	1.37 = To

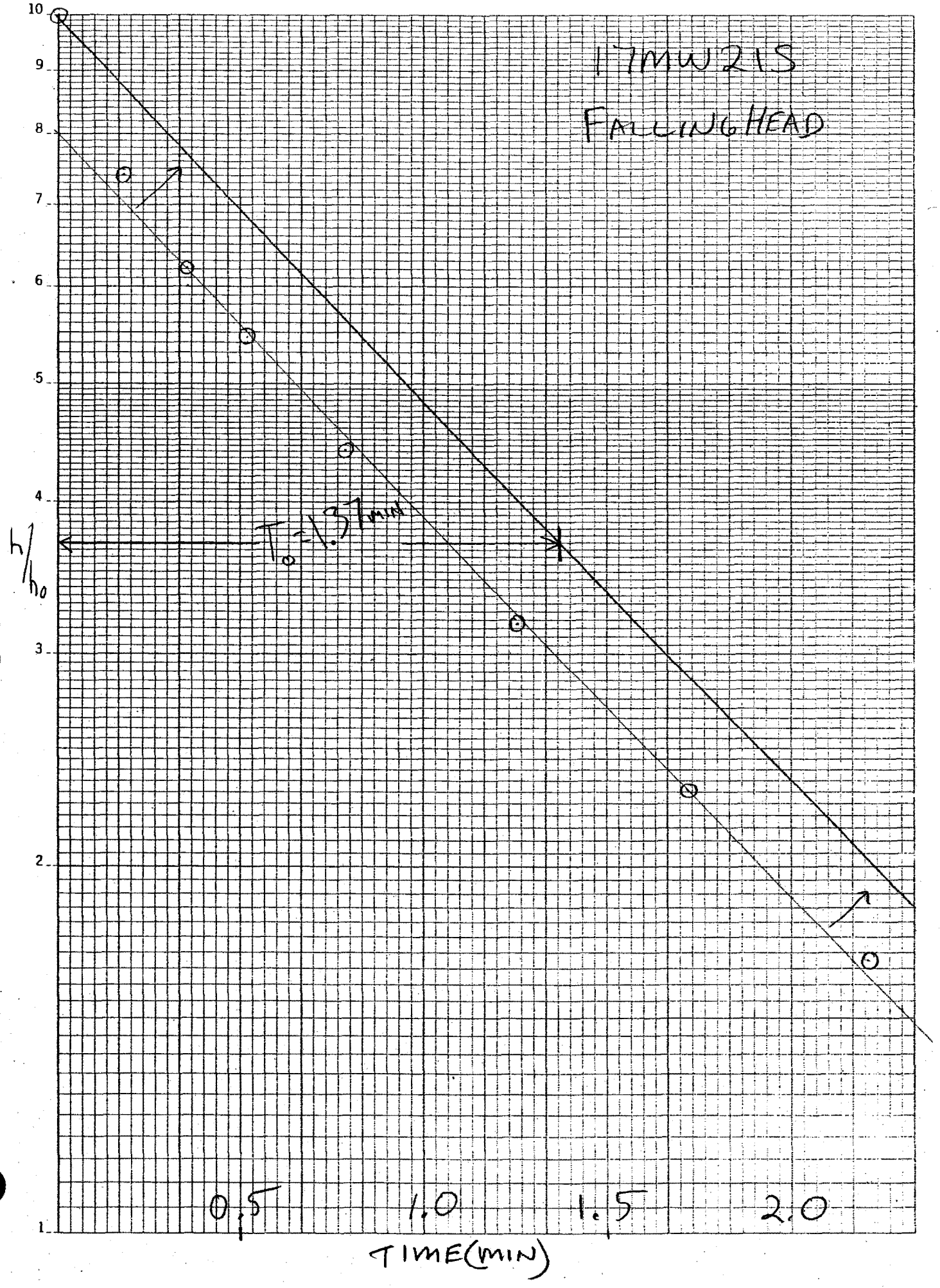
Hydraulic Conductivity (K) :

1.21E-03	ft./min.
2.02E-05	ft./sec.
1.75E+00	ft./day
6.16E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******



46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW21S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By: JLWR
Checked By: CD

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	1.85 = To

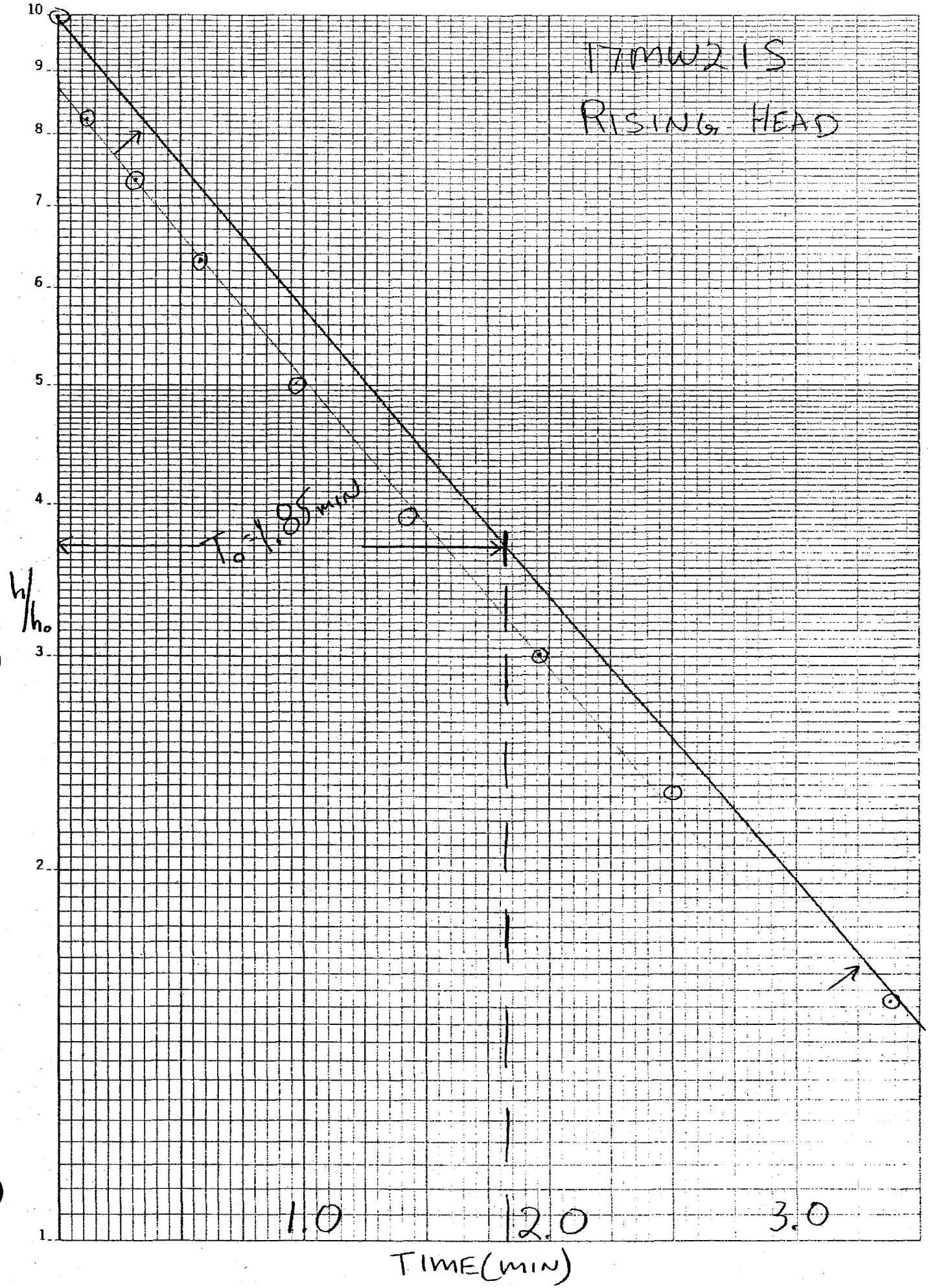
Hydraulic Conductivity (K) :

8.99E-04	ft./min.
1.50E-05	ft./sec.
1.29E+00	ft./day
4.56E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******



K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS KEUFFEL & ESSER CO. MADE IN U.S.A. 46 4650

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: SWMU 16/17 RFI CHARLESTON NWS WELL/BORING NO.: 17MW21S

PROJECT NO.: 0528 GEOLOGIST: FRED W RAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10, 8-18 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 6.43 (TOC) DATE: 2-23-05

TEST TYPE (Rising/Falling/Constant Head): FALLING CHECKED: C Doolan

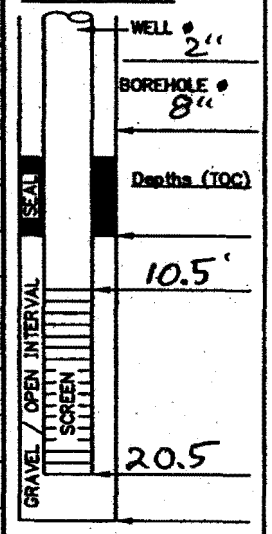
METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG 4.9' x 0.13' PAGE 1 OF

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

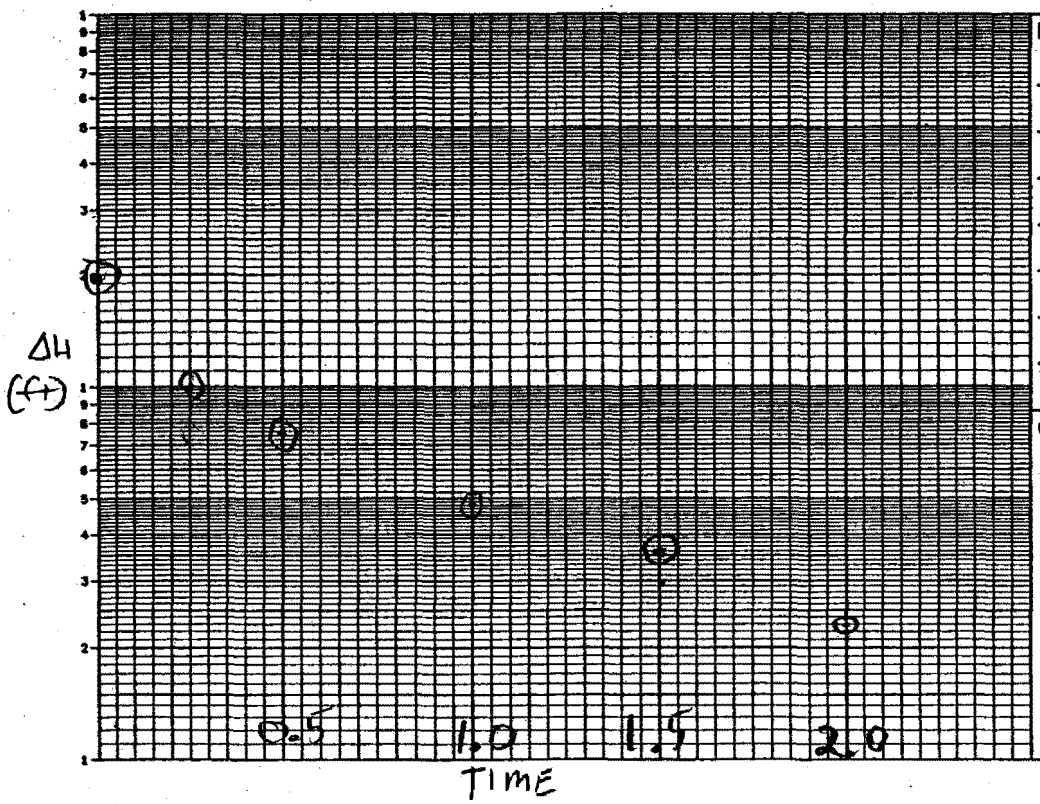
ACAD: FORM_HYDCONTST.dwg 07/06/99 INL

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.05		2.989	3.5147		0.085
0.10		1.468	4.6930		0.022
0.1985		1.007	5.2697		0.003
0.2498		0.939			
0.3147		0.870			
0.4963		0.728			
0.7380		0.599			
0.9830		0.498			
1.3113		0.395			
1.7530		0.290			
2.0847		0.234			
2.7863		0.146			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

STARTED TEST @ 1136

CALCS, SKETCH MAPS, ETC.:

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: SWMU 16/17 CHARLESTON NWS WELL/BORING NO.: 17MW21S

PROJECT NO.: 0528 GEOLOGIST: FREDWRAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10', 8-18 TEST NO.: 2

STATIC WATER LEVEL (Depth/Elevation): 6.43 DATE: 2-23-05

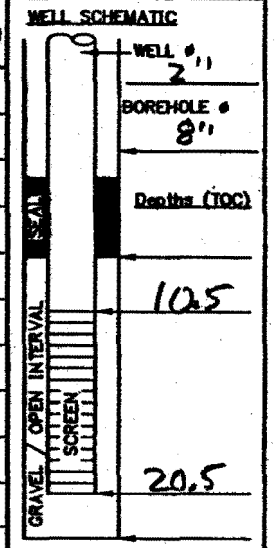
TEST TYPE (Rising/Falling/Constant Head): RISING HEAD CHECKED: C. Doolan

METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG 4.9 x 0.13 PAGE 1 OF 1

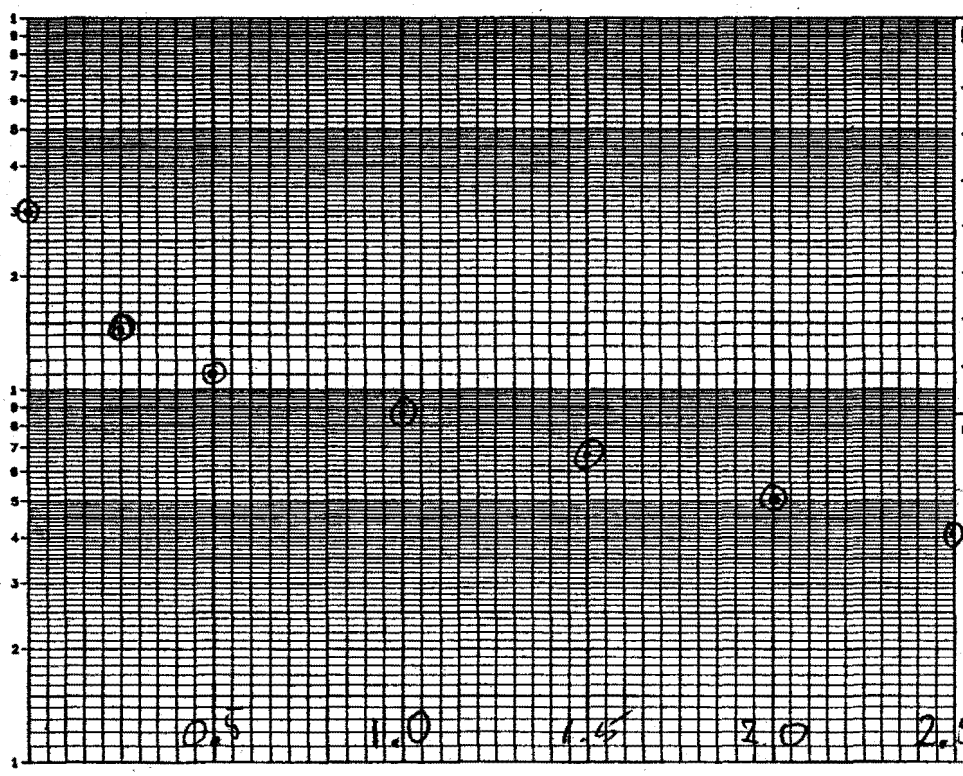
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.085		2.593	3.7247		0.239
0.100		1.909	4.4297		0.175
0.1985		1.495	5.2697		0.125
0.2498		1.427			
0.4963		1.205			
0.7380		1.043			
1.0413		0.873			
1.4730		0.694			
1.7530		0.600			
2.0847		0.510			
2.4813		0.421			
3.1297		0.315			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

CALCS, SKETCH MAPS, ETC.:

ACAD: FORM_HYDCONTST.dwg 07/06/99 INL

In-Situ Inc. MiniTroll Pro

Report generated: 2/23/2005 15:39:15
Report from file: ...\SN11262 2005-02-23 123610 17mw21fh.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw21fh

Test defined on: 2/23/2005 10:20:36
Test started on: 2/23/2005 12:36:10
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10.00 Minutes.
Number of data samples: 93

TOTAL DATA SAMPLES 93

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: Surface
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 11.612 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/23/2005	12:36:10	0	66.29	0			Plotted data
2/23/2005	12:36:11	0.005	66.34	0.007			
2/23/2005	12:36:11	0.01	66.36	0.009			
2/23/2005	12:36:11	0.015	66.36	0.012			
2/23/2005	12:36:12	0.02	66.36	0.012			
2/23/2005	12:36:12	0.025	66.38	0.012			
2/23/2005	12:36:12	0.03	66.38	0.014			
2/23/2005	12:36:12	0.035	66.38	0.019			
2/23/2005	12:36:13	0.04	66.38	0.628			
2/23/2005	12:36:13	0.045	66.38	2.018			
2/23/2005	12:36:13	0.05	66.38	2.989			
2/23/2005	12:36:14	0.055	66.38	3.435			
2/23/2005	12:36:14	0.06	66.38	2.774			
2/23/2005	12:36:14	0.065	66.38	1.485			
2/23/2005	12:36:15	0.07	66.38	1.305			
2/23/2005	12:36:15	0.075	66.38	0.71			
2/23/2005	12:36:15	0.08	66.38	0.772			
2/23/2005	12:36:15	0.085	66.38	1.058			
2/23/2005	12:36:16	0.09	66.41	1.332			
2/23/2005	12:36:16	0.095	66.41	1.476			
2/23/2005	12:36:16	0.1	66.41	1.468			
2/23/2005	12:36:17	0.1058	66.41	1.322			
2/23/2005	12:36:17	0.112	66.41	1.148			
2/23/2005	12:36:17	0.1185	66.41	1.088			
2/23/2005	12:36:18	0.1255	66.41	1.14			

2/23/2005	12:36:18	0.1328	66.41	1.174	0	1	ho
2/23/2005	12:36:19	0.1407	66.41	1.15	0.0079	0.979557	
2/23/2005	12:36:19	0.149	66.41	1.102	0.0162	0.938671	
2/23/2005	12:36:20	0.1578	66.41	1.077	0.025	0.917376	
2/23/2005	12:36:20	0.1672	66.36	1.065	0.0344	0.907155	
2/23/2005	12:36:21	0.177	66.36	1.05	0.0442	0.894378	
2/23/2005	12:36:22	0.1875	66.36	1.027	0.0547	0.874787	
2/23/2005	12:36:22	0.1985	66.36	1.007	0.0657	0.857751	
2/23/2005	12:36:23	0.2102	66.36	0.992	0.0774	0.844974	
2/23/2005	12:36:24	0.2227	66.34	0.974	0.0899	0.829642	
2/23/2005	12:36:25	0.2358	66.34	0.957	0.103	0.815162	
2/23/2005	12:36:25	0.2498	66.34	0.939	0.117	0.79983	
2/23/2005	12:36:26	0.2647	66.34	0.922	0.1319	0.785349	
2/23/2005	12:36:27	0.2803	66.34	0.904	0.1475	0.770017	
2/23/2005	12:36:28	0.297	66.34	0.887	0.1642	0.755537	
2/23/2005	12:36:29	0.3147	66.34	0.87	0.1819	0.741056	
2/23/2005	12:36:30	0.3333	66.34	0.853	0.2005	0.726576	
2/23/2005	12:36:32	0.3532	66.34	0.834	0.2204	0.710392	
2/23/2005	12:36:33	0.3742	66.32	0.817	0.2414	0.695911	
2/23/2005	12:36:34	0.3963	66.32	0.798	0.2635	0.679727	
2/23/2005	12:36:36	0.4198	66.32	0.781	0.287	0.665247	
2/23/2005	12:36:37	0.4447	66.32	0.763	0.3119	0.649915	
2/23/2005	12:36:39	0.4697	66.32	0.746	0.3369	0.635434	
2/23/2005	12:36:40	0.4963	66.32	0.728	0.3635	0.620102	
2/23/2005	12:36:42	0.5247	66.32	0.711	0.3919	0.605622	
2/23/2005	12:36:44	0.5547	66.32	0.694	0.4219	0.591141	
2/23/2005	12:36:46	0.5863	66.32	0.675	0.4535	0.574957	
2/23/2005	12:36:48	0.6213	66.32	0.656	0.4885	0.558773	
2/23/2005	12:36:50	0.658	66.32	0.639	0.5252	0.544293	
2/23/2005	12:36:52	0.6963	66.32	0.617	0.5635	0.525554	
2/23/2005	12:36:55	0.738	66.32	0.599	0.6052	0.510221	
2/23/2005	12:36:57	0.7813	66.29	0.579	0.6485	0.493186	
2/23/2005	12:37:00	0.828	66.29	0.559	0.6952	0.47615	
2/23/2005	12:37:03	0.8763	66.29	0.539	0.7435	0.459114	
2/23/2005	12:37:06	0.928	66.32	0.519	0.7952	0.442078	
2/23/2005	12:37:09	0.983	66.32	0.498	0.8502	0.424191	
2/23/2005	12:37:13	1.0413	66.32	0.478	0.9085	0.407155	
2/23/2005	12:37:17	1.103	66.32	0.456	0.9702	0.388416	
2/23/2005	12:37:20	1.168	66.32	0.436	1.0352	0.37138	
2/23/2005	12:37:25	1.238	66.32	0.415	1.1052	0.353492	
2/23/2005	12:37:29	1.3113	66.32	0.395	1.1785	0.336457	
2/23/2005	12:37:34	1.3897	66.32	0.374	1.2569	0.318569	
2/23/2005	12:37:39	1.473	66.32	0.353	1.3402	0.300681	
2/23/2005	12:37:44	1.5613	66.32	0.332	1.4285	0.282794	
2/23/2005	12:37:50	1.6547	66.29	0.309	1.5219	0.263203	
2/23/2005	12:37:56	1.753	66.29	0.29	1.6202	0.247019	
2/23/2005	12:38:02	1.858	66.27	0.271	1.7252	0.230835	
2/23/2005	12:38:08	1.968	66.27	0.252	1.8352	0.214651	
2/23/2005	12:38:15	2.0847	66.27	0.234	1.9519	0.199319	
2/23/2005	12:38:23	2.2097	66.27	0.216	2.0769	0.183986	
2/23/2005	12:38:31	2.3413	66.27	0.197	2.2085	0.167802	
2/23/2005	12:38:39	2.4813	66.27	0.18	2.3485	0.153322	
2/23/2005	12:38:48	2.6297	66.27	0.164	2.4969	0.139693	
2/23/2005	12:38:58	2.7863	66.27	0.146	2.6535	0.124361	
2/23/2005	12:39:08	2.953	66.27	0.13	2.8202	0.110733	
2/23/2005	12:39:18	3.1297	66.29	0.114	2.9969	0.097104	
2/23/2005	12:39:29	3.3163	66.29	0.099	3.1835	0.084327	
2/23/2005	12:39:41	3.5147	66.29	0.085	3.3819	0.072402	
2/23/2005	12:39:54	3.7247	66.29	0.07	3.5919	0.059625	
2/23/2005	12:40:07	3.9463	66.32	0.056	3.8135	0.0477	
2/23/2005	12:40:21	4.1813	66.34	0.042	4.0485	0.035775	
2/23/2005	12:40:36	4.4297	66.36	0.031	4.2969	0.026405	
2/23/2005	12:40:52	4.693	66.38	0.022	4.5602	0.018739	
2/23/2005	12:41:09	4.973	66.41	0.013	4.8402	0.011073	
2/23/2005	12:41:27	5.2697	66.41	0.003	5.1369	0.002555	
2/23/2005	12:41:45	5.583	66.38	-0.006	5.4502	-0.005111	
2/23/2005	12:42:05	5.9147	66.36	-0.011	5.7819	-0.00937	
2/23/2005	12:42:26	6.2663	66.34	-0.017	6.1335	-0.01448	

In-Situ Inc. MiniTroll Pro

Report generated: 2/23/2005 15:43:46
Report from file: ...\SN11262 2005-02-23 125210 17mw21rh.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw21rh

Test defined on: 2/23/2005 10:23:21
Test started on: 2/23/2005 12:52:10
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10.0000 Minutes.
Number of data samples: 97

TOTAL DATA SAMPLES 97

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: Surface
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 11.539 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/23/2005	12:52:10	0	66.38	0			Plotted data
2/23/2005	12:52:10	0.005	66.43	0.008			
2/23/2005	12:52:10	0.01	66.45	0.01			
2/23/2005	12:52:11	0.015	66.45	0.013			
2/23/2005	12:52:11	0.02	66.45	0.014			
2/23/2005	12:52:11	0.025	66.47	0.014			
2/23/2005	12:52:12	0.03	66.47	0.015			
2/23/2005	12:52:12	0.035	66.47	0.015			
2/23/2005	12:52:12	0.04	66.47	-0.026			
2/23/2005	12:52:12	0.045	66.47	-0.225			
2/23/2005	12:52:13	0.05	66.47	-0.503			
2/23/2005	12:52:13	0.055	66.47	-5.017			
2/23/2005	12:52:13	0.06	66.47	-2.012			
2/23/2005	12:52:14	0.065	66.47	-0.529			
2/23/2005	12:52:14	0.07	66.47	-3.435			
2/23/2005	12:52:14	0.075	66.47	-1.689			
2/23/2005	12:52:15	0.08	66.47	-1.378			
2/23/2005	12:52:15	0.085	66.5	-2.593			
2/23/2005	12:52:15	0.09	66.5	-1.381			
2/23/2005	12:52:15	0.095	66.5	-1.922			
2/23/2005	12:52:16	0.1	66.5	-1.909			
2/23/2005	12:52:16	0.1058	66.5	-1.575			
2/23/2005	12:52:16	0.112	66.5	-1.841			
2/23/2005	12:52:17	0.1185	66.5	-1.587			
2/23/2005	12:52:17	0.1255	66.5	-1.69	0	1	ho
2/23/2005	12:52:18	0.1328	66.5	-1.632	0.0073	0.96568	
2/23/2005	12:52:18	0.1407	66.5	-1.573	0.0152	0.930769	
2/23/2005	12:52:19	0.149	66.5	-1.61	0.0235	0.952663	
2/23/2005	12:52:19	0.1578	66.5	-1.559	0.0323	0.922485	
2/23/2005	12:52:20	0.1672	66.47	-1.534	0.0417	0.907692	
2/23/2005	12:52:20	0.177	66.47	-1.528	0.0515	0.904142	

2/23/2005	12:52:21	0.1875	66.47	-1.514	0.062	0.895858
2/23/2005	12:52:22	0.1985	66.47	-1.495	0.073	0.884615
2/23/2005	12:52:22	0.2102	66.47	-1.476	0.0847	0.873373
2/23/2005	12:52:23	0.2227	66.47	-1.46	0.0972	0.863905
2/23/2005	12:52:24	0.2358	66.47	-1.444	0.1103	0.854438
2/23/2005	12:52:25	0.2498	66.47	-1.427	0.1243	0.844379
2/23/2005	12:52:26	0.2647	66.47	-1.41	0.1392	0.83432
2/23/2005	12:52:27	0.2803	66.47	-1.393	0.1548	0.82426
2/23/2005	12:52:28	0.297	66.47	-1.375	0.1715	0.813609
2/23/2005	12:52:29	0.3147	66.47	-1.358	0.1892	0.80355
2/23/2005	12:52:30	0.3333	66.47	-1.339	0.2078	0.792308
2/23/2005	12:52:31	0.3532	66.47	-1.322	0.2277	0.782249
2/23/2005	12:52:32	0.3742	66.47	-1.303	0.2487	0.771006
2/23/2005	12:52:33	0.3963	66.5	-1.283	0.2708	0.759172
2/23/2005	12:52:35	0.4198	66.5	-1.265	0.2943	0.748521
2/23/2005	12:52:36	0.4447	66.5	-1.245	0.3192	0.736686
2/23/2005	12:52:38	0.4697	66.5	-1.225	0.3442	0.724852
2/23/2005	12:52:39	0.4963	66.5	-1.205	0.3708	0.713018
2/23/2005	12:52:41	0.5247	66.5	-1.183	0.3992	0.7
2/23/2005	12:52:43	0.5547	66.5	-1.162	0.4292	0.687574
2/23/2005	12:52:45	0.5863	66.5	-1.139	0.4608	0.673964
2/23/2005	12:52:47	0.6213	66.52	-1.116	0.4958	0.660355
2/23/2005	12:52:49	0.658	66.5	-1.092	0.5325	0.646154
2/23/2005	12:52:51	0.6963	66.52	-1.068	0.5708	0.631953
2/23/2005	12:52:54	0.738	66.52	-1.043	0.6125	0.61716
2/23/2005	12:52:57	0.7813	66.52	-1.017	0.6558	0.601775
2/23/2005	12:52:59	0.828	66.52	-0.99	0.7025	0.585799
2/23/2005	12:53:02	0.8763	66.52	-0.963	0.7508	0.569822
2/23/2005	12:53:05	0.928	66.52	-0.935	0.8025	0.553254
2/23/2005	12:53:09	0.983	66.52	-0.907	0.8575	0.536686
2/23/2005	12:53:12	1.0413	66.52	-0.878	0.9158	0.519527
2/23/2005	12:53:16	1.103	66.52	-0.847	0.9775	0.501183
2/23/2005	12:53:20	1.168	66.52	-0.818	1.0425	0.484024
2/23/2005	12:53:24	1.238	66.52	-0.787	1.1125	0.46568
2/23/2005	12:53:28	1.3113	66.52	-0.756	1.1858	0.447337
2/23/2005	12:53:33	1.3897	66.52	-0.724	1.2642	0.428402
2/23/2005	12:53:38	1.473	66.54	-0.694	1.3475	0.410651
2/23/2005	12:53:43	1.5613	66.54	-0.662	1.4358	0.391716
2/23/2005	12:53:49	1.6547	66.54	-0.631	1.5292	0.373373
2/23/2005	12:53:55	1.753	66.54	-0.6	1.6275	0.35503
2/23/2005	12:54:01	1.858	66.52	-0.57	1.7325	0.337278
2/23/2005	12:54:08	1.968	66.52	-0.541	1.8425	0.320118
2/23/2005	12:54:15	2.0847	66.52	-0.51	1.9592	0.301775
2/23/2005	12:54:22	2.2097	66.52	-0.481	2.0842	0.284615
2/23/2005	12:54:30	2.3413	66.52	-0.451	2.2158	0.266864
2/23/2005	12:54:39	2.4813	66.5	-0.421	2.3558	0.249112
2/23/2005	12:54:47	2.6297	66.5	-0.392	2.5042	0.231953
2/23/2005	12:54:57	2.7863	66.5	-0.366	2.6608	0.216568
2/23/2005	12:55:07	2.953	66.47	-0.339	2.8275	0.200592
2/23/2005	12:55:17	3.1297	66.47	-0.315	3.0042	0.186391
2/23/2005	12:55:29	3.3163	66.45	-0.289	3.1908	0.171006
2/23/2005	12:55:41	3.5147	66.45	-0.264	3.3892	0.156213
2/23/2005	12:55:53	3.7247	66.45	-0.239	3.5992	0.14142
2/23/2005	12:56:06	3.9463	66.45	-0.216	3.8208	0.127811
2/23/2005	12:56:21	4.1813	66.47	-0.195	4.0558	0.115385
2/23/2005	12:56:35	4.4297	66.47	-0.175	4.3042	0.10355
2/23/2005	12:56:51	4.693	66.5	-0.156	4.5675	0.092308
2/23/2005	12:57:08	4.973	66.5	-0.14	4.8475	0.08284
2/23/2005	12:57:26	5.2697	66.47	-0.125	5.1442	0.073964
2/23/2005	12:57:45	5.583	66.47	-0.11	5.4575	0.065089
2/23/2005	12:58:05	5.9147	66.47	-0.097	5.7892	0.057396
2/23/2005	12:58:26	6.2663	66.47	-0.086	6.1408	0.050888
2/23/2005	12:58:48	6.6397	66.5	-0.076	6.5142	0.04497
2/23/2005	12:59:12	7.0347	66.5	-0.068	6.9092	0.040237
2/23/2005	12:59:37	7.453	66.45	-0.055	7.3275	0.032544
2/23/2005	13:00:03	7.8963	66.43	-0.049	7.7708	0.028994

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW22S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By: FWR
Checked By: CD

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	1.54 = To

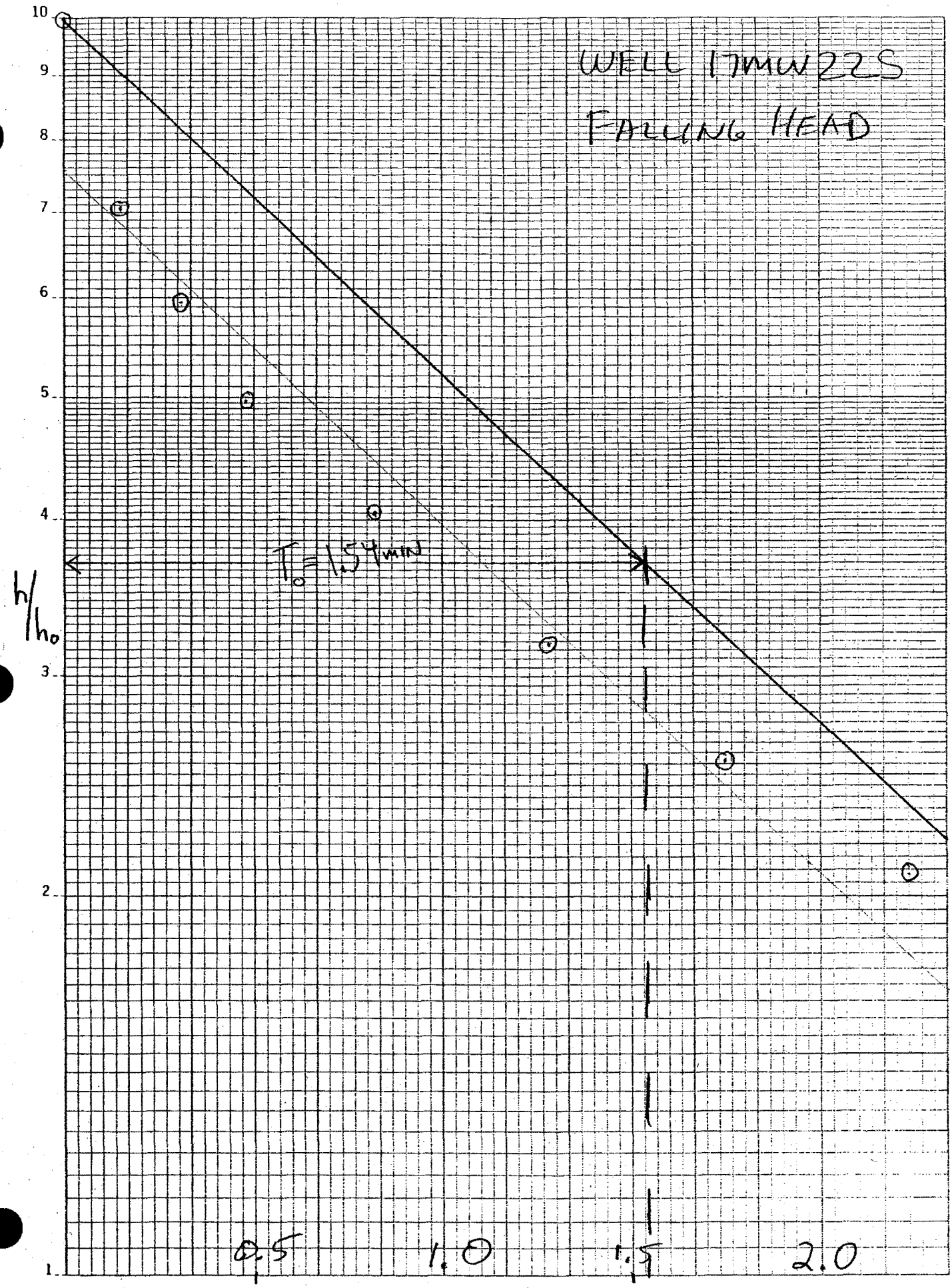
Hydraulic Conductivity (K) :

1.08E-03	ft./min.
1.80E-05	ft./sec.
1.55E+00	ft./day
5.48E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******



46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW22S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By: FWR
Checked By: CD

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	2.20 = To

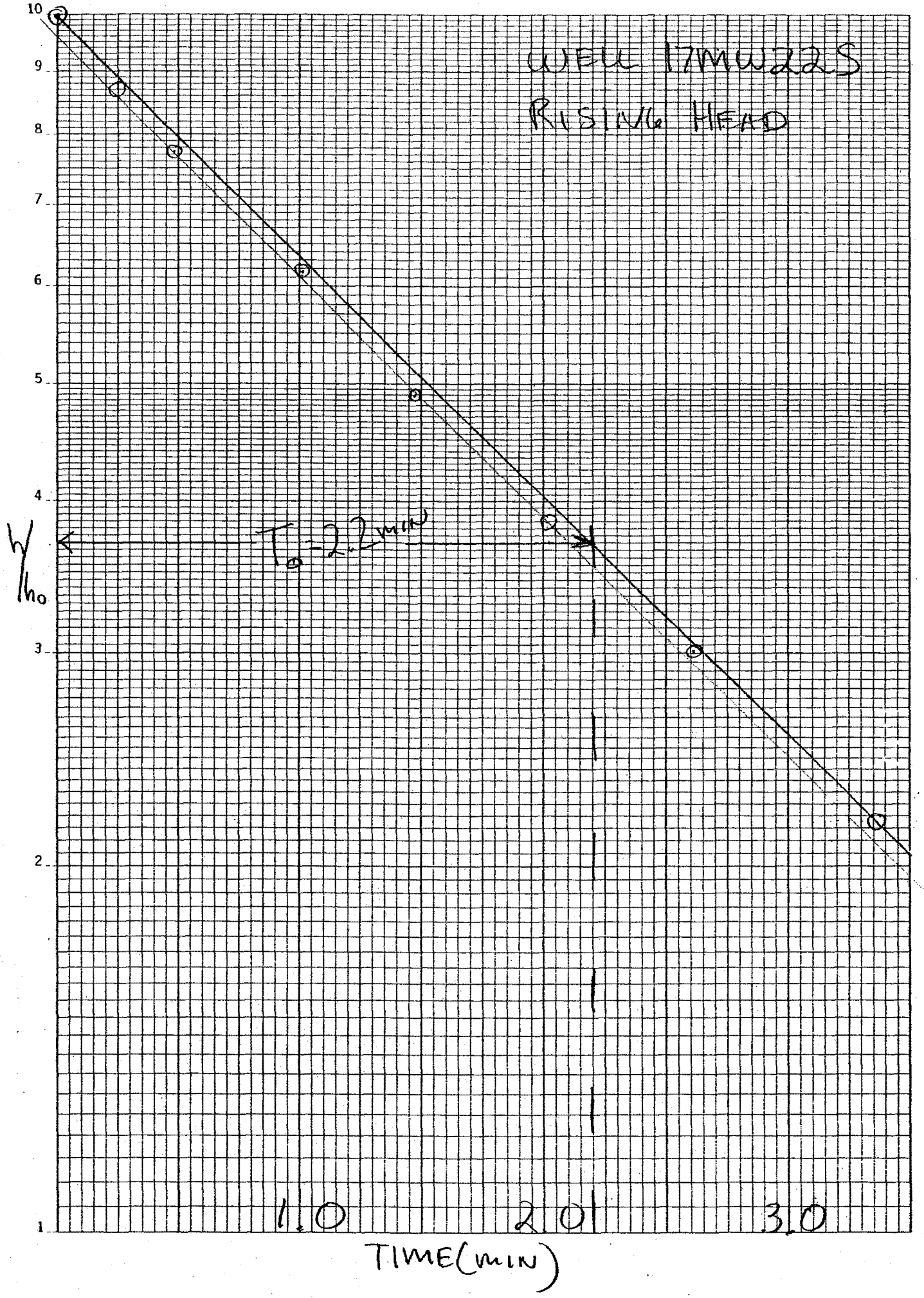
Hydraulic Conductivity (K) :

7.56E-04	ft./min.
1.26E-05	ft./sec.
1.09E+00	ft./day
3.84E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW22S
RISING HEAD
$T_0 = 2.2$ MIN
h/h_0
10
9
8
7
6
5
4
3
2
1
1.0
2.0
3.0
TIME (MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: SWMU 16/17 CHARLESTON NWS WELL/BORING NO.: MW22S

PROJECT NO.: 0528 GEOLOGIST: FRED W RAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10, 10-20 TEST NO.: 2

STATIC WATER LEVEL (Depth/Elevation): 6.10 DATE: 2-23-05

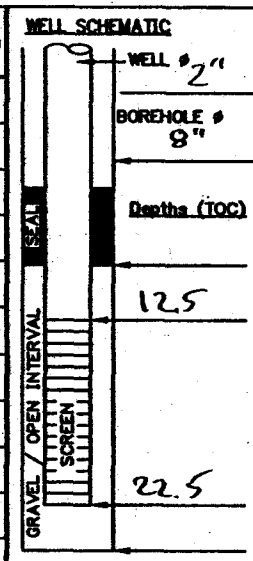
TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED: C Doolan

METHOD OF INDUCING WATER LEVEL CHANGE: 4.9 X 0.13 SOLID SLUG PAGE ..... OF .....

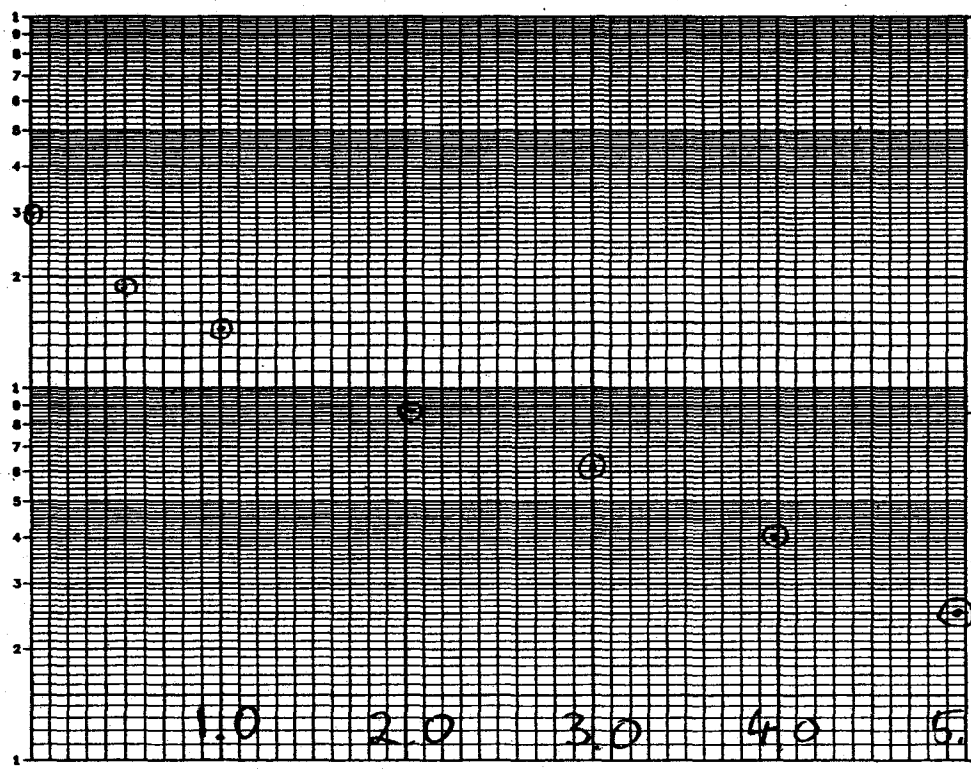
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

ELAPSED TIME (min or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.06		2.541	4.97		0.272
0.1058		2.389	5.9147		0.199
0.2102		2.110	7.8963		0.113
0.3147		1.998			
0.6213		1.714			
1.1680		1.324			
1.6547		1.066			
2.2097		0.836			
2.4813		0.744			
2.9530		0.609			
3.5147		0.478			
4.4297		0.333			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

CALCS, SKETCH MAPS, ETC.:

ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

In-Situ Inc. MiniTroll Pro

Report generated: 2/24/2005 9:38:25
Report from file: ...\SN11262 2005-02-23 134832 17mw22rh.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw22rh

Test defined on: 2/23/2005 10:28:13
Test started on: 2/23/2005 13:48:32
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10.0000 Minutes.
Number of data samples: 97

TOTAL DATA SAMPLES 97

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 11.869 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/23/2005	13:48:32	0	66.43	0			Plotted data
2/23/2005	13:48:33	0.005	66.47	-0.007			
2/23/2005	13:48:33	0.01	66.5	-0.004			
2/23/2005	13:48:33	0.015	66.5	-0.013			
2/23/2005	13:48:34	0.02	66.5	-0.017			
2/23/2005	13:48:34	0.025	66.5	-0.014			
2/23/2005	13:48:34	0.03	66.52	-0.01			
2/23/2005	13:48:34	0.035	66.52	-0.006			
2/23/2005	13:48:35	0.04	66.52	4.039			
2/23/2005	13:48:35	0.045	66.52	4.688			
2/23/2005	13:48:35	0.05	66.52	0.318			
2/23/2005	13:48:36	0.055	66.52	3.668			
2/23/2005	13:48:36	0.06	66.52	2.541			
2/23/2005	13:48:36	0.065	66.52	1.484			
2/23/2005	13:48:37	0.07	66.52	3.32			
2/23/2005	13:48:37	0.075	66.52	1.797			
2/23/2005	13:48:37	0.08	66.54	2.433			
2/23/2005	13:48:37	0.085	66.52	2.455			
2/23/2005	13:48:38	0.09	66.52	1.993			
2/23/2005	13:48:38	0.095	66.54	2.556			
2/23/2005	13:48:38	0.1	66.52	2.067			
2/23/2005	13:48:39	0.1058	66.54	2.389			
2/23/2005	13:48:39	0.112	66.54	2.126			
2/23/2005	13:48:39	0.1185	66.54	2.327			
2/23/2005	13:48:40	0.1255	66.54	2.144			
2/23/2005	13:48:40	0.1328	66.54	2.239			
2/23/2005	13:48:41	0.1407	66.54	2.207			
2/23/2005	13:48:41	0.149	66.54	2.154			
2/23/2005	13:48:42	0.1578	66.54	2.172			
2/23/2005	13:48:42	0.1672	66.52	2.175	0	1	ho
2/23/2005	13:48:43	0.177	66.52	2.155	0.0098	0.990805	

2/23/2005	13:48:44	0.1875	66.52	2.138	0.0203	0.982989
2/23/2005	13:48:44	0.1985	66.52	2.123	0.0313	0.976092
2/23/2005	13:48:45	0.2102	66.52	2.11	0.043	0.970115
2/23/2005	13:48:46	0.2227	66.52	2.097	0.0555	0.964138
2/23/2005	13:48:46	0.2358	66.52	2.082	0.0686	0.957241
2/23/2005	13:48:47	0.2498	66.52	2.067	0.0826	0.950345
2/23/2005	13:48:48	0.2647	66.52	2.051	0.0975	0.942989
2/23/2005	13:48:49	0.2803	66.52	2.033	0.1131	0.934713
2/23/2005	13:48:50	0.297	66.52	2.017	0.1298	0.927356
2/23/2005	13:48:51	0.3147	66.54	1.998	0.1475	0.918621
2/23/2005	13:48:52	0.3333	66.54	1.978	0.1661	0.909425
2/23/2005	13:48:54	0.3532	66.54	1.958	0.186	0.90023
2/23/2005	13:48:55	0.3742	66.54	1.939	0.207	0.891494
2/23/2005	13:48:56	0.3963	66.54	1.916	0.2291	0.88092
2/23/2005	13:48:58	0.4198	66.54	1.894	0.2526	0.870805
2/23/2005	13:48:59	0.4447	66.56	1.87	0.2775	0.85977
2/23/2005	13:49:01	0.4697	66.56	1.846	0.3025	0.848736
2/23/2005	13:49:02	0.4963	66.56	1.822	0.3291	0.837701
2/23/2005	13:49:04	0.5247	66.56	1.797	0.3575	0.826207
2/23/2005	13:49:06	0.5547	66.56	1.77	0.3875	0.813793
2/23/2005	13:49:08	0.5863	66.56	1.743	0.4191	0.801379
2/23/2005	13:49:10	0.6213	66.56	1.714	0.4541	0.788046
2/23/2005	13:49:12	0.658	66.56	1.683	0.4908	0.773793
2/23/2005	13:49:14	0.6963	66.56	1.653	0.5291	0.76
2/23/2005	13:49:17	0.738	66.56	1.619	0.5708	0.744368
2/23/2005	13:49:19	0.7813	66.56	1.586	0.6141	0.729195
2/23/2005	13:49:22	0.828	66.59	1.552	0.6608	0.713563
2/23/2005	13:49:25	0.8763	66.59	1.517	0.7091	0.697471
2/23/2005	13:49:28	0.928	66.59	1.481	0.7608	0.68092
2/23/2005	13:49:31	0.983	66.59	1.442	0.8158	0.662989
2/23/2005	13:49:35	1.0413	66.59	1.404	0.8741	0.645517
2/23/2005	13:49:39	1.103	66.59	1.365	0.9358	0.627586
2/23/2005	13:49:42	1.168	66.59	1.324	1.0008	0.608736
2/23/2005	13:49:47	1.238	66.61	1.283	1.0708	0.589885
2/23/2005	13:49:51	1.3113	66.61	1.242	1.1441	0.571034
2/23/2005	13:49:56	1.3897	66.61	1.198	1.2225	0.550805
2/23/2005	13:50:01	1.473	66.61	1.154	1.3058	0.530575
2/23/2005	13:50:06	1.5613	66.63	1.111	1.3941	0.510805
2/23/2005	13:50:12	1.6547	66.63	1.066	1.4875	0.490115
2/23/2005	13:50:18	1.753	66.63	1.02	1.5858	0.468966
2/23/2005	13:50:24	1.858	66.63	0.974	1.6908	0.447816
2/23/2005	13:50:30	1.968	66.61	0.926	1.8008	0.425747
2/23/2005	13:50:37	2.0847	66.61	0.881	1.9175	0.405057
2/23/2005	13:50:45	2.2097	66.61	0.836	2.0425	0.384368
2/23/2005	13:50:53	2.3413	66.61	0.79	2.1741	0.363218
2/23/2005	13:51:01	2.4813	66.61	0.744	2.3141	0.342069
2/23/2005	13:51:10	2.6297	66.63	0.7	2.4625	0.321839
2/23/2005	13:51:20	2.7863	66.65	0.655	2.6191	0.301149
2/23/2005	13:51:30	2.953	66.68	0.609	2.7858	0.28
2/23/2005	13:51:40	3.1297	66.7	0.563	2.9625	0.258851
2/23/2005	13:51:51	3.3163	66.72	0.52	3.1491	0.23908
2/23/2005	13:52:03	3.5147	66.77	0.478	3.3475	0.21977
2/23/2005	13:52:16	3.7247	66.79	0.438	3.5575	0.201379
2/23/2005	13:52:29	3.9463	66.81	0.401	3.7791	0.184368
2/23/2005	13:52:43	4.1813	66.83	0.368	4.0141	0.169195
2/23/2005	13:52:58	4.4297	66.83	0.333	4.2625	0.153103
2/23/2005	13:53:14	4.693	66.83	0.3	4.5258	0.137931
2/23/2005	13:53:31	4.973	66.86	0.272	4.8058	0.125057
2/23/2005	13:53:49	5.2697	66.83	0.245	5.1025	0.112644
2/23/2005	13:54:07	5.583	66.83	0.222	5.4158	0.102069
2/23/2005	13:54:27	5.9147	66.83	0.199	5.7475	0.091494
2/23/2005	13:54:48	6.2663	66.83	0.178	6.0991	0.081839
2/23/2005	13:55:11	6.6397	66.86	0.16	6.4725	0.073563
2/23/2005	13:55:34	7.0347	66.88	0.145	6.8675	0.066667
2/23/2005	13:56:00	7.453	66.88	0.129	7.2858	0.05931
2/23/2005	13:56:26	7.8963	66.9	0.113	7.7291	0.051954

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: SWMU 16/17 CHARLESTON NWS WELL/BORING NO.: 17MW22S

PROJECT NO.: 0528 GEOLOGIST: FRED W RAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10, 10-20 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 6.10 DATE: 2-23-05

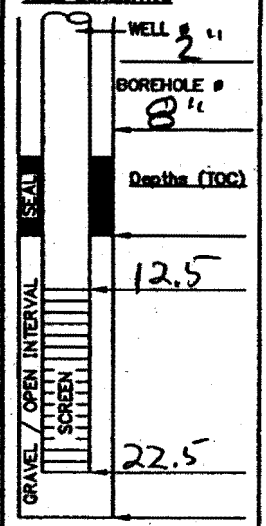
TEST TYPE (Rising/Falling/Constant Head): FALLING CHECKED: C Doolan

METHOD OF INDUCING WATER LEVEL CHANGE: 4.9×0.13 SOLID SLUG PAGE 1 OF

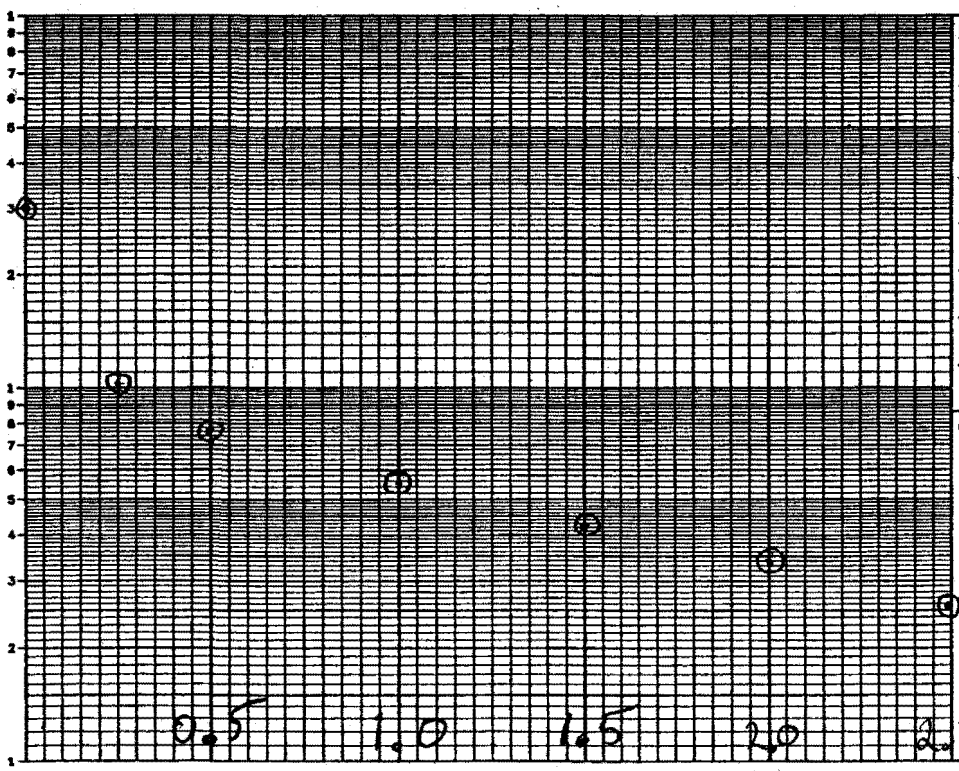
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.04		2.98	4.693		0.107
0.07		1.823			
0.10		1.411			
0.149		1.190			
0.2498		1.007			
0.4963		0.765			
0.7380		0.642			
1.0413		0.532			
1.5613		0.408			
2.0847		0.324			
2.7863		0.238			
3.7247		0.163			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

CALCS, SKETCH MAPS, ETC.:

ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

In-Situ Inc. MiniTroll Pro

Report generated: 2/24/2005 9:40:06
Report from file: ...\SN11262 2005-02-23 133649 17mw22fh.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw22fh

Test defined on: 2/23/2005 10:27:02
Test started on: 2/23/2005 13:36:49
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10.0000 Minutes.
Number of data samples: 99

TOTAL DATA SAMPLES 99

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 11.865 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho
2/23/2005	13:36:49	0	67.06	0		
2/23/2005	13:36:50	0.005	67.1	-0.008		
2/23/2005	13:36:50	0.01	67.1	-0.012		
2/23/2005	13:36:50	0.015	67.13	-0.015		
2/23/2005	13:36:50	0.02	67.13	-0.591		
2/23/2005	13:36:51	0.025	67.13	-2.54		
2/23/2005	13:36:51	0.03	67.13	-4.184		
2/23/2005	13:36:51	0.035	67.15	-4.401		
2/23/2005	13:36:52	0.04	67.15	-2.982		
2/23/2005	13:36:52	0.045	67.15	-0.337		
2/23/2005	13:36:52	0.05	67.13	-0.685		
2/23/2005	13:36:53	0.055	67.15	-0.604		
2/23/2005	13:36:53	0.06	67.15	-1.524		
2/23/2005	13:36:53	0.065	67.15	-1.792		
2/23/2005	13:36:53	0.07	67.15	-1.823		
2/23/2005	13:36:54	0.075	67.15	-1.665		
2/23/2005	13:36:54	0.08	67.15	-1.429		
2/23/2005	13:36:54	0.085	67.15	-1.275		
2/23/2005	13:36:55	0.09	67.15	-1.275		
2/23/2005	13:36:55	0.095	67.15	-1.361		
2/23/2005	13:36:55	0.1	67.15	-1.411		
2/23/2005	13:36:56	0.1058	67.15	-1.395	0	ho
2/23/2005	13:36:56	0.112	67.15	-1.331	0.0062	0.954122
2/23/2005	13:36:56	0.1185	67.15	-1.275	0.0127	0.913978
2/23/2005	13:36:57	0.1255	67.15	-1.252	0.0197	0.897491
2/23/2005	13:36:57	0.1328	67.15	-1.244	0.027	0.891756
2/23/2005	13:36:58	0.1407	67.15	-1.222	0.0349	0.875986
2/23/2005	13:36:58	0.149	67.15	-1.19	0.0432	0.853047
2/23/2005	13:36:59	0.1578	67.15	-1.165	0.052	0.835125
2/23/2005	13:36:59	0.1672	67.13	-1.161	0.0614	0.832258
2/23/2005	13:37:00	0.177	67.13	-1.118	0.0712	0.801434

Plotted data

2/23/2005	13:37:01	0.1875	67.1	-1.097	0.0817	0.78638
2/23/2005	13:37:01	0.1985	67.1	-1.089	0.0927	0.780645
2/23/2005	13:37:02	0.2102	67.1	-1.069	0.1044	0.766308
2/23/2005	13:37:03	0.2227	67.1	-1.044	0.1169	0.748387
2/23/2005	13:37:03	0.2358	67.08	-1.028	0.13	0.736918
2/23/2005	13:37:04	0.2498	67.08	-1.007	0.144	0.721864
2/23/2005	13:37:05	0.2647	67.08	-0.985	0.1589	0.706093
2/23/2005	13:37:06	0.2803	67.08	-0.967	0.1745	0.69319
2/23/2005	13:37:07	0.297	67.08	-0.946	0.1912	0.678136
2/23/2005	13:37:08	0.3147	67.08	-0.924	0.2089	0.662366
2/23/2005	13:37:09	0.3333	67.08	-0.904	0.2275	0.648029
2/23/2005	13:37:10	0.3532	67.06	-0.882	0.2474	0.632258
2/23/2005	13:37:12	0.3742	67.06	-0.886	0.2684	0.635125
2/23/2005	13:37:13	0.3963	67.06	-0.82	0.2905	0.587814
2/23/2005	13:37:14	0.4198	67.06	-0.829	0.314	0.594265
2/23/2005	13:37:16	0.4447	67.04	-0.803	0.3389	0.575627
2/23/2005	13:37:17	0.4697	67.04	-0.783	0.3639	0.56129
2/23/2005	13:37:19	0.4963	67.04	-0.765	0.3905	0.548387
2/23/2005	13:37:21	0.5247	67.04	-0.745	0.4189	0.53405
2/23/2005	13:37:23	0.5547	67.04	-0.724	0.4489	0.518996
2/23/2005	13:37:24	0.5863	67.01	-0.693	0.4805	0.496774
2/23/2005	13:37:27	0.6213	67.01	-0.674	0.5155	0.483154
2/23/2005	13:37:29	0.658	67.01	-0.677	0.5522	0.485305
2/23/2005	13:37:31	0.6963	67.01	-0.59	0.5905	0.422939
2/23/2005	13:37:34	0.738	67.01	-0.642	0.6322	0.460215
2/23/2005	13:37:36	0.7813	67.01	-0.613	0.6755	0.439427
2/23/2005	13:37:39	0.828	66.99	-0.597	0.7222	0.427957
2/23/2005	13:37:42	0.8763	66.99	-0.581	0.7705	0.416487
2/23/2005	13:37:45	0.928	66.99	-0.565	0.8222	0.405018
2/23/2005	13:37:48	0.983	66.99	-0.548	0.8772	0.392832
2/23/2005	13:37:52	1.0413	66.97	-0.532	0.9355	0.381362
2/23/2005	13:37:55	1.103	66.97	-0.513	0.9972	0.367742
2/23/2005	13:37:59	1.168	66.97	-0.498	1.0622	0.356989
2/23/2005	13:38:04	1.238	66.97	-0.48	1.1322	0.344086
2/23/2005	13:38:08	1.3113	66.95	-0.462	1.2055	0.331183
2/23/2005	13:38:13	1.3897	66.95	-0.445	1.2839	0.318996
2/23/2005	13:38:18	1.473	66.95	-0.427	1.3672	0.306093
2/23/2005	13:38:23	1.5613	66.95	-0.408	1.4555	0.292473
2/23/2005	13:38:29	1.6547	66.92	-0.391	1.5489	0.280287
2/23/2005	13:38:34	1.753	66.92	-0.374	1.6472	0.2681
2/23/2005	13:38:41	1.858	66.92	-0.356	1.7522	0.255197
2/23/2005	13:38:47	1.968	66.9	-0.34	1.8622	0.243728
2/23/2005	13:38:54	2.0847	66.9	-0.324	1.9789	0.232258
2/23/2005	13:39:02	2.2097	66.88	-0.306	2.1039	0.219355
2/23/2005	13:39:10	2.3413	66.88	-0.29	2.2355	0.207885
2/23/2005	13:39:18	2.4813	66.86	-0.272	2.3755	0.194982
2/23/2005	13:39:27	2.6297	66.86	-0.255	2.5239	0.182796
2/23/2005	13:39:36	2.7863	66.83	-0.238	2.6805	0.170609
2/23/2005	13:39:46	2.953	66.81	-0.222	2.8472	0.15914
2/23/2005	13:39:57	3.1297	66.81	-0.206	3.0239	0.14767
2/23/2005	13:40:08	3.3163	66.79	-0.191	3.2105	0.136918
2/23/2005	13:40:20	3.5147	66.79	-0.176	3.4089	0.126165
2/23/2005	13:40:33	3.7247	66.77	-0.163	3.6189	0.116846
2/23/2005	13:40:46	3.9463	66.74	-0.147	3.8405	0.105376
2/23/2005	13:41:00	4.1813	66.74	-0.134	4.0755	0.096057
2/23/2005	13:41:15	4.4297	66.72	-0.121	4.3239	0.086738
2/23/2005	13:41:31	4.693	66.68	-0.107	4.5872	0.076703
2/23/2005	13:41:48	4.973	66.63	-0.092	4.8672	0.06595
2/23/2005	13:42:05	5.2697	66.61	-0.08	5.1639	0.057348
2/23/2005	13:42:24	5.583	66.59	-0.07	5.4772	0.050179
2/23/2005	13:42:44	5.9147	66.56	-0.061	5.8089	0.043728
2/23/2005	13:43:05	6.2663	66.54	-0.051	6.1605	0.036559
2/23/2005	13:43:28	6.6397	66.54	-0.037	6.5339	0.026523
2/23/2005	13:43:51	7.0347	66.54	-0.03	6.9289	0.021505
2/23/2005	13:44:16	7.453	66.52	-0.025	7.3472	0.017921
2/23/2005	13:44:43	7.8963	66.5	-0.02	7.7905	0.014337
2/23/2005	13:45:11	8.3663	66.52	-0.016	8.2605	0.01147
2/23/2005	13:45:41	8.8647	66.56	-0.021	8.7589	0.015054

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW23S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, falling head.	**Test Date:**	Feb, 05

Done By: JWR
Checked By: CD

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	1.00 = To

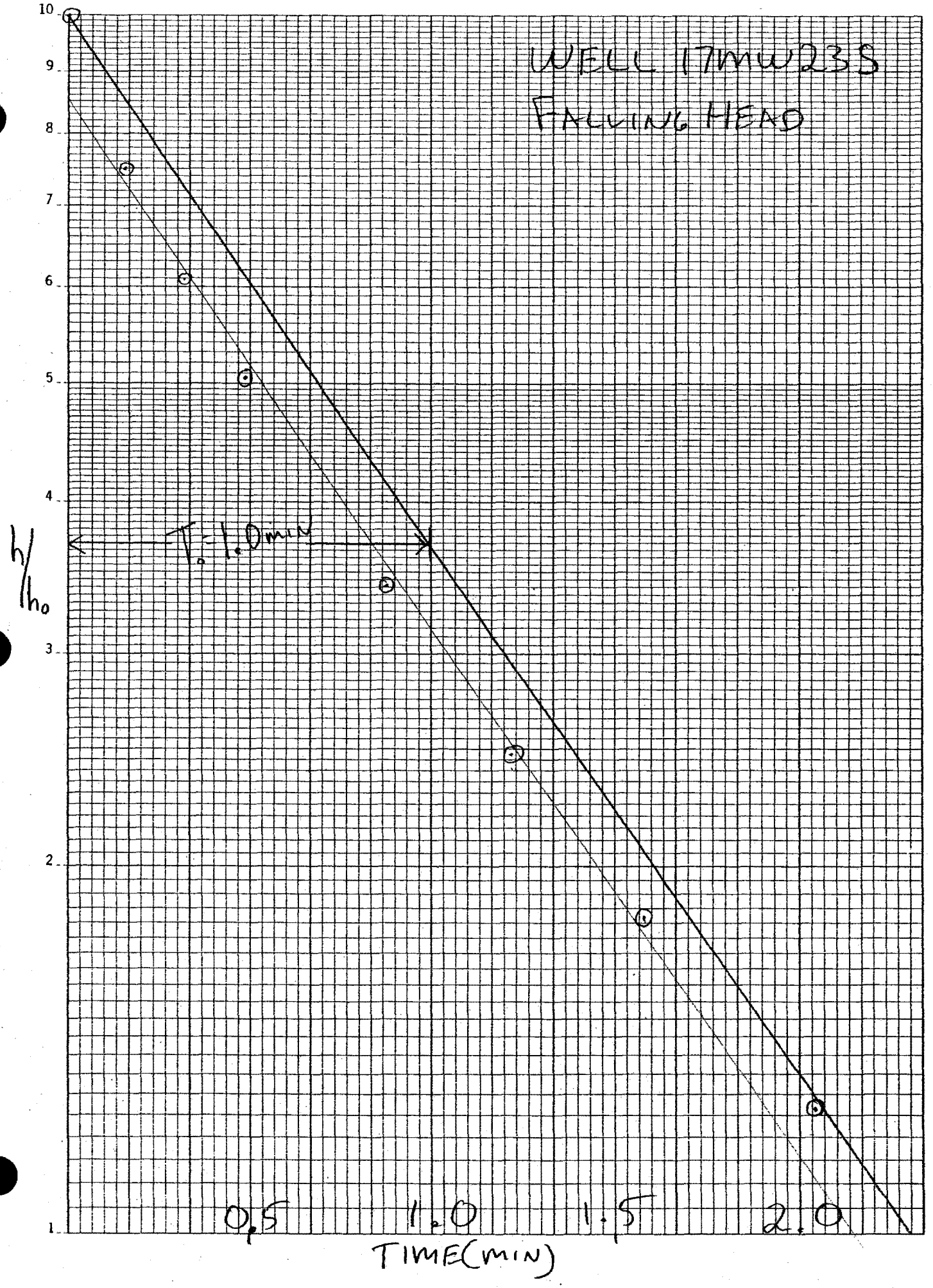
Hydraulic Conductivity (K) :

1.66E-03	ft./min.
2.77E-05	ft./sec.
2.39E+00	ft./day
8.44E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW23S
FALLING HEAD
T_o = 1.0 MIN
h/h₀
10
9
8
7
6
5
4
3
2
1
0.5
1.0
1.5
2.0
TIME (MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

TETRA-TECH NUS

HYDRAULIC CONDUCTIVITY TEST DATA EVALUATION SHEET
Hvorslev Method

Project Name:	Charleston NWS	**Well/Boring No.:**	17MW23S
Project No.:	N0528	**Aquifer Type:**	Sand with some to trace silt.
Test Type:	Slug test, rising head.	**Test Date:**	Feb, 05

Done By: JLR
Checked By: CD

Radius of Well Casing (in.) :	1 = r
Effective Radius of Well Screen (in.) :	1 = R
Length of Well Screen (ft.) :	10 = L
Time for 37% head change (min.) :	0.85 = To

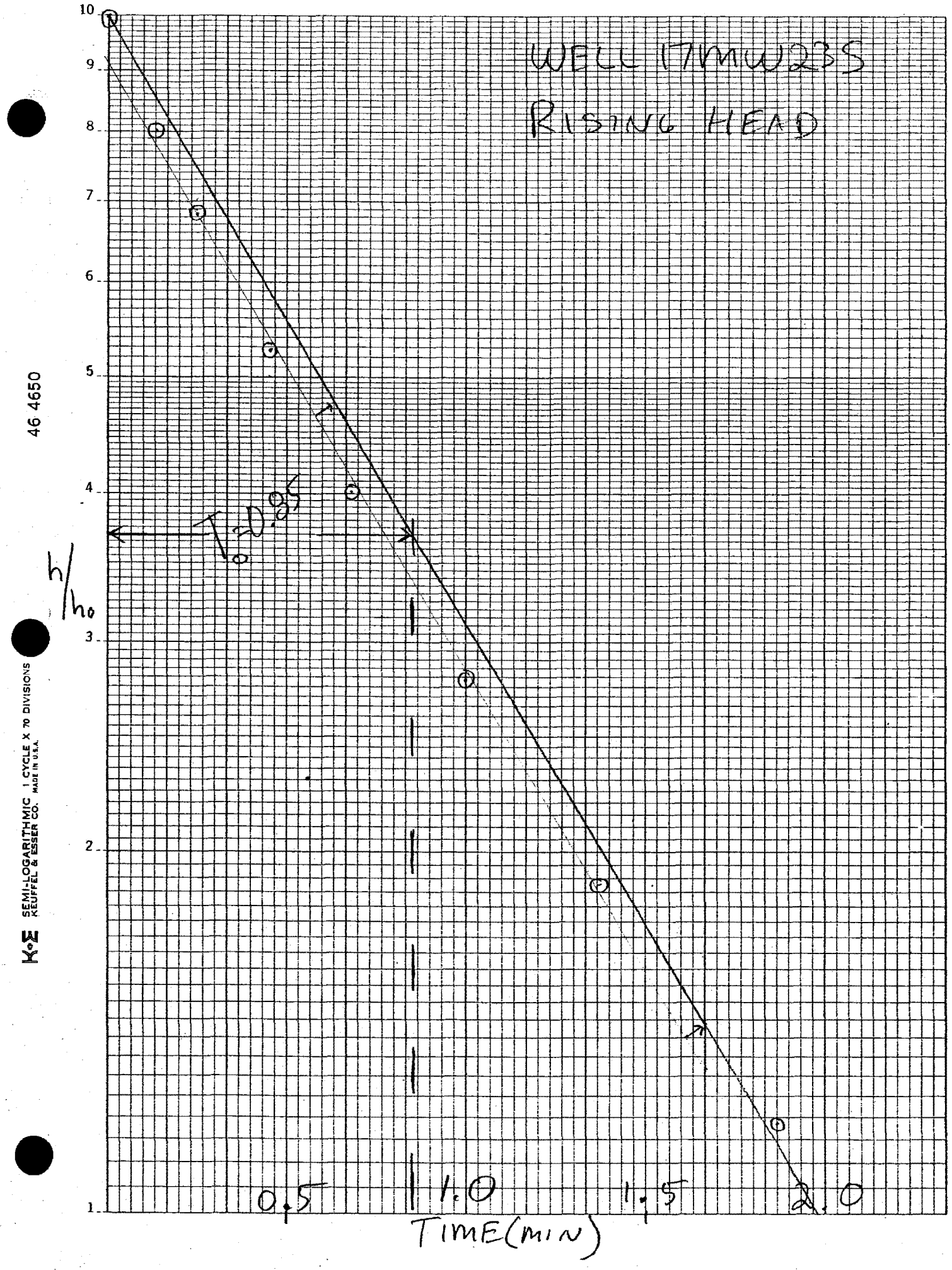
Hydraulic Conductivity (K) :

1.96E-03	ft./min.
3.26E-05	ft./sec.
2.82E+00	ft./day
9.93E-04	cm./sec.

Equation:

$$K = \frac{r^2 \times Ln(L/R)}{2 \times L \times To}$$

******SEE ADJUSTED SLUG TEST DATA PLOT ON ATTACHED SHEETS******


WELL 17MW23S
RISING HEAD
$T_0 = 0.85$
h/ho
10
9
8
7
6
5
4
3
2
1
0.5
1.0
1.5
2.0
TIME(MIN)
46 4650
K+E SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: CHARLESTON NWS SWMU 16/17 WELL/BORING NO.: 17MW23S

PROJECT NO.: 0528 GEOLOGIST: FRED W RAMSER

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10', 9-19 BGS TEST NO.: 1+2

STATIC WATER LEVEL (Depth/Elevation): 3.08 DATE: 2-27-05

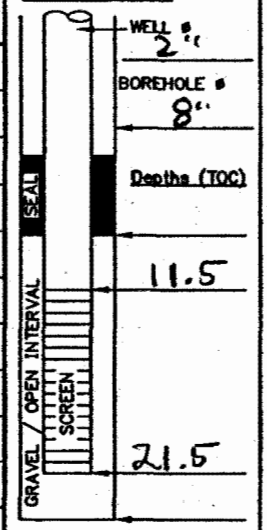
TEST TYPE (Rising/Falling/Constant Head): FALLING+RISING CHECKED: C Doolan

METHOD OF INDUCING WATER LEVEL CHANGE: SOLID SLUG PAGE 1 OF 1

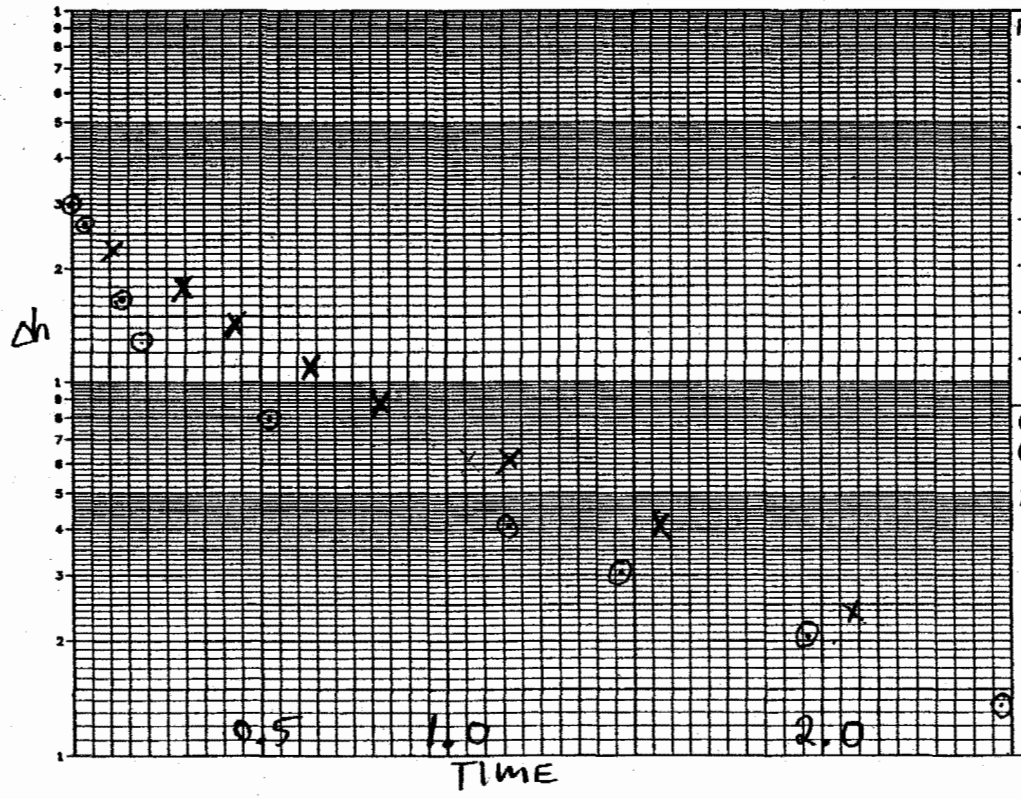
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TRANSDUCER

FALLING HEAD			RISING HEAD		
ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
0.095		2.649	0.08		2.685
0.1328		1.624	0.1058		2.280
0.1875		1.275	0.2102		1.957
0.2803		1.093	0.2970		1.735
0.4447		0.870	0.4447		1.430
0.5247		0.791	0.6580		1.097
0.6580		0.679	0.8280		0.897
1.1680		0.403	1.1680		0.610
1.47		0.306	1.5613		0.403
1.96		0.205	2.0847		0.246
2.48		0.138	3.1297		0.107
3.1297		0.090	3.5147		0.084

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS: FALLING HEAD
STARTED: 0746
STOPPED: 0758
RISING HEAD:
STARTED 0759
STOPPED 0810

CALCS, SKETCH MAPS, ETC.:
⊙ = FALLING HEAD
X = RISING HEAD

ACAD: FORM_HYDCONTST.dwg 07/06/99 INL

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 17:56:08
Report from file: ...\SN11262 2005-02-27 075955 17mw23sr.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw23sr

Test defined on: 2/27/2005 7:45:32
Test started on: 2/27/2005 7:59:55
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10.(Minutes.
Number of data samples: 88

TOTAL DATA SAMPLES 88

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.228 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/27/2005	7:59:55	0	64.78	0			Plotted data
2/27/2005	7:59:55	0.005	64.83	-0.009			
2/27/2005	7:59:56	0.01	64.85	-0.012			
2/27/2005	7:59:56	0.015	64.85	-0.013			
2/27/2005	7:59:56	0.02	64.87	-0.014			
2/27/2005	7:59:56	0.025	64.87	-0.015			
2/27/2005	7:59:57	0.03	64.87	-0.015			
2/27/2005	7:59:57	0.035	64.87	-0.016			
2/27/2005	7:59:57	0.04	64.87	-0.015			
2/27/2005	7:59:58	0.045	64.87	-0.021			
2/27/2005	7:59:58	0.05	64.87	0.356			
2/27/2005	7:59:58	0.055	64.87	3.913			
2/27/2005	7:59:59	0.06	64.87	3.285			
2/27/2005	7:59:59	0.065	64.9	1.784			
2/27/2005	7:59:59	0.07	64.9	3.172			
2/27/2005	7:59:59	0.075	64.9	2.067			
2/27/2005	8:00:00	0.08	64.9	2.685			
2/27/2005	8:00:00	0.085	64.9	2.227			
2/27/2005	8:00:00	0.09	64.9	2.465			
2/27/2005	8:00:01	0.095	64.9	2.274			
2/27/2005	8:00:01	0.1	64.9	2.357	0	1	ho
2/27/2005	8:00:01	0.1058	64.9	2.28	0.0058	0.967331	
2/27/2005	8:00:02	0.112	64.9	2.265	0.012	0.960967	
2/27/2005	8:00:02	0.1185	64.9	2.25	0.0185	0.954603	
2/27/2005	8:00:02	0.1255	64.9	2.216	0.0255	0.940178	
2/27/2005	8:00:03	0.1328	64.92	2.19	0.0328	0.929147	
2/27/2005	8:00:03	0.1407	64.92	2.165	0.0407	0.918541	
2/27/2005	8:00:04	0.149	64.92	2.137	0.049	0.906661	
2/27/2005	8:00:04	0.1578	64.92	2.107	0.0578	0.893933	
2/27/2005	8:00:05	0.1672	64.9	2.082	0.0672	0.883326	
2/27/2005	8:00:06	0.177	64.9	2.052	0.077	0.870598	

2/27/2005	8:00:06	0.1875	64.87	2.022	0.0875	0.85787
2/27/2005	8:00:07	0.1985	64.87	1.989	0.0985	0.843869
2/27/2005	8:00:08	0.2102	64.87	1.957	0.1102	0.830293
2/27/2005	8:00:08	0.2227	64.87	1.923	0.1227	0.815868
2/27/2005	8:00:09	0.2358	64.87	1.888	0.1358	0.801018
2/27/2005	8:00:10	0.2498	64.9	1.851	0.1498	0.78532
2/27/2005	8:00:11	0.2647	64.9	1.814	0.1647	0.769622
2/27/2005	8:00:12	0.2803	64.9	1.775	0.1803	0.753076
2/27/2005	8:00:13	0.297	64.9	1.735	0.197	0.736105
2/27/2005	8:00:14	0.3147	64.9	1.695	0.2147	0.719134
2/27/2005	8:00:15	0.3333	64.9	1.653	0.2333	0.701315
2/27/2005	8:00:16	0.3532	64.9	1.61	0.2532	0.683072
2/27/2005	8:00:17	0.3742	64.9	1.568	0.2742	0.665252
2/27/2005	8:00:19	0.3963	64.9	1.522	0.2963	0.645736
2/27/2005	8:00:20	0.4198	64.9	1.475	0.3198	0.625796
2/27/2005	8:00:22	0.4447	64.92	1.43	0.3447	0.606703
2/27/2005	8:00:23	0.4697	64.92	1.385	0.3697	0.587611
2/27/2005	8:00:25	0.4963	64.92	1.338	0.3963	0.567671
2/27/2005	8:00:26	0.5247	64.92	1.291	0.4247	0.54773
2/27/2005	8:00:28	0.5547	64.92	1.245	0.4547	0.528214
2/27/2005	8:00:30	0.5863	64.94	1.198	0.4863	0.508273
2/27/2005	8:00:32	0.6213	64.94	1.147	0.5213	0.486636
2/27/2005	8:00:34	0.658	64.94	1.097	0.558	0.465422
2/27/2005	8:00:37	0.6963	64.96	1.047	0.5963	0.444209
2/27/2005	8:00:39	0.738	64.96	0.997	0.638	0.422995
2/27/2005	8:00:42	0.7813	64.96	0.947	0.6813	0.401782
2/27/2005	8:00:45	0.828	64.96	0.897	0.728	0.380569
2/27/2005	8:00:48	0.8763	64.99	0.846	0.7763	0.358931
2/27/2005	8:00:51	0.928	64.99	0.798	0.828	0.338566
2/27/2005	8:00:54	0.983	64.99	0.749	0.883	0.317777
2/27/2005	8:00:57	1.0413	65.01	0.702	0.9413	0.297836
2/27/2005	8:01:01	1.103	65.01	0.656	1.003	0.278532
2/27/2005	8:01:05	1.168	65.01	0.61	1.068	0.258804
2/27/2005	8:01:09	1.238	65.01	0.565	1.138	0.239711
2/27/2005	8:01:14	1.3113	65.01	0.522	1.2113	0.221468
2/27/2005	8:01:18	1.3897	65.03	0.481	1.2897	0.204073
2/27/2005	8:01:23	1.473	65.03	0.443	1.373	0.187951
2/27/2005	8:01:29	1.5613	65.03	0.403	1.4613	0.17098
2/27/2005	8:01:34	1.6547	65.03	0.367	1.5547	0.155706
2/27/2005	8:01:40	1.753	65.03	0.335	1.653	0.14213
2/27/2005	8:01:46	1.858	65.03	0.303	1.758	0.128553
2/27/2005	8:01:53	1.968	65.03	0.273	1.868	0.115825
2/27/2005	8:02:00	2.0847	65.03	0.246	1.9847	0.10437
2/27/2005	8:02:08	2.2097	65.03	0.221	2.1097	0.093763
2/27/2005	8:02:15	2.3413	65.03	0.196	2.2413	0.083157
2/27/2005	8:02:24	2.4813	65.03	0.174	2.3813	0.073823
2/27/2005	8:02:33	2.6297	65.05	0.155	2.5297	0.065762
2/27/2005	8:02:42	2.7863	65.05	0.136	2.6863	0.0577
2/27/2005	8:02:52	2.953	65.03	0.122	2.853	0.051761
2/27/2005	8:03:03	3.1297	65.03	0.107	3.0297	0.045397
2/27/2005	8:03:14	3.3163	65.05	0.096	3.2163	0.04073
2/27/2005	8:03:26	3.5147	65.05	0.084	3.4147	0.035639
2/27/2005	8:03:38	3.7247	65.08	0.074	3.6247	0.031396
2/27/2005	8:03:52	3.9463	65.1	0.064	3.8463	0.027153
2/27/2005	8:04:06	4.1813	65.12	0.057	4.0813	0.024183
2/27/2005	8:04:21	4.4297	65.14	0.053	4.3297	0.022486
2/27/2005	8:04:37	4.693	65.17	0.047	4.593	0.019941

In-Situ Inc. MiniTroll Pro

Report generated: 2/27/2005 17:53:52
Report from file: ...\SN11262 2005-02-27 074654 17mw23sf.bin
Win-Situ Version 4.51

Serial number: 11262
Firmware Version 3.09
Unit name:

Test name: 17mw23sf

Test defined on: 2/27/2005 7:44:51
Test started on: 2/27/2005 7:46:54
Test stopped on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data points: 10.000 Minutes.
Number of data samples: 101

TOTAL DATA SAMPLES 101

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: Pressure
Sensor Range: 15 PSIG.
Specific gravity: 1
Mode: TOC
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 13.205 Feet H2O

Date	Time	ET (min)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Adjust ET min	h/ho	
2/27/2005	7:46:54	0	65.5	0			Plotted data
2/27/2005	7:46:55	0.005	65.55	-0.011			
2/27/2005	7:46:55	0.01	65.55	-0.013			
2/27/2005	7:46:55	0.015	65.57	-0.015			
2/27/2005	7:46:56	0.02	65.57	-0.017			
2/27/2005	7:46:56	0.025	65.57	-0.018			
2/27/2005	7:46:56	0.03	65.57	-0.019			
2/27/2005	7:46:57	0.035	65.57	-0.02			
2/27/2005	7:46:57	0.04	65.59	-0.024			
2/27/2005	7:46:57	0.045	65.59	-0.019			
2/27/2005	7:46:57	0.05	65.59	-0.02			
2/27/2005	7:46:58	0.055	65.59	-0.022			
2/27/2005	7:46:58	0.06	65.59	-0.017			
2/27/2005	7:46:58	0.065	65.59	-0.021			
2/27/2005	7:46:59	0.07	65.59	-0.02			
2/27/2005	7:46:59	0.075	65.59	-0.61			
2/27/2005	7:46:59	0.08	65.59	-2.26			
2/27/2005	7:47:00	0.085	65.59	-3.25			
2/27/2005	7:47:00	0.09	65.59	-3.398			
2/27/2005	7:47:00	0.095	65.59	-2.649			
2/27/2005	7:47:00	0.1	65.59	-1.843			
2/27/2005	7:47:01	0.1058	65.59	-0.958			
2/27/2005	7:47:01	0.112	65.59	-0.606			
2/27/2005	7:47:02	0.1185	65.59	-1.26			
2/27/2005	7:47:02	0.1255	65.59	-1.562			
2/27/2005	7:47:02	0.1328	65.62	-1.624			
2/27/2005	7:47:03	0.1407	65.62	-1.486			
2/27/2005	7:47:03	0.149	65.62	-1.317			
2/27/2005	7:47:04	0.1578	65.62	-1.316			
2/27/2005	7:47:05	0.1672	65.57	-1.343	0	1 ho	
2/27/2005	7:47:05	0.177	65.57	-1.321	0.0098	0.983619	

2/27/2005	7:47:06	0.1875	65.55	-1.275	0.0203	0.949367
2/27/2005	7:47:06	0.1985	65.57	-1.246	0.0313	0.927774
2/27/2005	7:47:07	0.2102	65.55	-1.226	0.043	0.912882
2/27/2005	7:47:08	0.2227	65.55	-1.199	0.0555	0.892777
2/27/2005	7:47:09	0.2358	65.55	-1.171	0.0686	0.871929
2/27/2005	7:47:09	0.2498	65.53	-1.138	0.0826	0.847357
2/27/2005	7:47:10	0.2647	65.53	-1.117	0.0975	0.83172
2/27/2005	7:47:11	0.2803	65.53	-1.093	0.1131	0.81385
2/27/2005	7:47:12	0.297	65.53	-1.062	0.1298	0.790767
2/27/2005	7:47:13	0.3147	65.53	-1.035	0.1475	0.770663
2/27/2005	7:47:14	0.3333	65.5	-1.008	0.1661	0.750558
2/27/2005	7:47:16	0.3532	65.5	-0.981	0.186	0.730454
2/27/2005	7:47:17	0.3742	65.48	-0.954	0.207	0.71035
2/27/2005	7:47:18	0.3963	65.48	-0.926	0.2291	0.689501
2/27/2005	7:47:20	0.4198	65.48	-0.899	0.2526	0.669397
2/27/2005	7:47:21	0.4447	65.46	-0.87	0.2775	0.647803
2/27/2005	7:47:23	0.4697	65.46	-0.844	0.3025	0.628444
2/27/2005	7:47:24	0.4963	65.44	-0.818	0.3291	0.609084
2/27/2005	7:47:26	0.5247	65.44	-0.791	0.3575	0.58898
2/27/2005	7:47:28	0.5547	65.44	-0.762	0.3875	0.567386
2/27/2005	7:47:30	0.5863	65.41	-0.736	0.4191	0.548027
2/27/2005	7:47:32	0.6213	65.41	-0.708	0.4541	0.527178
2/27/2005	7:47:34	0.658	65.39	-0.679	0.4908	0.505585
2/27/2005	7:47:36	0.6963	65.39	-0.651	0.5291	0.484736
2/27/2005	7:47:39	0.738	65.37	-0.622	0.5708	0.463142
2/27/2005	7:47:41	0.7813	65.37	-0.595	0.6141	0.443038
2/27/2005	7:47:44	0.828	65.37	-0.566	0.6608	0.421445
2/27/2005	7:47:47	0.8763	65.35	-0.538	0.7091	0.400596
2/27/2005	7:47:50	0.928	65.35	-0.508	0.7608	0.378258
2/27/2005	7:47:53	0.983	65.32	-0.481	0.8158	0.358153
2/27/2005	7:47:57	1.0413	65.32	-0.457	0.8741	0.340263
2/27/2005	7:48:01	1.103	65.3	-0.428	0.9358	0.31869
2/27/2005	7:48:05	1.168	65.3	-0.403	1.0008	0.300074
2/27/2005	7:48:09	1.238	65.3	-0.38	1.0708	0.282949
2/27/2005	7:48:13	1.3113	65.3	-0.354	1.1441	0.263589
2/27/2005	7:48:18	1.3897	65.28	-0.33	1.2225	0.245719
2/27/2005	7:48:23	1.473	65.28	-0.306	1.3058	0.227848
2/27/2005	7:48:28	1.5613	65.28	-0.286	1.3941	0.212956
2/27/2005	7:48:34	1.6547	65.28	-0.265	1.4875	0.197319
2/27/2005	7:48:40	1.753	65.28	-0.245	1.5858	0.182427
2/27/2005	7:48:46	1.858	65.28	-0.224	1.6908	0.166791
2/27/2005	7:48:53	1.968	65.28	-0.205	1.8008	0.152643
2/27/2005	7:49:00	2.0847	65.28	-0.187	1.9175	0.139241
2/27/2005	7:49:07	2.2097	65.28	-0.17	2.0425	0.126582
2/27/2005	7:49:15	2.3413	65.3	-0.154	2.1741	0.114669
2/27/2005	7:49:23	2.4813	65.3	-0.138	2.3141	0.102755
2/27/2005	7:49:32	2.6297	65.3	-0.124	2.4625	0.092331
2/27/2005	7:49:42	2.7863	65.28	-0.113	2.6191	0.08414
2/27/2005	7:49:52	2.953	65.26	-0.101	2.7858	0.075205
2/27/2005	7:50:02	3.1297	65.26	-0.09	2.9625	0.067014
2/27/2005	7:50:13	3.3163	65.23	-0.081	3.1491	0.060313
2/27/2005	7:50:25	3.5147	65.23	-0.074	3.3475	0.055101
2/27/2005	7:50:38	3.7247	65.23	-0.066	3.5575	0.049144
2/27/2005	7:50:51	3.9463	65.23	-0.061	3.7791	0.045421
2/27/2005	7:51:05	4.1813	65.21	-0.055	4.0141	0.040953
2/27/2005	7:51:20	4.4297	65.21	-0.052	4.2625	0.038719
2/27/2005	7:51:36	4.693	65.17	-0.047	4.5258	0.034996
2/27/2005	7:51:53	4.973	65.12	-0.043	4.8058	0.032018
2/27/2005	7:52:11	5.2697	65.05	-0.041	5.1025	0.030529
2/27/2005	7:52:29	5.583	64.96	-0.039	5.4158	0.029039
2/27/2005	7:52:49	5.9147	64.9	-0.037	5.7475	0.02755
2/27/2005	7:53:10	6.2663	64.85	-0.034	6.0991	0.025316
2/27/2005	7:53:33	6.6397	64.78	-0.033	6.4725	0.024572
2/27/2005	7:53:57	7.0347	64.72	-0.031	6.8675	0.023083
2/27/2005	7:54:22	7.453	64.69	-0.032	7.2858	0.023827
2/27/2005	7:54:48	7.8963	64.69	-0.03	7.7291	0.022338
2/27/2005	7:55:16	8.3663	64.65	-0.031	8.1991	0.023083
2/27/2005	7:55:46	8.8647	64.72	-0.029	8.6975	0.021593
2/27/2005	7:56:18	9.3913	64.81	-0.027	9.2241	0.020104
2/27/2005	7:56:51	9.9497	64.83	-0.026	9.7825	0.01936

APPENDIX D-2
2001 TIDAL STUDY

TIDAL STUDY LETTER REPORT
SWMUs 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

Introduction

A tidal study was conducted at SWMUs 16 and 17 to determine the extent of tidal influence on the elevations and flow patterns of groundwater beneath the sites. The study consisted of two parts; 1) field activities including continuous data acquisition (i.e., data recorders and synoptic (manual) water level measurements), and 2) data reduction and evaluation.

Field Activities

In-Situ Troll 2000 pressure transducers and data loggers were programmed to measure and record a water level every 15 minutes. The transducers were installed in four wells (16MW01S, 16MW02S, 17MW01S, and 17MW03S) and at two staff gauges (16SG03 and 17SG04) several hours prior to start time, allowing the transducers to reach temperature equilibrium with the water. The data acquisition started at 1400 hours on October 9, 2001 and was completed two days later at 1600 hours on October 11, 2001, for a 50-hour duration.

Two rounds of synoptic water-level measurements were collected from all the monitoring wells and staff gauges at SWMUs 16 and 17 during the data acquisition phase (while the data loggers were running). One round took place during low tide and the other at high tide. All water-level measurements were taken within a short time period (approximately 2 hours). Measurements in wells and staff gauges were made with an electric water-level indicator using the top of the PVC pipe or well riser as the reference point for determining depths to water. Water level measurements were recorded October 10, 2001 to the nearest 0.01-foot.

Data Reduction and Evaluation

All data were converted into water-level elevations relative to mean sea level (msl) based on the surveyed reference points at each well and staff gauge. The results were then used to develop the individual hydrographs provided as Attachments 1 through 6 and the Attachment 7 summary. The results of the synoptic water-level measurements were used to generate potentiometric contour maps provided as Attachments 8 and 9.

Hydrographs

Staff Gauges

The surface water elevations at staff gauge 16SG03 (Attachment 3) ranged from slightly greater than 3 feet above msl at the higher high tide to approximately –1.5 feet msl at low tide for a differential of 4.5 feet. The staff gauge 17SG04 hydrograph (Attachment 6) curve mimics the curve at 16SG03. However, the high tide water-level elevations at 17SG04 are slightly lower than those of 16SG03. The flat horizontal portions of the staff gauge curves at the low tides are a result of the water level dropping below the transducer/data logger elevation. The surface water elevations at the gauged areas of Goose Creek and its tributary fluctuated by at least 4.5 feet during the 50-hour monitoring period.

Monitoring Wells

Groundwater elevations were relatively steady in three wells 16MW01S, 17MW01S, and 17MW03S during the monitoring period, indicating that the groundwater level at these wells is not influenced by the tidal fluctuations, as shown by Attachments 1, 2, and 5, respectively. The saw-tooth pattern seen on the hydrograph (Attachment 1) for well 16MW01 may be attributed to electronic noise in the data logger instrument or some unknown ambient electro-magnetic or physical interference. The water levels measured at 16MW01S during high tide and low tide as part of the synoptic water level measurements correlate with the water levels measured by the transducers, suggesting that the transducer and logger were operating correctly during the data acquisition phase.

The water-level elevation at 16MW02S (Attachment 4) varied from approximately +0.95 feet msl at lower low tide to approximately +2 feet msl at higher high tide. However, the well was flooded during the higher high tides (i.e., surface water entered the well casing). Therefore, measurements during this flooded period reflect surface water rather than groundwater elevations. The sharp rise in water level near the higher high tide marks the flooding event. During the lower high tide cycles, water level elevation at 16MW02S varied from +1.0 feet msl to approximately +1.5 feet msl. The gradual rise in the hydrograph shows a delayed and attenuated response relative to the rise in surface water. This suggests that groundwater at well 16MW02S is poorly connected hydraulically to the surface water, and the marsh clay that underlies the surface water acts as a hydraulic barrier between the surface water and the groundwater throughout the study area. The hydraulic barrier effect is also demonstrated during low tide by

the steep hydraulic gradient between the groundwater elevation at well 16MW02S and the surface water elevation at staff gauge 16SG02.

Potentiometric Contour Maps

During low tide, there is a northwest-southeast oriented groundwater divide or mound in the western portion of the study area. Groundwater is flowing from the ridge to the west toward Goose Creek. A high gradient develops on the western side of the ridge as a result of the previously described hydraulic barrier between groundwater and surface water. The gradient on the northeast side of the ridge is much less steep. There is a depression seen in the groundwater contours in the northeast portion of the study area. This depression is marked by the wells installed outside the marsh in adjacent higher ground areas. These wells are generally screened in a sand and silt formation. The marsh clay apparently acts as a hydraulic barrier between the groundwater in the sand and silt formation and the surface water.

During high tides the same depression in the potentiometric contours observed in the northeast portion of the study area becomes much more pronounced as a result of the rise in water levels to the west, south, and southeast. Groundwater flows toward this depression during the high tide portion of the tidal cycle.

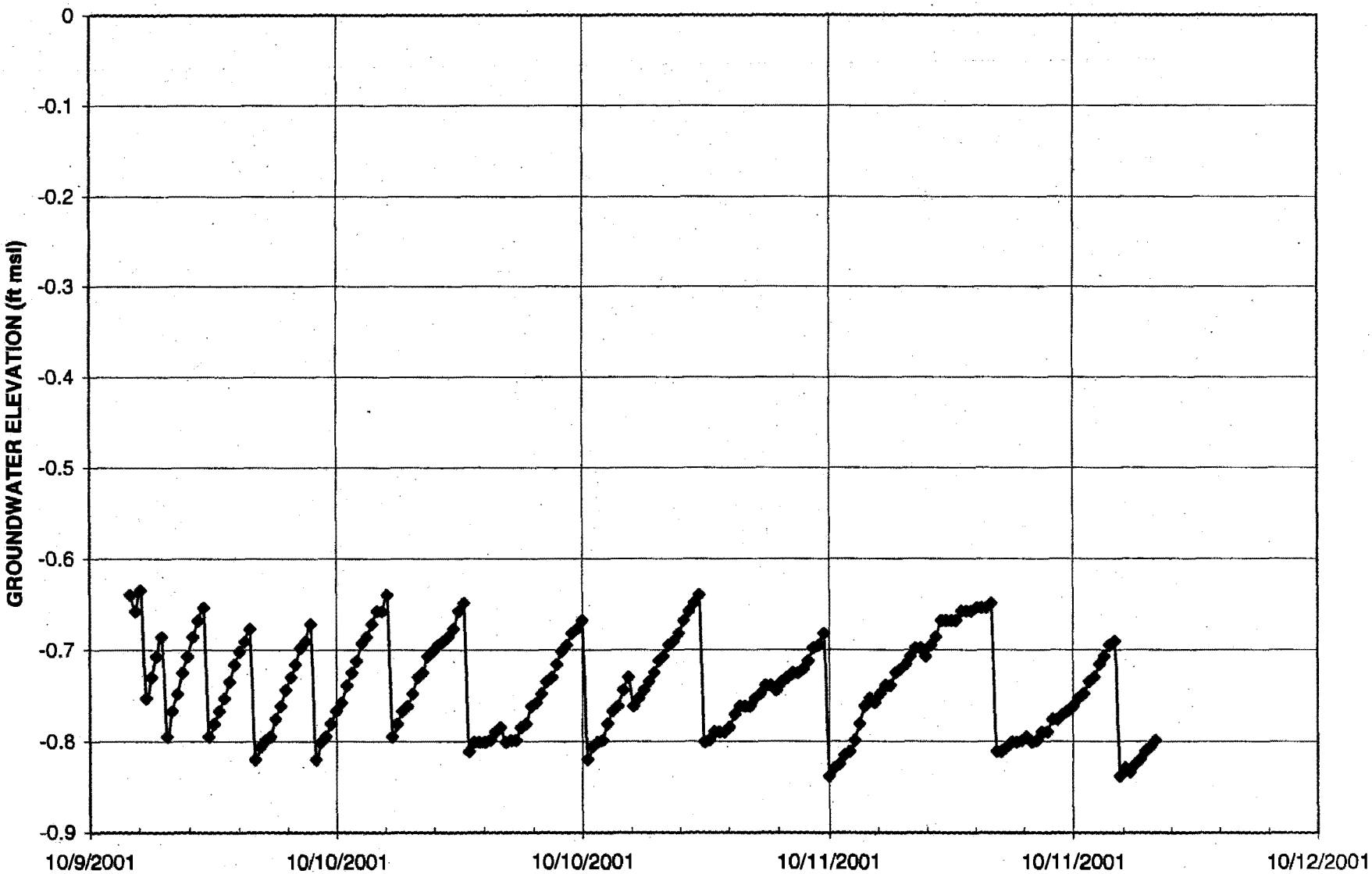
As seen by the hydrographs and the potentiometric contour maps, the water levels in monitoring wells 17MW01S, 17MW02S, 17MW03S, 17MW04S and 16MW01S held relatively steady throughout the tidal cycle. The groundwater levels were approximately the same at both high- and low-tide synoptic measurements indicating that these wells are not tidally influenced. The groundwater elevations at wells 16MW03S, 16MW04S, 16MW02S, and 16MW05S installed in the marsh show variations of approximately 0.7 to 1.2 between low-tide and high-tide water level elevations, indicating that these wells are tidally influenced.

Conclusions

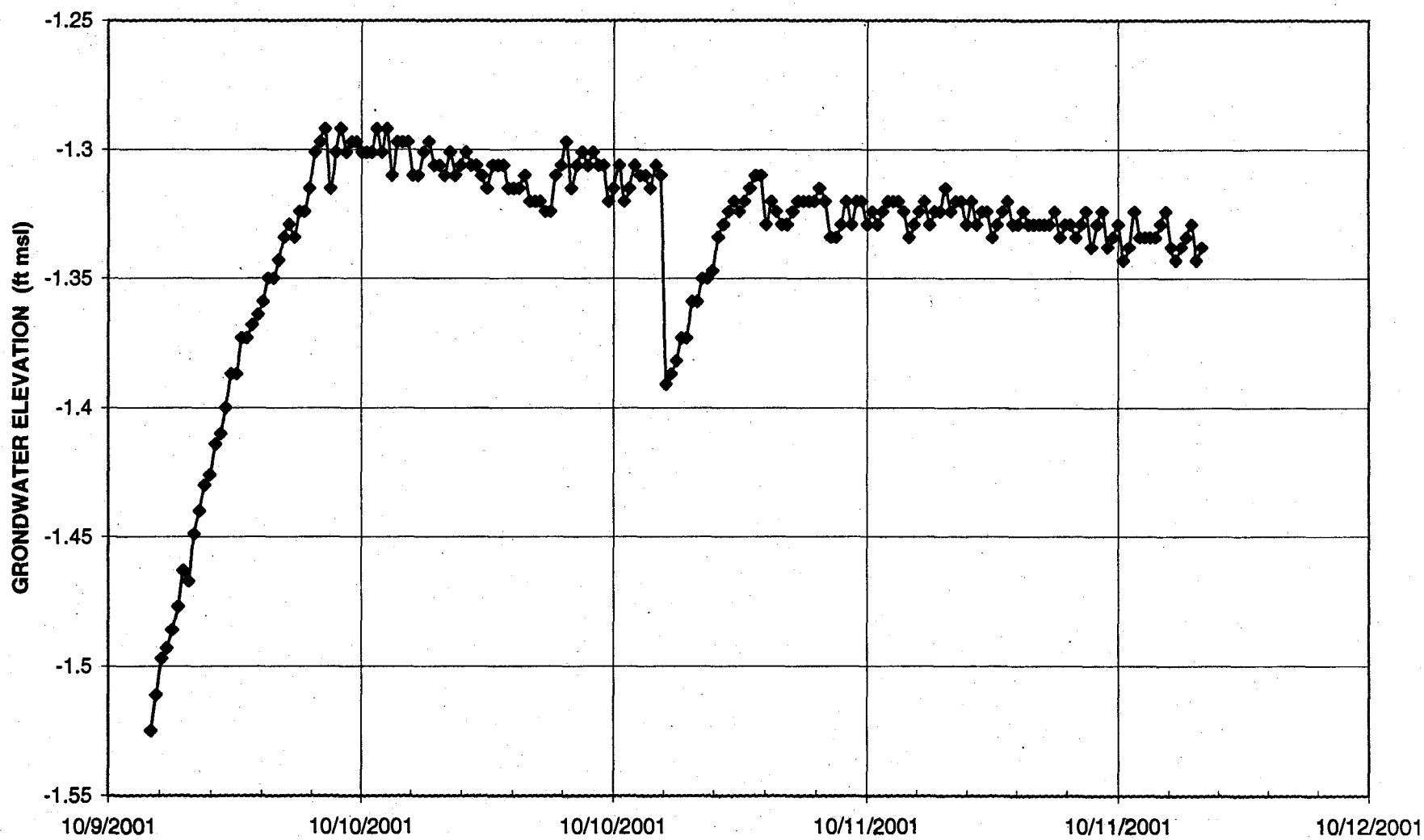
The SWMU 16 and 17 tidal study was conducted to approximate the extent of tidal influence on the groundwater flow. Data loggers were used to collect water-level data at 15-minute intervals for 50 hours at six locations consisting of four monitoring wells (16MW01S, 16MW02S, 17MW01S, and 17MW03S) and two staff gauges (16SG03, and 17SG04). In support of and in conjunction with the tidal study, two rounds of synoptic water-level measurements were collected from 13 monitoring wells and staff gauges. Surface water elevations measured at the staff gauges varied by approximately 4.5 feet due to tidal fluctuation. The groundwater elevations in

wells screened in the silt and clay marsh deposits adjacent to the surface water bodies did fluctuate (variations of approximately 0.7 to 1.2) although the fluctuation was less than that of surface water but are believed to be influenced by the surface water tidal fluctuations. The groundwater elevations did not fluctuate at wells located in the upland areas outside of the marsh areas; these wells were screened in a sand formation and are believed to be isolated hydraulically from the surface water by the marsh clay.

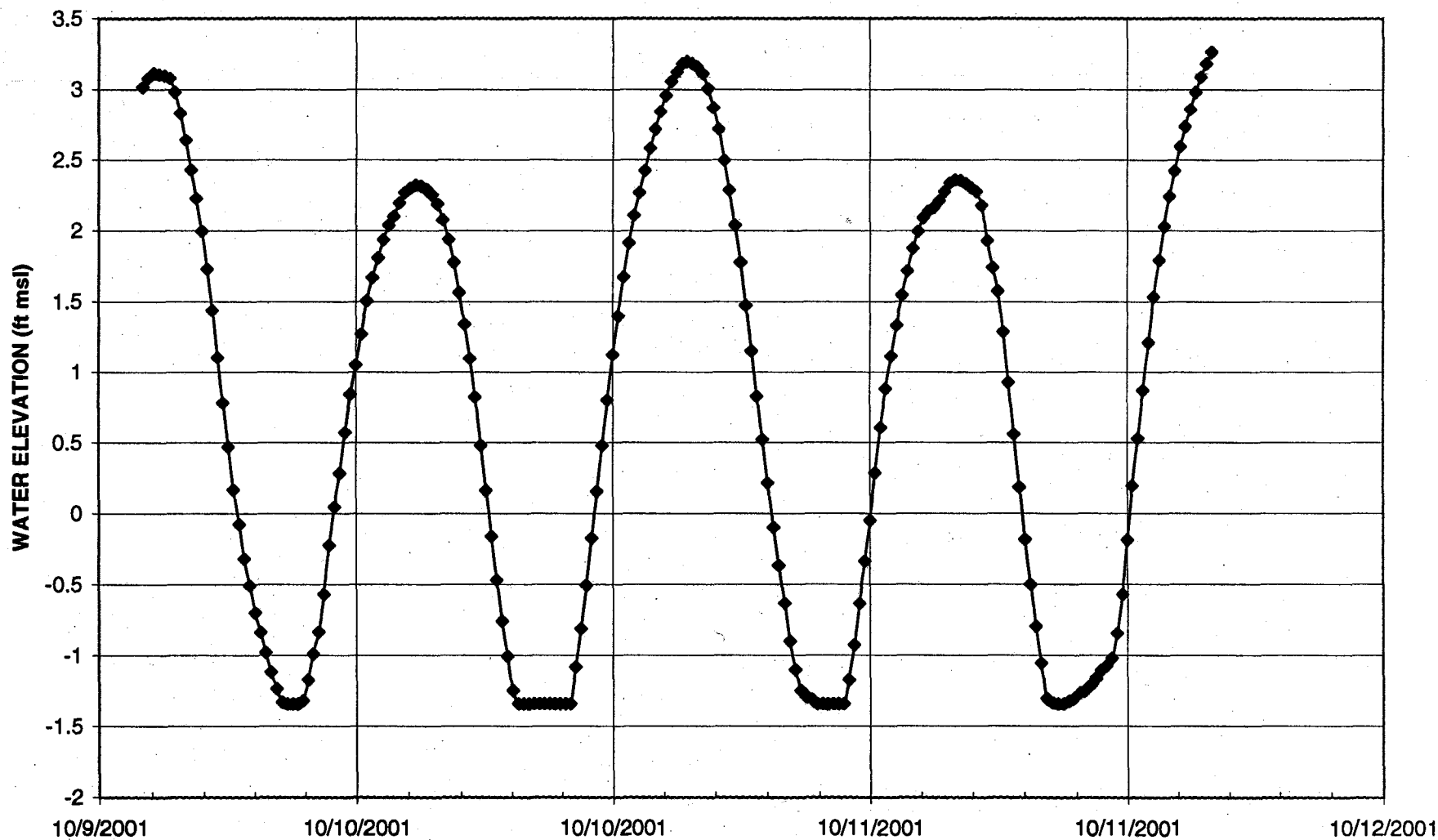
ATTACHMENT 1
NWS CHARLESTON SITE 16/17 TIDAL STUDY MONITORING WELL 16MW01



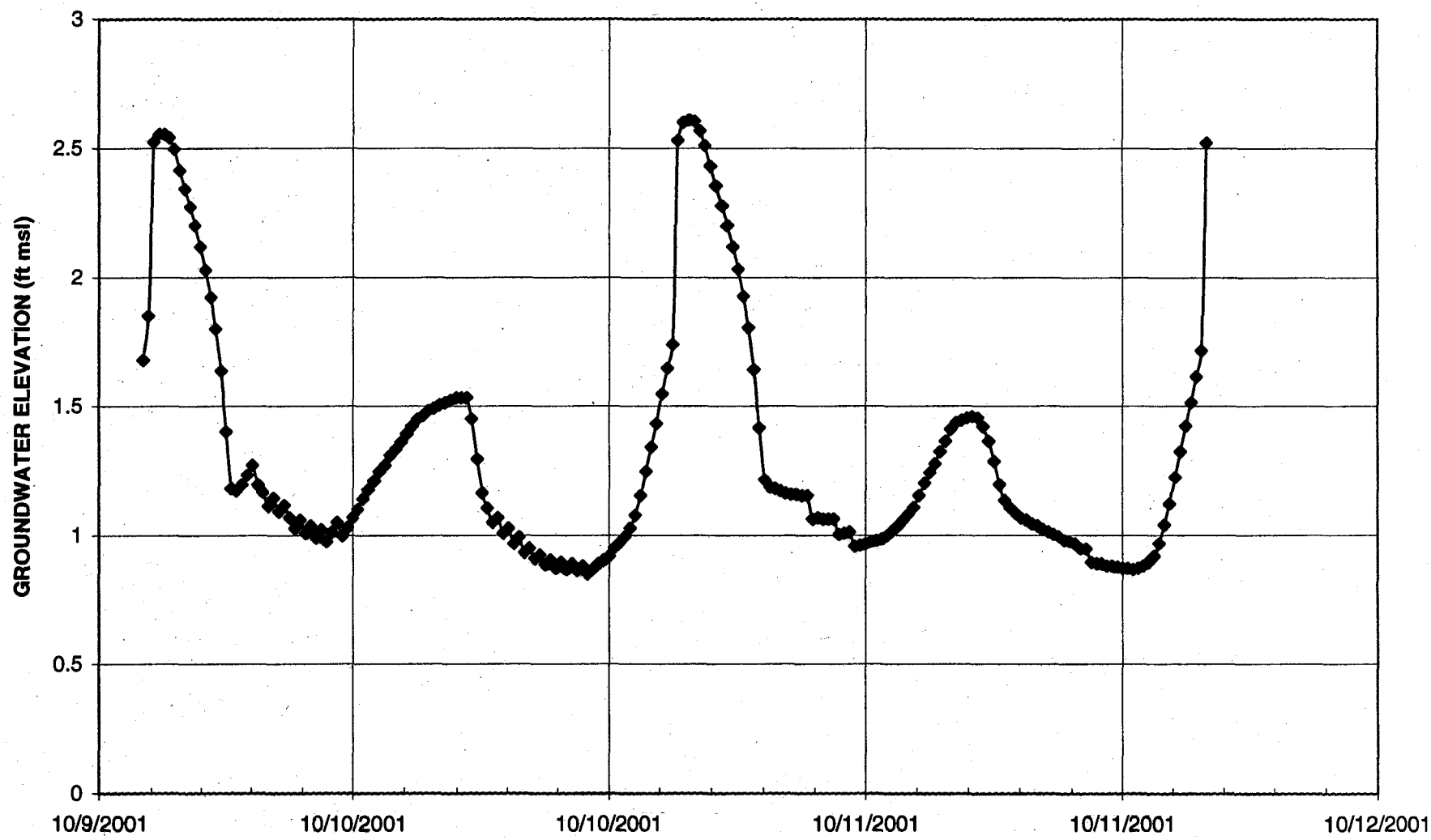
ATTACHMENT 2
NWS CHARLESTON SITES 16/17 TIDAL STUDY MONITORING WELL 17MW01



ATTACHMENT 3
NWS CHARLESTON SITES 16/17 TIDAL STUDY STAFF GAUGE 16SG03



ATTACHMENT 4
NWS CHARLESTON SITES 16/17 TIDAL STUDY MONITORING WELL 16MW02



ATTACHMENT 5
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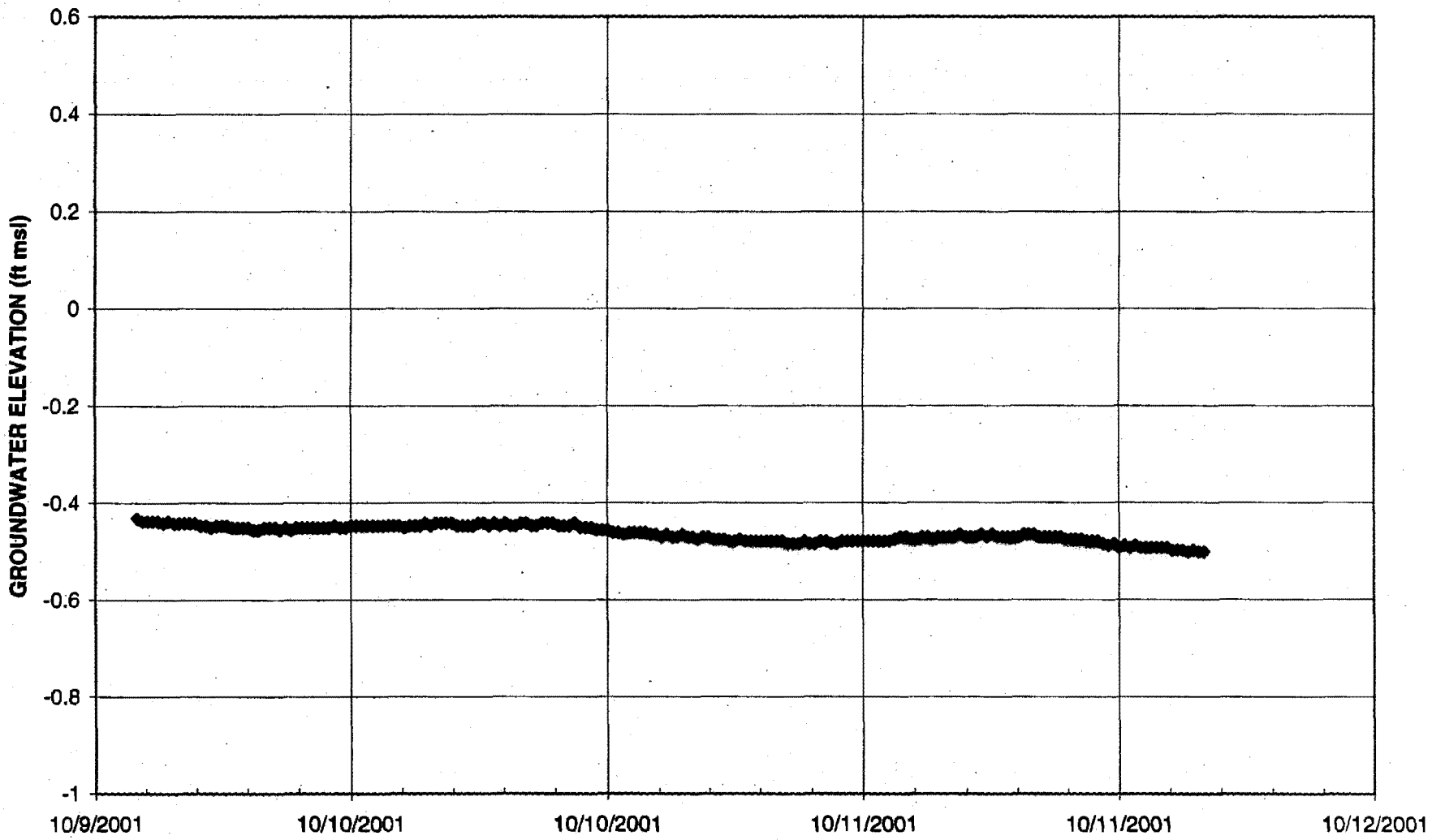
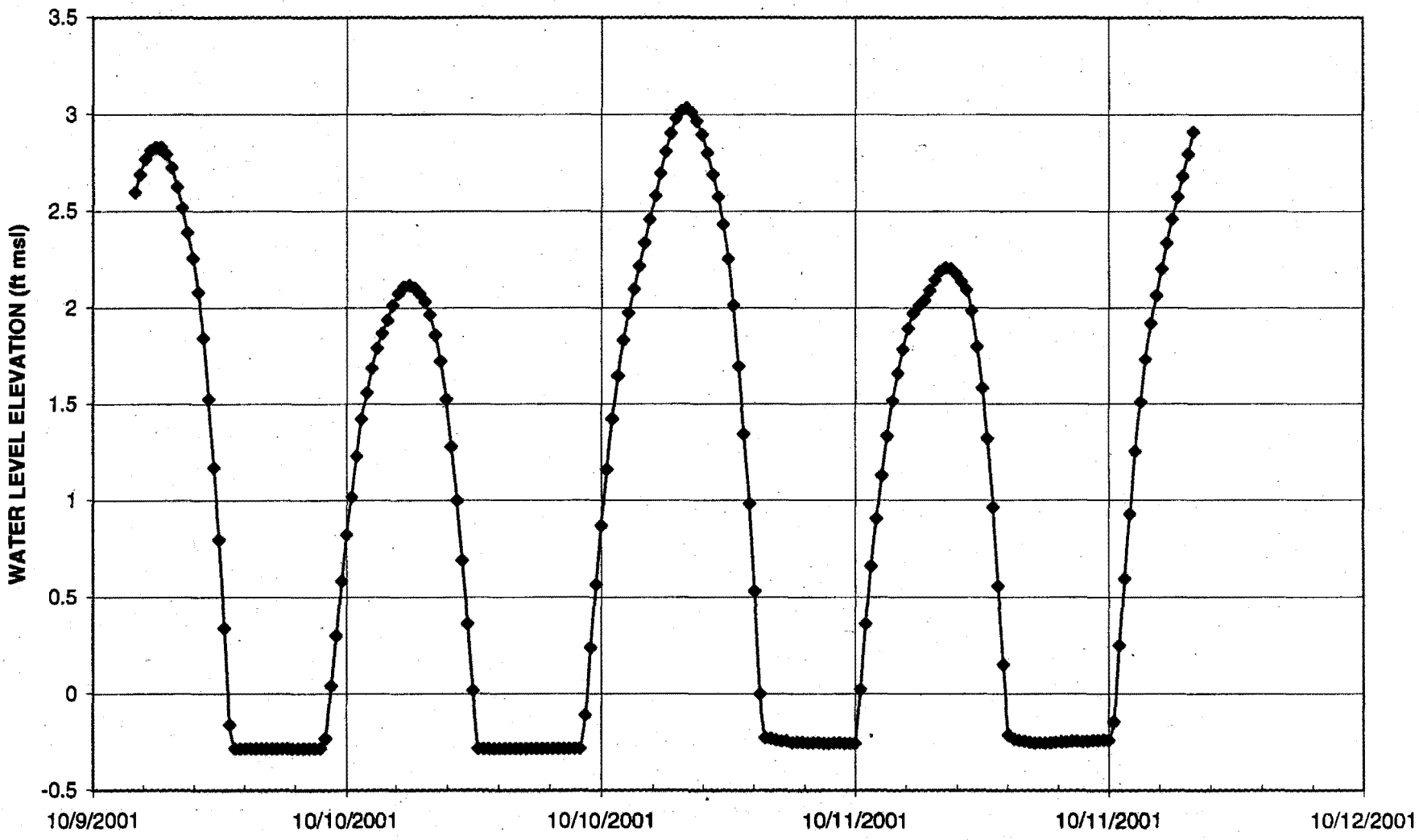
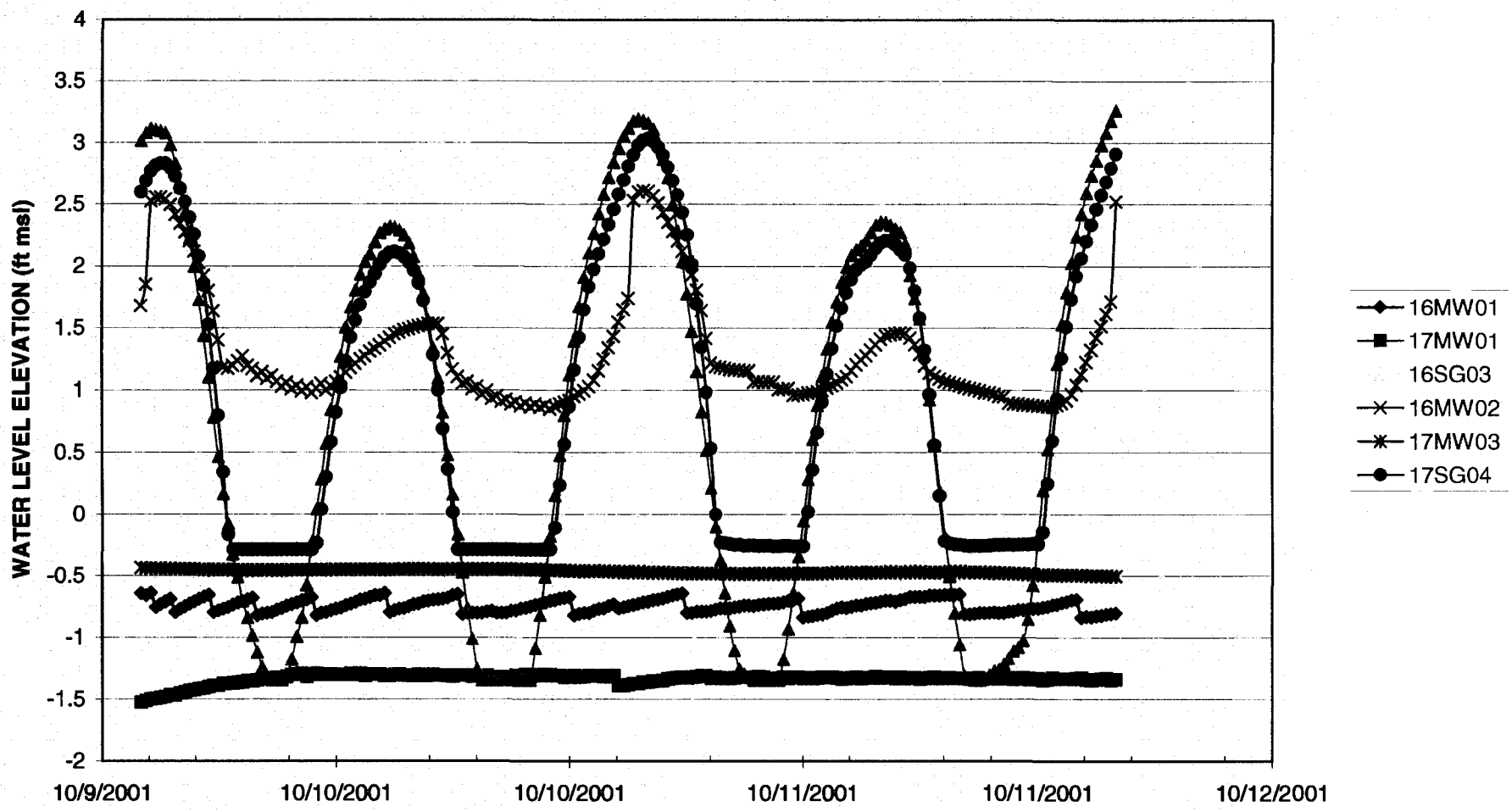


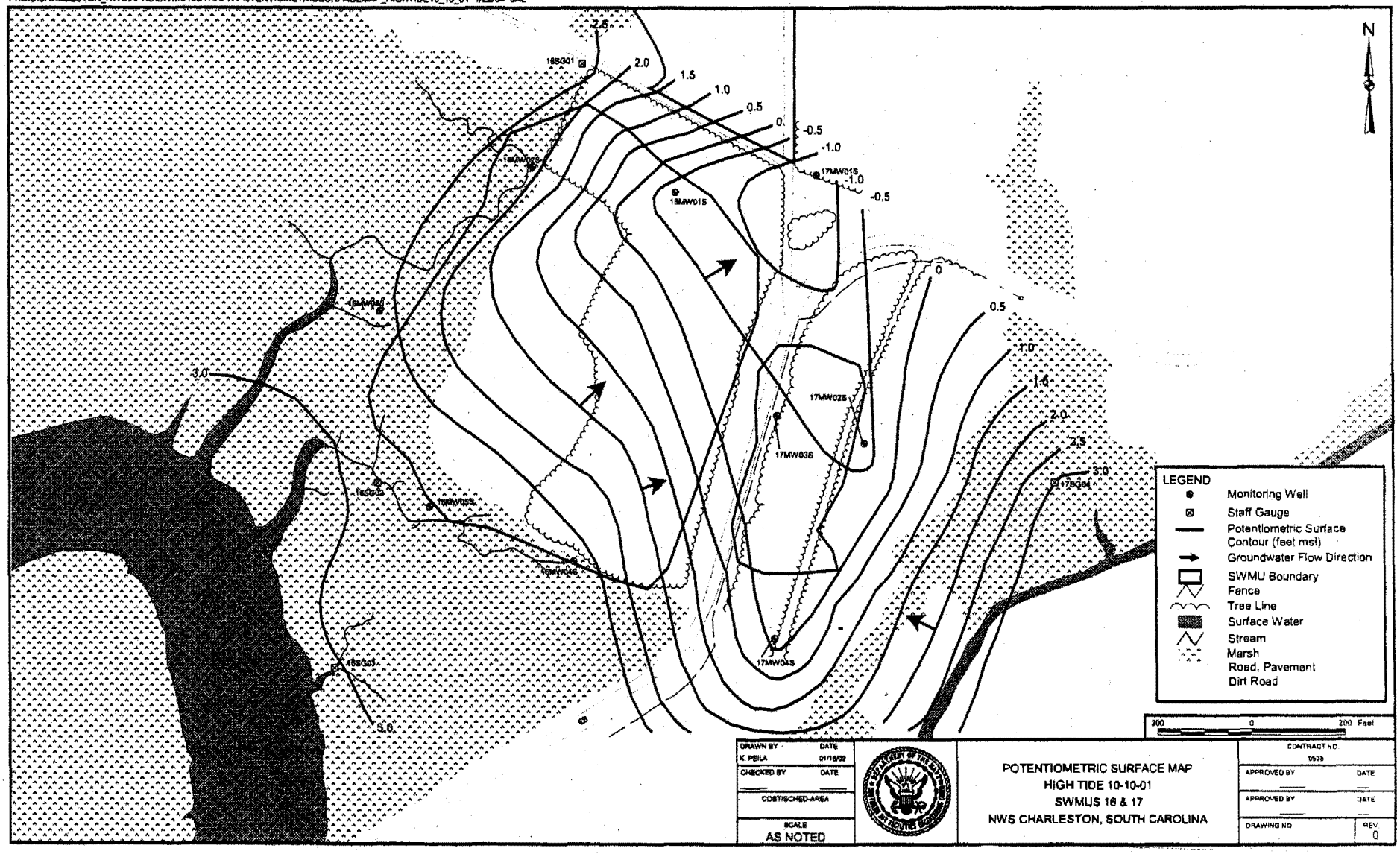
ATTACHMENT 6
NWS CHARLESTON SITES 16/17 TIDAL STUDY STAFF GAUGE 17SG04



ATTACHMENT 7
SUMMARY OF SWMUs 16/17 TIDAL STUDY
NWS CHARLESTON, SOUTH CAROLINA



P:\GIS\CH[illegible]STON_NWS\APRS\SWMU18&17.APR POTENTIOMETRICSURFACEMAP_HIGHTIDE10_10_01 1/22/04 JAL



Attachment 8

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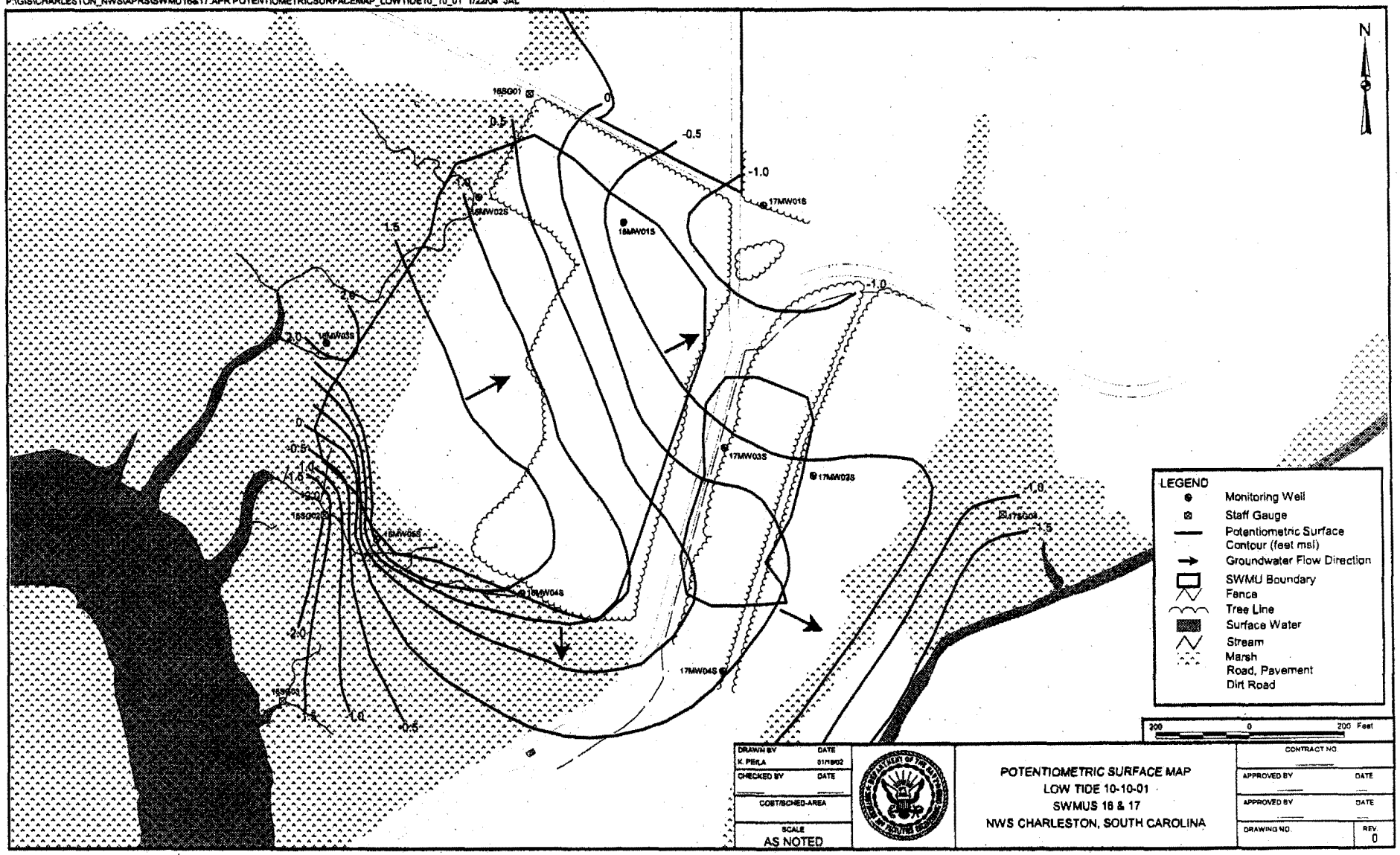


Attachment 9

APPENDIX D-3
HYDRAULIC GRADIENT AND SEEPAGE VELOCITY CALCULATIONS

CALCULATION WORKSHEET Order No. 19116 (01-91)

CLIENT	JOB NUMBER
CHARLESTON NWS SOUTH DIV NAVY	0528

SUBJECT: HYDRAULIC GRADIENT AND SEEPAGE VELOCITY SWMU17

BASED ON	DRAWING NUMBER

BY	CHECKED BY	APPROVED BY	DATE
FWR	C. Doolan		

I. $V_s = K\,i/n$ WHERE: V_s = SEEPAGE VELOCITY (ft/day)
K = HYDRAULIC COND. (ft/day)
i = HYDRAULIC GRADIENT, AVERAGED FROM HIGH AND LOW TIDE 2005 WATER LEVELS.

n = POROSITY (ft/ft)

II ASSUME: n = 0.30 (SAND, FROM FETTER, 1998)

KNOWN: K = 1.24 ft/day (FROM TABLE 3-10 SWMU17 SHALLOW WELLS)

III HYDRAULIC GRADIENT:

$\frac{dh}{dl}$ = SUM OF RISE / SUM OF RUN

+ FEB 22, 2005

- $i = \frac{dh}{dl} = \frac{0.5}{100} + \frac{0.5}{130} + \frac{2.5}{210}$

$= \frac{3.5}{440}$

$= 8.0\,e^{-3}$

+ MAR. 1, 2005

- $i = \frac{dh}{dl} = \frac{0.5}{120} + \frac{0.5}{90} + \frac{0.5}{65} + \frac{0.5}{65} + \frac{0.5}{50} + \frac{0.5}{45}$

$= \frac{3}{435}$

$= 6.9\,e^{-3}$

$i_{ave} = (8.0e^{-3} + 6.9e^{-3}) \cdot \frac{1}{2} = \underline{7.5e^{-3}}$

CALCULATION WORKSHEET Order No. 19116 (01-91)

CLIENT	JOB NUMBER 0528
SUBJECT HYDRAULIC GRADIENT AND SEEPAGE VELOCITY SUMM 17	
BASED ON	DRAWING NUMBER

BY	CHECKED BY	APPROVED BY	DATE
FWR	C. Doolan		

IV SEEPAGE VELOCITY

+ $V_s = K\,i/n$

- SUB:

$$V_s = 1.24\ \frac{7.5e^{-3}}{0.30}$$

$$V_s = 3.1 \times 10^{-2}\ ft/day$$

$$V_s = 3.1 \times 10^{-2}\ \frac{ft}{day} \times \frac{365\ day}{1\ yr}$$

$$= 11.3\ ft/yr$$

CALCULATION WORKSHEET Order No. 19116 (01-91)

CLIENT	JOB NUMBER
CHARLESTON NWS SOUTH DIV NAVY	0528

SUBJECT: HYDRAULIC GRADIENT AND SEEPAGE VELOCITY SWMU 16

BASED ON	DRAWING NUMBER

BY	CHECKED BY	APPROVED BY	DATE
FRANK RAMSER	C. Doolan		

I. $V_s = K\,i/n$ WHERE: V_s = SEEPAGE VELOCITY (FT/day)
K = HYDRAULIC COND. FT/day
i = HYDRAULIC GRADIENT AVERAGED FROM HI TIDE + LOW TIDE 2005 WATER LEVELS.

n = POROSITY

II. ASSUME: n = 0.40 (SILT, FROM FETTER 1998)

KNOWN: K = 0.51 ft/day (FROM TABLE 3-10 SWMU 16 SHALLOW WELLS)

III HYDRAULIC GRADIENT:

dh = SUM OF RISE
dl = SUM OF RUN

+ FEB. 22, 2005

$$-i = \frac{dh}{dl} = \frac{0.5}{210} + \frac{0.5}{105} + \frac{0.5}{65} + \frac{0.5}{70}$$
$$= \frac{2}{450}$$
$$= 4.4e^{-3}$$

+ MAR. 1, 2005

$$-i = \frac{dh}{dl} = \frac{0.5}{110} + \frac{0.5}{75} + \frac{0.5}{90} + \frac{0.5}{95} + \frac{0.5}{105}$$
$$= \frac{2.5}{475}$$
$$= 5.3e^{-3}$$

+ AVERAGE $i = (4.4e^{-3} + 5.3e^{-3}) \cdot 1/2$
$$= 0.00485$$
$$= 4.9e^{-3}$$

CALCULATION WORKSHEET Order No. 19116 (01-91)

CLIENT	JOB NUMBER 0528
SUBJECT HYDRAULIC GRADIENT + SEEPAGE VELOCITY SUMU	
BASED ON	DRAWING NUMBER

BY	CHECKED BY	APPROVED BY	DATE
FRED WRAMSKE	C. Doolan		

IV. SEEPAGE VELOCITY:

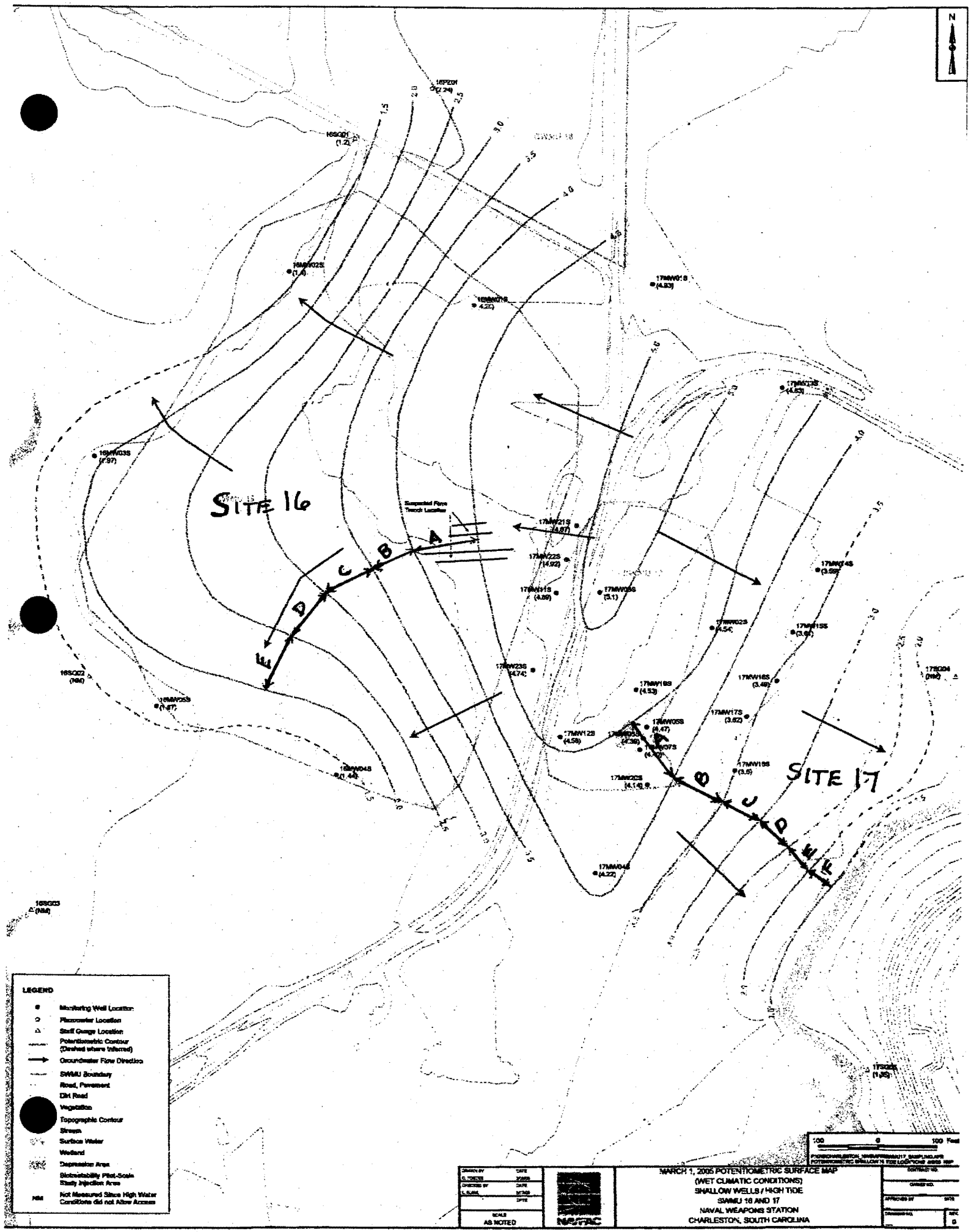
+ $V_s = Ki/n$

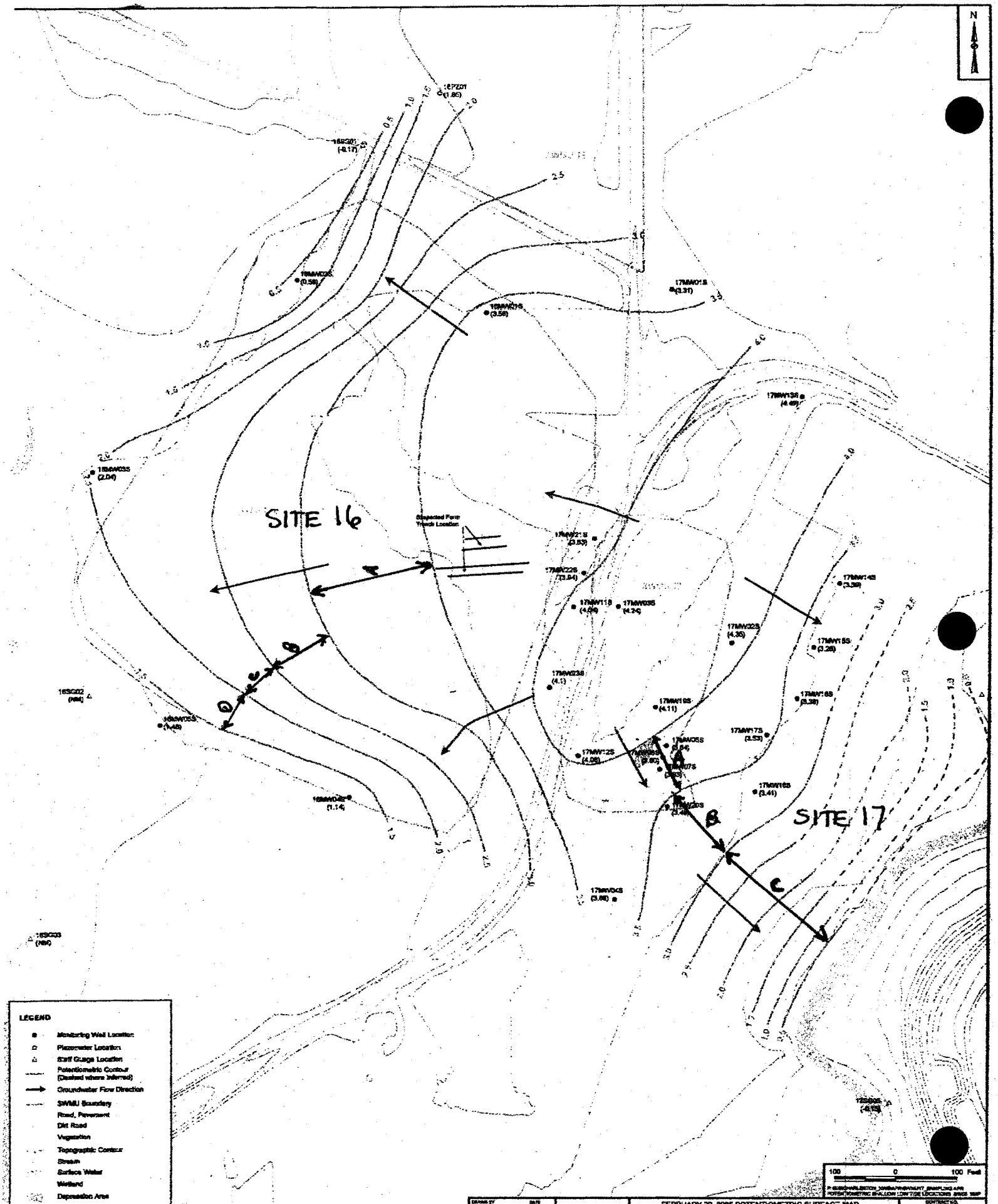
- SUB: $V_s = 0.51\left(\frac{4.9e^{-3}}{0.4}\right)$

$V_s = 6.3 \times 10^{-3}$ ft/day

$V_s = 0.0063 \frac{ft}{day} \times \frac{365\ day}{yr}$

$= 2.3$ ft/yr


N
SITE 16
SITE 17
A
B
C
D
E
Suspected Pipe Trench Location
LEGEND
Monitoring Well Location
Piezometer Location
Staff Gauge Location
Potentiometric Contour (Dashed where inferred)
Groundwater Flow Direction
SWMU Boundary
Road, Pavement
Dirt Road
Vegetation
Topographic Contour
Stream
Surface Water
Wetland
Depression Area
Bioremediability Pilot-Scale Study Injection Area
NM Not Measured Since High Water Conditions did not Allow Access
100 0 100 Feet
AS NOTED
NAVFAC
MARCH 1, 2005 POTENTIOMETRIC SURFACE MAP
(WET CLIMATIC CONDITIONS)
SHALLOW WELLS / HIGH TIDE
SWMU 16 AND 17
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA


N
SITE 16
SITE 17
Suspected Fuel Trench Location
A
B
C
D
16PZ01 (1.85)
16SG01 (-0.17)
16MW02S (0.58)
16MW03S (3.56)
17MW01S (3.31)
17MW13S (4.49)
16MW03S (2.04)
17MW21S (3.83)
17MW22S (3.94)
17MW11S (4.09)
17MW03S (4.24)
17MW14S (3.39)
17MW32S (4.35)
17MW15S (3.28)
17MW23S (4.1)
17MW10S (4.11)
17MW16S (3.38)
16SG02 (NM)
16MW05S (1.48)
17MW17S (3.53)
17MW05S (3.64)
17MW12S (4.05)
17MW07S (3.80)
17MW18S (3.41)
16MW04S (1.14)
17MW20S (3.48)
17MW04S (3.86)
16SG03 (NM)
12SG05 (4.19)
LEGEND
Monitoring Well Location
Piezometer Location
Staff Gauge Location
Potentiometric Contour (Dashed where inferred)
Groundwater Flow Direction
SWMU Boundary
Road, Pavement
Dirt Road
Vegetation
Topographic Contour
Stream
Surface Water
Wetland
Depression Area
Bioremediation Pilot-Scale Study Injection Area
NM Not Measured Since High Water Conditions did not Allow Access
100 0 100 Feet
AS NOTED
NAVFAC
FEBRUARY 22, 2005 POTENTIOMETRIC SURFACE MAP
(WET CLIMATIC CONDITIONS)
SHALLOW WELLS / LOW TIDE
SWMU 16 AND 17
NAVAL WEAPONS STATION
CHARLESTON, SOUTH CAROLINA

APPENDIX E
ANALYTICAL RESULTS

APPENDIX E-1
SURFACE SOIL ANALYTICAL RESULTS

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	017	017	017	017	017
Sample Location	16SS01	16SS02	16SS02	16SS02	16SS03	16SS04	17SB01	17SB02	17SB02	17SB02	17SB03
Sample Number	16-S-01-00	16-S-02-00	16-S-02-00-AVG	16-S-02-00-D	16-S-03-00	16-S-04-00	17-B-01-00	17-B-02-00	17-B-02-00-AVG	17-B-02-00-D	17-B-03-00
Depth Range (below ground surface)	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	10/11/01	10/11/01	10/11/01	10/11/01	01/18/05	01/18/05	06/07/01	06/07/01	06/07/01	06/07/01	06/06/01
Volatile Organics (ug/kg)											
1,1,1,2-TETRACHLOROETHANE							210 U				
1,1,1-TRICHLOROETHANE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
1,1,2,2-TETRACHLOROETHANE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
1,1,2-TRICHLOROETHANE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
1,1,2-TRICHLOROTRIFLUOROETHANE	6 U	17 U	17 U	17 U	6 U	6 U		8 U	8 U	8 U	8 U
1,1-DICHLOROETHANE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
1,1-DICHLOROETHENE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
1,2,3-TRICHLOROPROPANE	-						210 U				
1,2,4-TRICHLOROBENZENE	6 U	17 U	17 U	17 U	6 U	6 U		8 U	8 U	8 U	8 U
1,2,4-TRIMETHYLBENZENE											
1,2-DIBROMO-3-CHLOROPROPANE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
1,2-DIBROMOETHANE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
1,2-DICHLOROBENZENE	6 U	17 U	17 U	17 U	6 U	6 U		8 U	8 U	8 U	8 U
1,2-DICHLOROETHANE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
1,2-DICHLOROPROPANE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
1,3,5-TRIMETHYLBENZENE											
1,3-DICHLOROBENZENE	6 U	17 U	17 U	17 U	6 U	6 U		8 U	8 U	8 U	8 U
1,4-DICHLOROBENZENE	6 U	17 U	17 U	17 U	6 U	6 U		8 U	8 U	8 U	8 U
2-BUTANONE	6 U	17 U	17 U	17 U	30 U	29 U	420 U	8 U	8 U	8 U	8 U
2-HEXANONE	6 U	17 U	17 U	17 U	30 U	29 U	420 U	8 U	8 U	8 U	8 U
3-CHLOROPROPENE							420 U				
4-METHYL-2-PENTANONE	6 U	17 U	17 U	17 U	30 U	29 U	420 U	8 U	8 U	8 U	8 U
ACETONE	17 U	120 U	92.5 U	65 U	1300 J	1700 J	690 U	20 U	14 U	8 U	8 U
ACETONITRILE							4200 U				
ACROLEIN							2100 U				
ACRYLONITRILE							420 U				
BENZENE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
BROMODICHLOROMETHANE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
BROMOFORM	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
BROMOMETHANE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
CARBON DISULFIDE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
CARBON TETRACHLORIDE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
CHLOROBENZENE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
CHLORODIBROMOMETHANE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
CHLOROETHANE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
CHLOROFORM	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
CHLOROMETHANE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
CHLOROPRENE							420 U				
CIS-1,2-DICHLOROETHENE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
CIS-1,3-DICHLOROPROPENE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
CYCLOHEXANE	6 U	17 U	17 U	17 U	6 U	6 U		8 U	8 U	8 U	8 U
DIBROMOMETHANE							210 U				
DICHLORODIFLUOROMETHANE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
ETHYL METHACRYLATE							420 U				
ETHYLBENZENE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
ISOBUTANOL							8400 U				
ISOPROPYLBENZENE	6 U	17 U	17 U	17 U	6 U	6 U		8 U	8 U	8 U	8 U
M+P-XYLENES					12 U	11 U					
METHACRYLONITRILE							4200 U				

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	017	017	017	017	017
Sample Location	16SS01	16SS02	16SS02	16SS02	16SS03	16SS04	17SB01	17SB02	17SB02	17SB02	17SB03
Sample Number	16-S-01-00	16-S-02-00	16-S-02-00-AVG	16-S-02-00-D	16-S-03-00	16-S-04-00	17-B-01-00	17-B-02-00	17-B-02-00-AVG	17-B-02-00-D	17-B-03-00
Depth Range (below ground surface)	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	10/11/01	10/11/01	10/11/01	10/11/01	01/18/05	01/18/05	06/07/01	06/07/01	06/07/01	06/07/01	06/06/01
METHYL ACETATE	6 U	17 U	17 U	17 U	6 U	6 U		8 U	8 U	8 U	8 U
METHYL CYCLOHEXANE	6 U	17 U	17 U	17 U	6 U	6 U		8 U	8 U	8 U	8 U
METHYL IODIDE							420 U				
METHYL METHACRYLATE							420 U				
METHYL TERT-BUTYL ETHER	6 U	17 U	17 U	17 U	12 U	11 U		8 U	8 U	8 U	8 U
METHYLENE CHLORIDE	19 U	52 U	46 U	40 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
O-XYLENE					6 U	6 U					
PENTACHLOROETHANE							420 U				
PROPIONITRILE							4200 U				
STYRENE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
TETRACHLOROETHENE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
TOLUENE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
TOTAL 1,2-DICHLOROETHENE					12 U	11 U					
TOTAL XYLENES	6 U	17 U	17 U	17 U	18 U	17 U	210 U	8 U	8 U	8 U	8 U
TRANS-1,2-DICHLOROETHENE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
TRANS-1,3-DICHLOROPROPENE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 UR	8 UR	8 UR	8 U
TRANS-1,4-DICHLORO-2-BUTENE							420 U				
TRICHLOROETHENE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
TRICHLOROFLUOROMETHANE	6 U	17 U	17 U	17 U	6 U	6 U	210 U	8 U	8 U	8 U	8 U
VINYL ACETATE							210 U				
VINYL CHLORIDE	6 U	17 U	17 U	17 U	6 U	6 U	420 U	8 U	8 U	8 U	8 U
Semivolatile Organics (ug/kg)											
1,1-BIPHENYL	400 U	6900 U	7250 U	7600 U	430 U	410 U		2200 U	1330 U	460 U	360 U
1,2,4,5-TETRACHLOROBENZENE							460 U				
1,3,5-TRINITROBENZENE							460 U				
1,3-DINITROBENZENE							460 U				
1,4-NAPHTHOQUINONE							460 U				
1,4-PHENYLENEDIAMINE							460 UR				
1-NAPHTHYLAMINE							460 U				
2,2'-OXYBIS(1-CHLOROPROPANE)	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
2,3,4,6-TETRACHLOROPHENOL							460 U				
2,4,5-TRICHLOROPHENOL	1000 U	17000 U	18000 U	19000 U	430 U	410 U	1100 U	5600 U	3400 U	1200 U	910 U
2,4,6-TRICHLOROPHENOL	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
2,4-DICHLOROPHENOL	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
2,4-DIMETHYLPHENOL	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
2,4-DINITROPHENOL	1000 U	17000 U	18000 U	19000 U	1000 U	1000 U	1100 U	5600 U	3400 U	1200 U	910 U
2,4-DINITROTOLUENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
2,6-DICHLOROPHENOL							460 U				
2,6-DINITROTOLUENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
2-ACETYLAMINOFLUORENE							460 U				
2-CHLORONAPHTHALENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
2-CHLOROPHENOL	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
2-METHYLNAPHTHALENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
2-METHYLPHENOL	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
2-NAPHTHYLAMINE							460 U				
2-NITROANILINE	1000 U	17000 U	18000 U	19000 U	1000 U	1000 U	1100 U	5600 U	3400 U	1200 U	910 U
2-NITROPHENOL	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
2-PICOLINE							460 U				
3&4-METHYLPHENOL							460 U				
3,3'-DICHLOROBENZIDINE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 UR	1330 UR	460 UR	360 UR

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	017	017	017	017	017
Sample Location	16SS01	16SS02	16SS02	16SS02	16SS03	16SS04	17SB01	17SB02	17SB02	17SB02	17SB03
Sample Number	16-S-01-00	16-S-02-00	16-S-02-00-AVG	16-S-02-00-D	16-S-03-00	16-S-04-00	17-B-01-00	17-B-02-00	17-B-02-00-AVG	17-B-02-00-D	17-B-03-00
Depth Range (below ground surface)	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	10/11/01	10/11/01	10/11/01	10/11/01	01/18/05	01/18/05	06/07/01	06/07/01	06/07/01	06/07/01	06/06/01
3,3'-DIMETHYLBENZIDINE							920 U				
3-METHYLCHOLANTHRENE							460 U				
3-NITROANILINE	1000 U	17000 U	18000 U	19000 U	1000 U	1000 U	1100 U	5600 U	3400 U	1200 U	910 U
4,6-DINITRO-2-METHYLPHENOL	1000 U	17000 U	18000 U	19000 U	1000 U	1000 U	1100 U	5600 U	3400 U	1200 U	910 U
4-AMINOBIPHENYL							460 U				
4-BROMOPHENYL PHENYL ETHER	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
4-CHLORO-3-METHYLPHENOL	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
4-CHLOROANILINE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
4-CHLOROPHENYL PHENYL ETHER	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
4-METHYLPHENOL	400 U	6900 U	7250 U	7600 U	430 U	410 U		2200 U	1330 U	460 U	360 U
4-NITROANILINE	1000 U	17000 U	18000 U	19000 U	1000 U	1000 U	1100 U	5600 UJ	3400 UJ	1200 UJ	910 U
4-NITROPHENOL	1000 U	17000 U	18000 U	19000 U	1000 U	1000 U	1100 U	5600 U	3400 U	1200 U	910 U
4-NITROQUINOLINE-1-OXIDE							920 UR				
5-NITRO-O-TOLUIDINE							920 U				
7,12-DIMETHYLBENZ(A)ANTHRACENE							460 U				
A,A-DIMETHYLPHENETHYLAMINE							460 U				
ACENAPHTHENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	170 J	170 J	460 U	360 U
ACENAPHTHYLENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
ACETOPHENONE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
ANILINE							460 U				
ANTHRACENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	450 J	450 J	460 U	360 U
ARAMITE							920 U				
ATRAZINE	400 U	6900 U	7250 U	7600 U	430 U	410 U		2200 U	1330 U	460 U	360 U
BENZALDEHYDE	400 U	6900 U	7250 U	7600 U	460	450		2200 U	1330 U	460 U	360 U
BENZO(A)ANTHRACENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	1000 J	517 J	34 J	28 J
BENZO(A)PYRENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	740 J	385.5 J	31 J	20 J
BENZO(B)FLUORANTHENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	1100 J	584.5 J	69 J	36 J
BENZO(G,H,I)PERYLENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	370 J	370 J	460 U	360 U
BENZO(K)FLUORANTHENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	340 J	340 J	460 U	360 U
BENZYL ALCOHOL							920 U				
BIS(2-CHLOROETHOXY)METHANE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
BIS(2-CHLOROETHYL)ETHER	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
BIS(2-ETHYLHEXYL)PHTHALATE	400 U	3800000	4950000	6100000	250 J	240 J	460 U	1100 J	665 J	460 U	360 U
BUTYL BENZYL PHTHALATE	400 U	9400	12700	16000	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
CAPROLACTAM	400 U	6900 U	7250 U	7600 U	430 U	410 U		2200 U	1330 U	460 U	360 U
CARBAZOLE	400 U	6900 U	7250 U	7600 U	430 U	410 U		450 J	450 J	460 U	360 U
CHLOROBENZILATE							920 U				
CHRYSENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	910 J	472.5 J	35 J	26 J
DI-N-BUTYL PHTHALATE	400 U	14000	20000	26000	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
DI-N-OCTYL PHTHALATE	400 U	34000 J	52000 J	70000 J	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
DIALLATE							920 U				
DIBENZO(A,H)ANTHRACENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	130 J	130 J	460 U	360 U
DIBENZOFURAN	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	74 J	74 J	460 U	360 U
DIETHYL PHTHALATE	400 U	870 J	1385 J	1900 J	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
DIMETHOATE							460 U				
DIMETHYL PHTHALATE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
ETHYL METHANE SULFONATE							460 U				
FLUORANTHENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	1700 J	867 J	34 J	26 J
FLUORENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	170 J	170 J	460 U	360 U
HEXACHLOROBENZENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	017	017	017	017	017
Sample Location	16SS01	16SS02	16SS02	16SS02	16SS03	16SS04	17SB01	17SB02	17SB02	17SB02	17SB03
Sample Number	16-S-01-00	16-S-02-00	16-S-02-00-AVG	16-S-02-00-D	16-S-03-00	16-S-04-00	17-B-01-00	17-B-02-00	17-B-02-00-AVG	17-B-02-00-D	17-B-03-00
Depth Range (below ground surface)	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	10/11/01	10/11/01	10/11/01	10/11/01	01/18/05	01/18/05	06/07/01	06/07/01	06/07/01	06/07/01	06/06/01
HEXACHLOROBUTADIENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
HEXACHLOROCYCLOPENTADIENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
HEXACHLOROETHANE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
HEXACHLOROPHENE							460 UR				
HEXACHLOROPROPENE							460 U				
INDENO(1,2,3-CD)PYRENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	410 J	216.5 J	23 J	360 U
ISODRIN							920 U				
ISOPHORONE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
ISOSAFROLE							920 U				
METHAPYRILENE							460 U				
METHYL METHANE SULFONATE							920 U				
N-NITROSO-DI-N-BUTYLAMINE							460 U				
N-NITROSO-DI-N-PROPYLAMINE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
N-NITROSODIETHYLAMINE							920 U				
N-NITROSODIMETHYLAMINE							920 U				
N-NITROSODIPHENYLAMINE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
N-NITROSOMETHYLETHYLAMINE							460 U				
N-NITROSOMORPHOLINE							460 U				
N-NITROSOPIPERIDINE							460 U				
N-NITROSOPYRROLIDINE							460 U				
NAPHTHALENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	92 J	92 J	460 U	360 U
NITROBENZENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE							920 U				
O-TOLUIDINE							460 U				
P-(DIMETHYLAMINO)AZOBENZENE							920 U				
PENTACHLOROBENZENE							460 U				
PENTACHLORONITROBENZENE							460 U				
PENTACHLOROPHENOL	1000 U	17000 U	18000 U	19000 U	1000 U	1000 U	1100 U	5600 U	3400 U	1200 U	910 U
PHENACETIN							460 U				
PHENANTHRENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	30 J	1400 J	709.5 J	19 J	360 U
PHENOL	400 U	6900 U	7250 U	7600 U	430 U	410 U	460 U	2200 U	1330 U	460 U	360 U
PRONAMIDE							460 U				
PYRENE	400 U	6900 U	7250 U	7600 U	430 U	410 U	50 J	1700 J	876.5 J	53 J	41 J
PYRIDINE							2200 U				
SAFROLE							460 U				
SULFOTEPP							460 U				
THIONAZIN							920 U				
Pesticides/PCBs (ug/kg)											
4,4'-DDD	3.9 U	690 U	730 U	770 U	1.4 J	4.1 U	0.31 R	4.4 U	4.55 U	4.7 U	3.7 U
4,4'-DDE	3.9 U	690 U	730 U	770 U	3.1 J	4.6	2.6	2.5 J	1.95 J	1.4 J	3.7 U
4,4'-DDT	3.9 U	690 U	730 U	770 U	4.3 U	4.8	3.5	6.2 J	4.275 J	4.7 U	3.7 U
ALDRIN	2.0 U	360 U	380 U	400 U	2.2 U	2.1 U	1.9 U	2.3 U	2.35 U	2.4 U	1.9 U
ALPHA-BHC	2.0 U	360 U	380 U	400 U	2.2 U	2.1 U	1.9 U	2.3 U	2.35 U	2.4 U	1.9 U
ALPHA-CHLORDANE	2.0 U	360 U	380 U	400 U	2.2 U	2.1 U	1.9 U	2.3 U	2.35 U	2.4 U	1.9 U
AROCLOR-1016	20 U	890 U	945 U	1000 U	22 U	21 U	23 U	23 U	23.5 U	24 U	19 U
AROCLOR-1221	20 U	890 U	945 U	1000 U	22 U	21 U	23 U	23 U	23.5 U	24 U	19 U
AROCLOR-1232	20 U	890 U	945 U	1000 U	22 U	21 U	23 U	23 U	23.5 U	24 U	19 U
AROCLOR-1242	20 U	890 U	945 U	1000 U	22 U	21 U	23 U	23 U	23.5 U	24 U	19 U
AROCLOR-1248	20 U	890 U	945 U	1000 U	22 U	21 U	23 U	23 U	23.5 U	24 U	19 U
AROCLOR-1254	20 U	59000	49500	40000	22 U	21 U	23 U	23 U	23.5 U	24 U	12 J

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	017	017	017	017	017
Sample Location	16SS01	16SS02	16SS02	16SS02	16SS03	16SS04	17SB01	17SB02	17SB02	17SB02	17SB03
Sample Number	16-S-01-00	16-S-02-00	16-S-02-00-AVG	16-S-02-00-D	16-S-03-00	16-S-04-00	17-B-01-00	17-B-02-00	17-B-02-00-AVG	17-B-02-00-D	17-B-03-00
Depth Range (below ground surface)	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	10/11/01	10/11/01	10/11/01	10/11/01	01/18/05	01/18/05	06/07/01	06/07/01	06/07/01	06/07/01	06/06/01
AROCLOR-1260	20 U	890 U	945 U	1000 U	22 U	21 U	23 U	23 U	23.5 U	24 U	19 U
BETA-BHC	2.0 U	360 U	380 U	400 U	2.2 U	2.1 U	1.9 U	2.3 U	2.35 U	2.4 U	1.9 U
CHLORDANE (TECHNICAL)							19 U				
DELTA-BHC	2.0 U	360 U	380 U	400 U	2.2 U	2.1 U	1.9 U	2.3 U	2.35 U	2.4 U	1.9 U
DIELDRIN	3.9 U	690 U	730 U	770 U	4.3 U	4.1 U	1.9 U	4.4 U	4.55 U	4.7 U	3.7 U
ENDOSULFAN I	2.0 U	360 U	380 U	400 U	2.2 U	2.1 U	1.9 U	2.3 U	2.35 U	2.4 U	1.9 U
ENDOSULFAN II	3.9 U	690 U	730 U	770 U	4.3 U	4.1 U	1.2 R	4.4 U	4.55 U	4.7 U	3.7 U
ENDOSULFAN SULFATE	3.9 U	690 U	730 U	770 U	4.3 U	4.1 U	0.21 R	4.4 U	4.55 U	4.7 U	3.7 U
ENDRIN	3.9 U	690 U	730 U	770 U	4.3 U	4.1 U	0.39 R	4.4 U	4.55 U	4.7 U	3.7 U
ENDRIN ALDEHYDE	3.9 U	690 U	730 U	770 U	4.3 U	4.1 U	1.3 J	4.4 U	4.55 U	4.7 U	3.7 U
ENDRIN KETONE	3.9 U	690 U	730 U	770 U	4.3 U	4.1 U	0.15 R	2.1 J	1.9 J	1.7 J	1.4 J
GAMMA-BHC (LINDANE)	2.0 U	360 U	380 U	400 U	2.2 U	2.1 U	1.9 U	2.3 U	2.35 U	2.4 U	1.9 U
GAMMA-CHLORDANE	2.0 U	360 U	380 U	400 U	2.2 U	2.1 U	0.17 R	2.3 U	2.35 U	2.4 U	1.9 U
HEPTACHLOR	2.0 U	360 U	380 U	400 U	2.2 U	2.1 U	1.9 U	2.3 U	2.35 U	2.4 U	1.9 U
HEPTACHLOR EPOXIDE	2.0 U	360 U	380 U	400 U	2.2 U	2.1 U	1.9 U	2.3 U	2.35 U	2.4 U	1.9 U
KEPONE							36 U				
METHOXYCHLOR	20 U	3600 U	3800 U	4000 U	22 U	21 U	3.6 U	23 U	23.5 U	24 U	19 U
TOXAPHENE	39 U	6900 U	7300 U	7700 U	43 U	41 U	73 U	44 U	45.5 U	47 U	37 U
OrganoPhos Pesticides (ug/kg)											
DISULFOTON							36 U				
ETHYL PARATHION							36 U				
FAMPHUR							36 U				
METHYL PARATHION							36 U				
PHORATE							36 U				
Herbicides (ug/kg)											
2,4,5-T							22 U				
2,4,5-TP (SILVEX)							22 U				
2,4-D							88 U				
DINOSEB							13 U				
Explosives (ug/kg)											
1,3,5-TRINITROBENZENE	250 U	250 U	250 U	250 U	100 U	100 U	250 U	250 U	250 U	250 U	250 U
1,3-DINITROBENZENE	250 U	250 U	250 U	250 U	100 U	100 U	250 U	250 U	250 U	250 U	250 U
2,4,6-TRINITROTOLUENE	250 U	250 U	250 U	250 U	100 U	100 U	250 U	250 U	250 U	250 U	250 U
2,4-DINITROTOLUENE	250 U	250 U	250 U	250 U	100 U	100 U	250 U	250 U	250 U	250 U	250 U
2,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	200 U	200 U	250 U	250 U	250 U	250 U	250 U
2-AMINO-4,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	200 U	200 U	250 U	250 U	250 U	250 U	250 U
2-NITROTOLUENE	250 U	250 U	250 U	250 U	200 U	200 U	250 U	250 U	250 U	250 U	250 U
3-NITROTOLUENE	250 U	250 U	250 U	250 U	200 U	200 U	250 U	250 U	250 U	250 U	250 U
4-AMINO-2,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	200 U	200 U	250 U	250 U	250 U	250 U	250 U
4-NITROTOLUENE	250 U	250 U	250 U	250 U	200 U	200 U	250 U	250 U	250 U	250 U	250 U
HMX	500 U	500 U	500 U	500 U	200 U	200 U	500 U	500 U	500 U	500 U	500 U
NITROBENZENE	250 U	250 U	250 U	250 U	100 U	100 U	250 U	250 U	250 U	250 U	250 U
RDX	500 U	500 U	500 U	500 U	200 U	200 U	500 U	500 U	500 U	500 U	500 U
TETRYL	650 U	650 U	650 U	650 U	250 U	250 U	650 U	650 U	650 U	650 U	650 U
Inorganics (mg/kg)											
ALUMINUM	14200	4420	3725	3030	8040	8970	5980	7710	9455	11200	8660
ANTIMONY	0.41 U	98.3	110.15	122	0.18 U	0.21 U	0.37 U	0.43 U	0.39 U	0.35 U	0.76 U
ARSENIC	3.9	1.1	1.1	10.7 U	3.9	3.9	2 U	2.5 U	2.525	3.8	3.7
BARIUM	19.8	150	178.5	207	15.8	13.5	19.4	24.8	31	37.2	47.4
BERYLLIUM	0.20 U	0.10 U	0.1 U	0.10 U	0.09 U	0.08 U	0.33 U	0.35 U	0.3225	0.47	0.38 U

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	017	017	017	017	017
Sample Location	16SS01	16SS02	16SS02	16SS02	16SS03	16SS04	17SB01	17SB02	17SB02	17SB02	17SB03
Sample Number	16-S-01-00	16-S-02-00	16-S-02-00-AVG	16-S-02-00-D	16-S-03-00	16-S-04-00	17-B-01-00	17-B-02-00	17-B-02-00-AVG	17-B-02-00-D	17-B-03-00
Depth Range (below ground surface)	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	10/11/01	10/11/01	10/11/01	10/11/01	01/18/05	01/18/05	06/07/01	06/07/01	06/07/01	06/07/01	06/06/01
CADMIUM	0.32 U	60.7	52.35	44	0.16	0.26	0.06 U	0.12 U	0.125 U	0.13 U	0.34 U
CALCIUM	487	1440	1116.5	793	366	274	1120	2860	3850	4840	2610
CHROMIUM	18.3	478	572.5	667	11	14.2	8.5	12.3	15.3	18.3	14.4
COBALT	1.1	0.76 U	0.79 U	0.82 U	0.52	0.91	0.9	1.1 U	1.075	1.6	1.3 U
COPPER	2.4	38.7	48.4	58.1	6.4	6.6	10.3	6.1	7.9	9.7	56.4
IRON	15800 J	2970 J	2245 J	1520 J	10800	14900	5410	7120	8960	10800	8230
LEAD	7.8	9610	11005	12400	11.8	11.1	10.3	13.5	17.1	20.7	59.8
MAGNESIUM	1230	1220	957	694	710	626	411	629	789	949	579
MANGANESE	29.4	12.9	11.15	9.4	13.8 J	41.4 J	30.6	44.5	54.15	63.8	83.2
MERCURY	0.03	0.09	0.1	0.11	0.02	0.02	0.03 U	0.03 U	0.025 U	0.02 U	0.09
NICKEL	3.8	2.4	2.1	1.8	1.6	4.7	3.4	4.2	5.15	6.1	64.6
POTASSIUM	641	430	333	236	428	501	188	251	315.5	380	551
SELENIUM	0.49 U	0.71 U	6.805 U	12.9 U	0.67	0.69	0.31 U	0.36 U	0.315 U	0.27 U	0.46 U
SILVER	0.47 U	0.81 U	0.845 U	0.88 U	0.05 U	0.06 U	0.1 U	0.12 U	0.105 U	0.09 U	0.11 U
SODIUM	4160	3830	3150	2470	1800	1590	45.7 U	45.3 U	58.4 U	71.5 U	58.9 U
THALLIUM	0.53 U	0.92 U	10.46 U	20.0 U	0.59 U	0.65 U	0.48 U	0.56 U	0.49 U	0.42 U	0.71 U
VANADIUM	34.1	9.5	6.65	3.8	23.7	22.8	12.2	15.6	19.3	23	18.4
ZINC	10.3	157	141	125	5.4	7.3	12.2 J	24.8	30.2	35.6	54.5
Miscellaneous Parameters (mg/kg)											
CYANIDE	1.2 U	2.1 U	2.2 U	2.3 U	0.5 U	0.5 U	1.4 U	1.4 U	1.4 U	1.4 U	1.1 U
TOTAL ORGANIC CARBON					19000	25000					
TOTAL SOLIDS (%)	84 %	48 %	45.5 %	43 %	77 %	80 %					

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB04	17SB05	17SB06	17SB07	17SB08	17SB09	17SB09	17SB09	17SB10	17SB11	17SB12	17SB13
Sample Number	17-B-04-00	17-B-05-00	17-B-06-00	17-B-07-00	17-B-08-00	17-B-09-00	17-B-09-00-AVG	17-B-09-00-D	17-B-10-00	17-B-11-00	17-B-12-00	17-B-13-00
Depth Range (below ground surface)	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/05/01	06/06/01	06/07/01	06/05/01
Volatile Organics (ug/kg)												
1,1,1,2-TETRACHLOROETHANE												
1,1,1-TRICHLOROETHANE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
1,1,2,2-TETRACHLOROETHANE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
1,1,2-TRICHLOROETHANE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
1,1-DICHLOROETHANE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
1,1-DICHLOROETHENE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
1,2,3-TRICHLOROPROPANE												
1,2,4-TRICHLOROBENZENE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
1,2,4-TRIMETHYLBENZENE												
1,2-DIBROMO-3-CHLOROPROPANE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
1,2-DIBROMOETHANE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
1,2-DICHLOROBENZENE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
1,2-DICHLOROETHANE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
1,2-DICHLOROPROPANE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
1,3,5-TRIMETHYLBENZENE												
1,3-DICHLOROBENZENE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
1,4-DICHLOROBENZENE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
2-BUTANONE	7 U	7 U	6 J	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
2-HEXANONE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
3-CHLOROPROPENE												
4-METHYL-2-PENTANONE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
ACETONE	10 U	55 U	42 U	48 U	7 U	15 U	18.5 U	22 U	30 U	8 U	10 U	19 U
ACETONITRILE												
ACROLEIN												
ACRYLONITRILE												
BENZENE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
BROMODICHLOROMETHANE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
BROMOFORM	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
BROMOMETHANE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
CARBON DISULFIDE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
CARBON TETRACHLORIDE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
CHLOROBENZENE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
CHLORODIBROMOMETHANE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
CHLOROETHANE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
CHLOROFORM	7 U	7 U	7 U	5 U*	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
CHLOROMETHANE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
CHLOROPRENE												
CIS-1,2-DICHLOROETHENE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
CIS-1,3-DICHLOROPROPENE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
CYCLOHEXANE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
DIBROMOMETHANE												
DICHLORODIFLUOROMETHANE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
ETHYL METHACRYLATE												
ETHYLBENZENE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
ISOBUTANOL												
ISOPROPYLBENZENE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
M+P-XYLENES												
METHACRYLONITRILE												

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB04	17SB05	17SB06	17SB07	17SB08	17SB09	17SB09	17SB09	17SB10	17SB11	17SB12	17SB13
Sample Number	17-B-04-00	17-B-05-00	17-B-06-00	17-B-07-00	17-B-08-00	17-B-09-00	17-B-09-00-AVG	17-B-09-00-D	17-B-10-00	17-B-11-00	17-B-12-00	17-B-13-00
Depth Range (below ground surface)	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/05/01	06/06/01	06/07/01	06/05/01
METHYL ACETATE	7 U	7 U	7 U	16	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
METHYL CYCLOHEXANE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
METHYL IODIDE												
METHYL METHACRYLATE												
METHYL TERT-BUTYL ETHER	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
METHYLENE CHLORIDE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	11 U	7 U	6 U	5 U
O-XYLENE												
PENTACHLOROETHANE												
PROPIONITRILE												
STYRENE	7 U	7 U	2 J	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
TETRACHLOROETHENE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
TOLUENE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
TOTAL 1,2-DICHLOROETHENE												
TOTAL XYLENES	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
TRANS-1,2-DICHLOROETHENE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
TRANS-1,3-DICHLOROPROPENE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
TRANS-1,4-DICHLORO-2-BUTENE												
TRICHLOROETHENE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
TRICHLOROFLUOROMETHANE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
VINYL ACETATE												
VINYL CHLORIDE	7 U	7 U	7 U	5 U	7 U	6 U	6 U	6 U	7 U	6 U	6 U	5 U
Semivolatile Organics (ug/kg)												
1,1-BIPHENYL	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
1,2,4,5-TETRACHLOROBENZENE												
1,3,5-TRINITROBENZENE												
1,3-DINITROBENZENE												
1,4-NAPHTHOQUINONE												
1,4-PHENYLENEDIAMINE												
1-NAPHTHYLAMINE												
2,2'-OXYBIS(1-CHLOROPROPANE)	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
2,3,4,6-TETRACHLOROPHENOL												
2,4,5-TRICHLOROPHENOL	910 U	1100 U	1200 U	1000 U	910 U	910 U	910 U	910 U	1000 U	1200 U	910 U	910 U
2,4,6-TRICHLOROPHENOL	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
2,4-DICHLOROPHENOL	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
2,4-DIMETHYLPHENOL	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
2,4-DINITROPHENOL	910 U	1100 U	1200 U	1000 U	910 U	910 U	910 U	910 U	1000 U	1200 U	910 U	910 U
2,4-DINITROTOLUENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
2,6-DICHLOROPHENOL												
2,6-DINITROTOLUENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
2-ACETYLAMINOFLUORENE												
2-CHLORONAPHTHALENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
2-CHLOROPHENOL	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
2-METHYLNAPHTHALENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
2-METHYLPHENOL	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
2-NAPHTHYLAMINE												
2-NITROANILINE	910 U	1100 U	1200 U	1000 U	910 U	910 U	910 U	910 U	1000 U	1200 U	910 U	910 U
2-NITROPHENOL	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
2-PICOLINE												
3&4-METHYLPHENOL												
3,3'-DICHLOROBENZIDINE	360 UR	430 UR	460 UR	400 UR	360 UR	360 UR	360 UR	360 UR	400 UR	460 UR	360 UR	360 UR

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB04	17SB05	17SB06	17SB07	17SB08	17SB09	17SB09	17SB09	17SB10	17SB11	17SB12	17SB13
Sample Number	17-B-04-00	17-B-05-00	17-B-06-00	17-B-07-00	17-B-08-00	17-B-09-00	17-B-09-00-AVG	17-B-09-00-D	17-B-10-00	17-B-11-00	17-B-12-00	17-B-13-00
Depth Range (below ground surface)	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/05/01	06/06/01	06/07/01	06/05/01
3,3'-DIMETHYLBENZIDINE												
3-METHYLCHOLANTHRENE												
3-NITROANILINE	910 U	1100 U	1200 U	1000 U	910 U	910 U	910 U	910 U	1000 U	1200 U	910 U	910 U
4,6-DINITRO-2-METHYLPHENOL	910 U	1100 U	1200 U	1000 U	910 U	910 U	910 U	910 U	1000 U	1200 U	910 U	910 U
4-AMINOBIPHENYL												
4-BROMOPHENYL PHENYL ETHER	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
4-CHLORO-3-METHYLPHENOL	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
4-CHLOROANILINE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
4-CHLOROPHENYL PHENYL ETHER	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
4-METHYLPHENOL	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	42 J	360 U	360 U
4-NITROANILINE	910 U	1100 U	1200 U	1000 U	910 U	910 U	910 U	910 U	1000 U	1200 UR	910 U	910 U
4-NITROPHENOL	910 U	1100 U	1200 U	1000 U	910 U	910 U	910 U	910 U	1000 U	1200 U	910 U	910 U
4-NITROQUINOLINE-1-OXIDE												
5-NITRO-O-TOLUIDINE												
7,12-DIMETHYLBENZ(A)ANTHRACENE												
A,A-DIMETHYLPHENETHYLAMINE												
ACENAPHTHENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
ACENAPHTHYLENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	52 J	360 U	360 U
ACETOPHENONE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
ANILINE												
ANTHRACENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	66 J	360 U	360 U
ARAMITE												
ATRAZINE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
BENZALDEHYDE	360 U	460	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
BENZO(A)ANTHRACENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	390 J	360 U	360 U
BENZO(A)PYRENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	470	360 U	360 U
BENZO(B)FLUORANTHENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	950	360 U	360 U
BENZO(G,H,I)PERYLENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	300 J	360 U	360 U
BENZO(K)FLUORANTHENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	280 J	360 U	360 U
BENZYL ALCOHOL												
BIS(2-CHLOROETHOXY)METHANE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
BIS(2-CHLOROETHYL)ETHER	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
BIS(2-ETHYLHEXYL)PHTHALATE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	570 U	360 U	360 U
BUTYL BENZYL PHTHALATE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	80 J	360 U	360 U
CAPROLACTAM	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
CARBAZOLE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
CHLOROBENZILATE												
CHRYSENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	470	360 U	360 U
DI-N-BUTYL PHTHALATE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
DI-N-OCTYL PHTHALATE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
DIALLATE												
DIBENZO(A,H)ANTHRACENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	90 J	360 U	360 U
DIBENZOFURAN	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
DIETHYL PHTHALATE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
DIMETHOATE												
DIMETHYL PHTHALATE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
ETHYL METHANE SULFONATE												
FLUORANTHENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	550	360 U	360 U
FLUORENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
HEXACHLOROBENZENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB04	17SB05	17SB06	17SB07	17SB08	17SB09	17SB09	17SB09	17SB10	17SB11	17SB12	17SB13
Sample Number	17-B-04-00	17-B-05-00	17-B-06-00	17-B-07-00	17-B-08-00	17-B-09-00	17-B-09-00-AVG	17-B-09-00-D	17-B-10-00	17-B-11-00	17-B-12-00	17-B-13-00
Depth Range (below ground surface)	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/05/01	06/06/01	06/07/01	06/05/01
HEXACHLOROBUTADIENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
HEXACHLOROCYCLOPENTADIENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
HEXACHLOROETHANE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
HEXACHLOROPHENE												
HEXACHLOROPROPENE												
INDENO(1,2,3-CD)PYRENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	390 J	360 U	360 U
ISODRIN												
ISOPHORONE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
ISOSAFROLE												
METHAPYRILENE												
METHYL METHANE SULFONATE												
N-NITROSO-DI-N-BUTYLAMINE												
N-NITROSO-DI-N-PROPYLAMINE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
N-NITROSODIETHYLAMINE												
N-NITROSODIMETHYLAMINE												
N-NITROSODIPHENYLAMINE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
N-NITROSOMETHYLETHYLAMINE												
N-NITROSOMORPHOLINE												
N-NITROSOPIPERIDINE												
N-NITROSOPYRROLIDINE												
NAPHTHALENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
NITROBENZENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE												
O-TOLUIDINE												
P-(DIMETHYLAMINO)AZOBENZENE												
PENTACHLOROBENZENE												
PENTACHLORONITROBENZENE												
PENTACHLOROPHENOL	910 U	1100 U	1200 U	1000 U	910 U	910 U	910 U	910 U	1000 U	1200 U	910 U	910 U
PHENACETIN												
PHENANTHRENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	80 J	360 U	360 U
PHENOL	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	460 U	360 U	360 U
PRONAMIDE												
PYRENE	360 U	430 U	460 U	400 U	360 U	360 U	360 U	360 U	400 U	970	360 U	360 U
PYRIDINE												
SAFROLE												
SULFOTEPP												
THIONAZIN												
Pesticides/PCBs (ug/kg)												
4,4'-DDD	3.7 U	4.2 U	4.6 U	3.8 U	3.8 U	3.6 U	3.6 U	3.6 U	4 U	4.7 U	37	3.7 U
4,4'-DDE	3.7 U	4.2 U	4.6 U	3.8 U	0.54 J	3.6 U	3.6 U	3.6 U	4 U	4.7 U	3.6 U	3.7 U
4,4'-DDT	3.7 U	1.2 J	4.6 U	3.8 U	0.65 J	3.6 U	3.6 U	3.6 U	4 U	4.7 U	3.6 U	3.7 U
ALDRIN	1.9 U	2.2 U	2.4 U	2 U	1.9 U	1.8 U	1.85 U	1.9 U	2 U	2.4 U	2.2 J	1.9 U
ALPHA-BHC	1.9 U	2.2 U	2.4 U	2 U	1.9 U	1.8 U	1.85 U	1.9 U	2 U	2.4 U	1.8 U	0.67 J
ALPHA-CHLORDANE	1.9 U	2.2 U	2.4 U	0.55 J	1.9 U	1.8 U	1.85 U	1.9 U	2 U	2.4 U	1.8 U	1.9 U
AROCLOR-1016	19 U	22 U	24 U	20 U	19 U	18 U	18.5 U	19 U	20 U	24 U	18 U	19 U
AROCLOR-1221	19 U	22 U	24 U	20 U	19 U	18 U	18.5 U	19 U	20 U	24 U	18 U	19 U
AROCLOR-1232	19 U	22 U	24 U	20 U	19 U	18 U	18.5 U	19 U	20 U	24 U	18 U	19 U
AROCLOR-1242	19 U	22 U	24 U	20 U	19 U	18 U	18.5 U	19 U	20 U	24 U	18 U	19 U
AROCLOR-1248	19 U	22 U	24 U	20 U	19 U	18 U	18.5 U	19 U	20 U	570	18 U	19 U
AROCLOR-1254	19 U	22 U	24 U	20 U	19 U	18 U	18.5 U	19 U	20 U	870	450 J	19 U

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB04	17SB05	17SB06	17SB07	17SB08	17SB09	17SB09	17SB09	17SB10	17SB11	17SB12	17SB13
Sample Number	17-B-04-00	17-B-05-00	17-B-06-00	17-B-07-00	17-B-08-00	17-B-09-00	17-B-09-00-AVG	17-B-09-00-D	17-B-10-00	17-B-11-00	17-B-12-00	17-B-13-00
Depth Range (below ground surface)	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/05/01	06/06/01	06/07/01	06/05/01
AROCLOR-1260	19 U	22 U	24 U	20 U	19 U	18 U	18.5 U	19 U	20 U	350	170	19 U
BETA-BHC	0.9 J	2.2 U	2.4 U	2 U	1.9 U	1.8 U	1.85 U	1.9 U	2 U	2.4 U	1.8 U	1.9 U
CHLORDANE (TECHNICAL)												
DELTA-BHC	1.9 U	2.2 U	2.4 U	2 U	1.9 U	1.8 U	1.85 U	1.9 U	2 U	2.4 U	1.8 U	1.9 U
DIELDRIN	3.7 U	4.2 U	4.6 U	3.8 U	3.8 U	3.6 U	3.6 U	3.6 U	4 U	4.7 U	3.6 U	3.7 U
ENDOSULFAN I	1.9 U	2.2 U	2.4 U	2 U	1.9 U	1.8 U	1.85 U	1.9 U	2 U	2.4 U	1.8 U	1.9 U
ENDOSULFAN II	3.7 U	4.2 U	4.6 U	3.8 U	3.8 U	3.6 U	3.6 U	3.6 U	4 U	4.7 U	3.6 U	3.7 U
ENDOSULFAN SULFATE	3.7 U	4.2 U	4.6 U	3.8 U	3.8 U	3.6 U	3.6 U	3.6 U	4 U	4.7 U	3.6 U	3.7 U
ENDRIN	3.7 U	4.2 U	4.6 U	3.8 U	3.8 U	3.6 U	3.6 U	3.6 U	4 U	4.7 U	3.6 U	3.7 U
ENDRIN ALDEHYDE	3.7 U	4.2 U	4.6 U	3.8 U	3.8 U	3.6 U	3.6 U	3.6 U	4 U	4.7 U	3.6 U	3.7 U
ENDRIN KETONE	3.7 U	4.2 U	4.6 U	3.8 U	3.8 U	3.6 U	3.6 U	3.6 U	4 U	4.7 U	5.4	3.7 U
GAMMA-BHC (LINDANE)	1.9 U	2.2 U	2.4 U	2 U	1.9 U	1.8 U	1.85 U	1.9 U	2 U	2.4 U	1.8 U	0.87 J
GAMMA-CHLORDANE	1.9 U	2.2 U	2.4 U	2 U	1.9 U	1.8 U	1.85 U	1.9 U	2 U	2.4 U	1.8 U	1.9 U
HEPTACHLOR	1.9 U	2.2 U	2.4 U	2 U	1.9 U	1.8 U	1.85 U	1.9 U	2 U	2.8 J	1.8 U	0.48 J
HEPTACHLOR EPOXIDE	1.9 U	2.2 U	2.4 U	2 U	1.9 U	1.8 U	1.85 U	1.9 U	2 U	2.4 U	1.8 U	1.9 U
KEPONE												
METHOXYCHLOR	19 U	22 U	24 U	20 U	19 U	18 U	18.5 U	19 U	20 U	24 U	18 U	19 U
TOXAPHENE	37 U	42 U	46 U	38 U	38 U	36 U	36 U	36 U	40 U	47 U	36 U	37 U
OrganoPhos Pesticides (ug/kg)												
DISULFOTON												
ETHYL PARATHION												
FAMPHUR												
METHYL PARATHION												
PHORATE												
Herbicides (ug/kg)												
2,4,5-T												
2,4,5-TP (SILVEX)												
2,4-D												
DINOSEB												
Explosives (ug/kg)												
1,3,5-TRINITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
1,3-DINITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4,6-TRINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2-AMINO-4,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
3-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-AMINO-2,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
HMX	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
NITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
RDX	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
TETRYL	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U
Inorganics (mg/kg)												
ALUMINUM	3370	14200	14200	31800	6670	10600	10550	10500	7650	8950	5510	11300
ANTIMONY	0.37 U	0.44 U	0.43 U	0.38 U	0.4 U	0.31 U	0.31 U	0.31 U	0.42 U	31.4	26.6	0.35 U
ARSENIC	1.5	4.4	6.8	11.5	2.2	2.3	2.5	2.7	1.4 U	5.9	6	2.2
BARIUM	19	51.4	71	71.8	23.1	62.6	62	61.4	27.2	244	90.5	48.3
BERYLLIUM	0.27 U	0.59	1.2	0.67	0.31 U	0.73	0.775	0.82	0.63	0.36 U	0.66	1

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB04	17SB05	17SB06	17SB07	17SB08	17SB09	17SB09	17SB09	17SB10	17SB11	17SB12	17SB13
Sample Number	17-B-04-00	17-B-05-00	17-B-06-00	17-B-07-00	17-B-08-00	17-B-09-00	17-B-09-00-AVG	17-B-09-00-D	17-B-10-00	17-B-11-00	17-B-12-00	17-B-13-00
Depth Range (below ground surface)	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/05/01	06/06/01	06/07/01	06/05/01
CADMIUM	0.1 U	0.03 U	0.03 U	0.14 U	0.03 U	0.04 U	0.035 U	0.03 U	0.1 U	8.4	12.5	0.09 U
CALCIUM	507	1280	630	2070	443	698	673.5	649	273	2310	896	536
CHROMIUM	4.5	14.8	14.4	39	8.6	10.4	10	9.6	8	392	68.9	11.1
COBALT	0.46 U	2.3	3.4	3.3	1 U	1.7	1.75	1.8	0.98 U	12.8	6.2	2.6
COPPER	2.1	3.6	2.8	8.2	2.8	4.7	4.1	3.5	6.7	1220	1930	4
IRON	2810	10300	11000	38200	4680	5660	5740	5820	3700	38200	45500	5520
LEAD	15.7	17.2	36.2	33.1	23	30.1	27.05	24	15.6	667	670	47.2
MAGNESIUM	226	736	674	1560	325	473	468	463	347	598	440	481
MANGANESE	48.7	29.8	39.4	65.6	60.9	133	126.5	120	28.9	378	309	51.5
MERCURY	0.04	0.08	0.11	0.04	0.05	0.1	0.09	0.08	0.05	0.2	1.7	0.07
NICKEL	1.2 U	6.6	6.4	9.4	2.4	4	27.4	50.8	3.3	348	131	4.6
POTASSIUM	208	402	276	1110	215	252	239	226	160	268	172	251
SELENIUM	0.31 U	0.37 U	0.35 U	0.32 U	0.33 U	0.28 U	0.27 U	0.26 U	0.71 U	0.34 U	0.32 U	0.29 U
SILVER	0.1 U	0.13 U	0.12 U	0.11 U	0.11 U	0.09 U	0.09 U	0.09 U	0.12 U	0.86 U	0.47 U	0.1 U
SODIUM	50 U	59.2 U	59.5 U	81.3 U	25.8 U	81.2 U	55.85 U	30.5 U	49.6 U	343	244	83.8 U
THALLIUM	0.48 U	0.58 U	0.55 U	0.49 U	0.52 U	0.42 U			0.55 U	1.1 U	0.98 U	0.45 U
VANADIUM	6.9	23.6	22.4	51.8	12.2	12.2	12.4	12.6	14.7	18.3	18.6	17.7
ZINC	11.4	14.5	13.9	37.3	9.2	15.6	13.55	11.5	10.9	1510	1400	15.8
Miscellaneous Parameters (mg/kg)												
CYANIDE	1.1 U	1.3 U	1.4 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.2 U	1.4 U	1.1 U	1.1 U
TOTAL ORGANIC CARBON												
TOTAL SOLIDS (%)												

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB14	17SB15	17SB15	17SB15	17SB16	17SB16	17SB16	17SB17	17SB17	17SB17	17SB18
Sample Number	17-B-14-00	17-B-15-00	17-B-15-00-AVG	17-B-15-00-D	17-B-16-00	17-B-16-00-AVG	17-B-16-00-D	17-B-17-00	17-B-17-00-AVG	17-B-17-00-D	17-B-18-00
Depth Range (below ground surface)	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01
Volatile Organics (ug/kg)											
1,1,1,2-TETRACHLOROETHANE											
1,1,1-TRICHLOROETHANE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
1,1,2,2-TETRACHLOROETHANE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
1,1,2-TRICHLOROETHANE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
1,1,2-TRICHLOROTRIFLUOROETHANE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
1,1-DICHLOROETHANE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
1,1-DICHLOROETHENE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
1,2,3-TRICHLOROPROPANE											
1,2,4-TRICHLOROBENZENE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
1,2,4-TRIMETHYLBENZENE											
1,2-DIBROMO-3-CHLOROPROPANE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
1,2-DIBROMOETHANE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
1,2-DICHLOROBENZENE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
1,2-DICHLOROETHANE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
1,2-DICHLOROPROPANE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
1,3,5-TRIMETHYLBENZENE											
1,3-DICHLOROBENZENE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
1,4-DICHLOROBENZENE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
2-BUTANONE	7 U	5 U	4 J	4 J	5 J	3.75 J	5 U	8 U	7.5 U	7 U	8 U
2-HEXANONE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
3-CHLOROPROPENE											
4-METHYL-2-PENTANONE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
ACETONE	12 U	9 U	34.75	65	42 U	28.5 U	15 U	26 U	21 U	16 U	8 U
ACETONITRILE											
ACROLEIN											
ACRYLONITRILE											
BENZENE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
BROMODICHLOROMETHANE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
BROMOFORM	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
BROMOMETHANE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
CARBON DISULFIDE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
CARBON TETRACHLORIDE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
CHLOROBENZENE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
CHLORODIBROMOMETHANE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
CHLOROETHANE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
CHLOROFORM	23	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
CHLOROMETHANE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
CHLOROPRENE											
CIS-1,2-DICHLOROETHENE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	25	16	7	8 U
CIS-1,3-DICHLOROPROPENE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
CYCLOHEXANE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
DIBROMOMETHANE											
DICHLORODIFLUOROMETHANE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
ETHYL METHACRYLATE											
ETHYLBENZENE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
ISOBUTANOL											
ISOPROPYLBENZENE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
M+P-XYLENES											
METHACRYLONITRILE											

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB14	17SB15	17SB15	17SB15	17SB16	17SB16	17SB16	17SB17	17SB17	17SB17	17SB18
Sample Number	17-B-14-00	17-B-15-00	17-B-15-00-AVG	17-B-15-00-D	17-B-16-00	17-B-16-00-AVG	17-B-16-00-D	17-B-17-00	17-B-17-00-AVG	17-B-17-00-D	17-B-18-00
Depth Range (below ground surface)	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01
METHYL ACETATE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
METHYL CYCLOHEXANE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
METHYL IODIDE											
METHYL METHACRYLATE											
METHYL TERT-BUTYL ETHER	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
METHYLENE CHLORIDE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
O-XYLENE											
PENTACHLOROETHANE											
PROPIONITRILE											
STYRENE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
TETRACHLOROETHENE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
TOLUENE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
TOTAL 1,2-DICHLOROETHENE											
TOTAL XYLENES	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
TRANS-1,2-DICHLOROETHENE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
TRANS-1,3-DICHLOROPROPENE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
TRANS-1,4-DICHLORO-2-BUTENE											
TRICHLOROETHENE	65	5 U	5 U	5 U	5 U	5 U	5 U	3200	3200	3200	14 U
TRICHLOROFLUOROMETHANE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
VINYL ACETATE											
VINYL CHLORIDE	7 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	7.5 U	7 U	8 U
Semivolatile Organics (ug/kg)											
1,1-BIPHENYL	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
1,2,4,5-TETRACHLOROBENZENE											
1,3,5-TRINITROBENZENE											
1,3-DINITROBENZENE											
1,4-NAPHTHOQUINONE											
1,4-PHENYLENEDIAMINE											
1-NAPHTHYLAMINE											
2,2'-OXYBIS(1-CHLOROPROPANE)	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
2,3,4,6-TETRACHLOROPHENOL											
2,4,5-TRICHLOROPHENOL	1100 U	910 U	910 U	910 U	910 U	955 U	1000 U	1000 U	1550 U	2100 U	1100 U
2,4,6-TRICHLOROPHENOL	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
2,4-DICHLOROPHENOL	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
2,4-DIMETHYLPHENOL	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
2,4-DINITROPHENOL	1100 U	910 U	910 U	910 U	910 U	955 U	1000 U	1000 U	1550 U	2100 U	1100 U
2,4-DINITROTOLUENE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
2,6-DICHLOROPHENOL											
2,6-DINITROTOLUENE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
2-ACETYLAMINOFLUORENE											
2-CHLORONAPHTHALENE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
2-CHLOROPHENOL	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
2-METHYLNAPHTHALENE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
2-METHYLPHENOL	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
2-NAPHTHYLAMINE											
2-NITROANILINE	1100 U	910 U	910 U	910 U	910 U	955 U	1000 U	1000 U	1550 U	2100 U	1100 U
2-NITROPHENOL	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
2-PICOLINE											
3&4-METHYLPHENOL											
3,3'-DICHLOROBENZIDINE	430 UR	360 UR	360 UR	360 UR	360 UR	380 UR	400 UR	400 UR	610 UR	820 UR	430 UR

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB14	17SB15	17SB15	17SB15	17SB16	17SB16	17SB16	17SB17	17SB17	17SB17	17SB18
Sample Number	17-B-14-00	17-B-15-00	17-B-15-00-AVG	17-B-15-00-D	17-B-16-00	17-B-16-00-AVG	17-B-16-00-D	17-B-17-00	17-B-17-00-AVG	17-B-17-00-D	17-B-18-00
Depth Range (below ground surface)	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01
3,3'-DIMETHYLBENZIDINE											
3-METHYLCHOLANTHRENE											
3-NITROANILINE	1100 U	910 U	910 U	910 U	910 U	955 U	1000 U	1000 U	1550 U	2100 U	1100 U
4,6-DINITRO-2-METHYLPHENOL	1100 U	910 U	910 U	910 U	910 U	955 U	1000 U	1000 U	1550 U	2100 U	1100 U
4-AMINOBIPHENYL											
4-BROMOPHENYL PHENYL ETHER	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
4-CHLORO-3-METHYLPHENOL	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
4-CHLOROANILINE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
4-CHLOROPHENYL PHENYL ETHER	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
4-METHYLPHENOL	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
4-NITROANILINE	1100 U	910 U	910 U	910 U	910 U	955 U	1000 U	1000 U	1550 U	2100 U	1100 U
4-NITROPHENOL	1100 U	910 U	910 U	910 U	910 U	955 U	1000 U	1000 U	1550 U	2100 U	1100 U
4-NITROQUINOLINE-1-OXIDE											
5-NITRO-O-TOLUIDINE											
7,12-DIMETHYLBENZ(A)ANTHRACENE											
A,A-DIMETHYLPHENETHYLAMINE											
ACENAPHTHENE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
ACENAPHTHYLENE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
ACETOPHENONE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
ANILINE											
ANTHRACENE	430 U	360 U	360. U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
ARAMITE											
ATRAZINE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
BENZALDEHYDE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
BENZO(A)ANTHRACENE	40 J	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
BENZO(A)PYRENE	40 J	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
BENZO(B)FLUORANTHENE	84 J	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
BENZO(G,H,I)PERYLENE	23 J	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
BENZO(K)FLUORANTHENE	33 J	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
BENZYL ALCOHOL											
BIS(2-CHLOROETHOXY)METHANE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
BIS(2-CHLOROETHYL)ETHER	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
BIS(2-ETHYLHEXYL)PHTHALATE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
BUTYL BENZYL PHTHALATE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
CAPROLACTAM	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
CARBAZOLE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
CHLOROBENZILATE											
CHRYSENE	52 J	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
DI-N-BUTYL PHTHALATE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
DI-N-OCTYL PHTHALATE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
DIALLATE											
DIBENZO(A,H)ANTHRACENE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
DIBENZOFURAN	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
DIETHYL PHTHALATE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
DIMETHOATE											
DIMETHYL PHTHALATE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
ETHYL METHANE SULFONATE											
FLUORANTHENE	40 J	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
FLUORENE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
HEXACHLOROBENZENE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB14	17SB15	17SB15	17SB15	17SB16	17SB16	17SB16	17SB17	17SB17	17SB17	17SB18
Sample Number	17-B-14-00	17-B-15-00	17-B-15-00-AVG	17-B-15-00-D	17-B-16-00	17-B-16-00-AVG	17-B-16-00-D	17-B-17-00	17-B-17-00-AVG	17-B-17-00-D	17-B-18-00
Depth Range (below ground surface)	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01
HEXACHLOROBUTADIENE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
HEXACHLOROCYCLOPENTADIENE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
HEXACHLOROETHANE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
HEXACHLOROPHENE											
HEXACHLOROPROPENE											
INDENO(1,2,3-CD)PYRENE	28 J	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
ISODRIN											
ISOPHORONE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
ISOSAFROLE											
METHAPYRILENE											
METHYL METHANE SULFONATE											
N-NITROSO-DI-N-BUTYLAMINE											
N-NITROSO-DI-N-PROPYLAMINE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
N-NITROSODIETHYLAMINE											
N-NITROSODIMETHYLAMINE											
N-NITROSODIPHENYLAMINE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
N-NITROSOMETHYLETHYLAMINE											
N-NITROSOMORPHOLINE											
N-NITROSOPIPERIDINE											
N-NITROSOPYRROLIDINE											
NAPHTHALENE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
NITROBENZENE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE											
O-TOLUIDINE											
P-(DIMETHYLAMINO)AZOBENZENE											
PENTACHLOROBENZENE											
PENTACHLORONITROBENZENE											
PENTACHLOROPHENOL	1100 U	910 U	910 U	910 U	910 U	955 U	1000 U	1000 U	1550 U	2100 U	1100 U
PHENACETIN											
PHENANTHRENE	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
PHENOL	430 U	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
PRONAMIDE											
PYRENE	66 J	360 U	360 U	360 U	360 U	380 U	400 U	400 U	610 U	820 U	430 U
PYRIDINE											
SAFROLE											
SULFOTEPP											
THIONAZIN											
Pesticides/PCBs (ug/kg)											
4,4'-DDD	3.6 J	3.6 U	3.55 U	3.5 U	3.8 U	3.9 U	4 U	4.1 U	4.15 U	4.2 U	4.2 U
4,4'-DDE	9.2	0.55 J	0.55 J	3.5 U	3.8 U	3.9 U	4 U	4.1 U	4.15 U	4.2 U	4.2 U
4,4'-DDT	20	7.2	4.475	3.5 U	3.8 U	3.9 U	4 U	4.1 U	1.8 J	1.8 J	4.2 U
ALDRIN	2.2 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	2.15 U	2.2 U	2.2 U
ALPHA-BHC	2.2 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	2.15 U	2.2 U	2.2 U
ALPHA-CHLORDANE	2.2 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	2.15 U	2.2 U	2.2 U
AROCLOR-1016	22 U	18 U	18 U	18 U	19 U	20 U	21 U	21 U	21.5 U	22 U	22 U
AROCLOR-1221	22 U	18 U	18 U	18 U	19 U	20 U	21 U	21 U	21.5 U	22 U	22 U
AROCLOR-1232	22 U	18 U	18 U	18 U	19 U	20 U	21 U	21 U	21.5 U	22 U	22 U
AROCLOR-1242	22 U	18 U	18 U	18 U	19 U	20 U	21 U	21 U	21.5 U	22 U	22 U
AROCLOR-1248	22 U	18 U	18 U	18 U	19 U	20 U	21 U	21 U	21.5 U	22 U	22 U
AROCLOR-1254	22 U	18 U	18 U	18 U	19 U	20 U	21 U	21 U	5.1 J	5.1 J	22 U

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB14	17SB15	17SB15	17SB15	17SB16	17SB16	17SB16	17SB17	17SB17	17SB17	17SB18
Sample Number	17-B-14-00	17-B-15-00	17-B-15-00-AVG	17-B-15-00-D	17-B-16-00	17-B-16-00-AVG	17-B-16-00-D	17-B-17-00	17-B-17-00-AVG	17-B-17-00-D	17-B-18-00
Depth Range (below ground surface)	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01
AROCLOR-1260	22 U	18 U	18 U	18 U	19 U	20 U	21 U	21 U	21.5 U	22 U	22 U
BETA-BHC	2.2 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	2.15 U	2.2 U	2.2 U
CHLORDANE (TECHNICAL)											
DELTA-BHC	2.2 U	1.8 U	1.8 U	1.8 U	1.9 U	1.8 J	1.8 J	2.1 U	2.15 U	2.2 U	2.2 U
DIELDRIN	4.3 U	3.6 U	3.55 U	3.5 U	3.8 U	3.9 U	4 U	4.1 U	4.15 U	4.2 U	4.2 U
ENDOSULFAN I	2.2 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	2.15 U	2.2 U	2.2 U
ENDOSULFAN II	4.3 U	3.6 U	3.55 U	3.5 U	3.8 U	3.9 U	4 U	4.1 U	4.15 U	4.2 U	4.2 U
ENDOSULFAN SULFATE	4.3 U	3.6 U	3.55 U	3.5 U	3.8 U	3.9 U	4 U	4.1 U	4.15 U	4.2 U	4.2 U
ENDRIN	4.3 U	3.6 U	3.55 U	3.5 U	3.8 U	3.9 U	4 U	4.1 U	4.15 U	4.2 U	4.2 U
ENDRIN ALDEHYDE	4.3 U	3.6 U	3.55 U	3.5 U	3.8 U	3.9 U	4 U	4.1 U	4.15 U	4.2 U	4.2 U
ENDRIN KETONE	4.3 U	3.6 U	3.55 U	3.5 U	3.8 U	3.9 U	4 U	4.1 U	4.15 U	4.2 U	4.2 U
GAMMA-BHC (LINDANE)	2.2 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	2.15 U	2.2 U	2.2 U
GAMMA-CHLORDANE	2.2 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	2.15 U	2.2 U	2.2 U
HEPTACHLOR	2.2 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	2.15 U	2.2 U	2.2 U
HEPTACHLOR EPOXIDE	2.2 U	1.8 U	1.8 U	1.8 U	1.9 U	2 U	2.1 U	2.1 U	2.15 U	2.2 U	2.2 U
KEPONE											
METHOXYCHLOR	22 U	18 U	18 U	18 U	19 U	20 U	21 U	21 U	21.5 U	22 U	22 U
TOXAPHENE	43 U	36 U	35.5 U	35 U	38 U	39 U	40 U	41 U	41.5 U	42 U	42 U
OrganoPhos Pesticides (ug/kg)											
DISULFOTON											
ETHYL PARATHION											
FAMPHUR											
METHYL PARATHION											
PHORATE											
Herbicides (ug/kg)											
2,4,5-T											
2,4,5-TP (SILVEX)											
2,4-D											
DINOSEB											
Explosives (ug/kg)											
1,3,5-TRINITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
1,3-DINITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4,6-TRINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2-AMINO-4,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
3-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-AMINO-2,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
HMX	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
NITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
RDX	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
TETRYL	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U
Inorganics (mg/kg)											
ALUMINUM	12900	9500	8415	7330	16400	16300	16200	28700	27550	26400	8990
ANTIMONY	0.46 U	0.37 U	0.335 U	0.3 U	0.35 U	0.38 U	0.41 U	0.4 U	0.42 U	0.44 U	0.42 U
ARSENIC	3.1	2	1.85	1.7	3	2.9	2.8	5.1	4.1	3.1	1.7 U
BARIUM	25.8	33.8	31.35	28.9	48.9	45.95	43	35.1	35.75	36.4	24.7
BERYLLIUM	0.41 U	0.62	0.57	0.52	1.7	1.45	1.2	0.52	0.53	0.54	0.59

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB14	17SB15	17SB15	17SB15	17SB16	17SB16	17SB16	17SB17	17SB17	17SB17	17SB18
Sample Number	17-B-14-00	17-B-15-00	17-B-15-00-AVG	17-B-15-00-D	17-B-16-00	17-B-16-00-AVG	17-B-16-00-D	17-B-17-00	17-B-17-00-AVG	17-B-17-00-D	17-B-18-00
Depth Range (below ground surface)	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01
CADMIUM	0.24 U	0.41 U	0.36 U	0.31 U	0.07 U	0.08 U	0.09 U	1.1	1.15	1.2	0.13 U
CALCIUM	631	420	374	328	171	246.5	322	713	736.5	760	202
CHROMIUM	17.6	10.7	9.5	8.3	12.6	13.5	14.4	37.5	37.5	37.5	10.4
COBALT	1.7	1.5	1.3	1.1	1.8	1.85	1.9	2.8	2.8	2.8	0.95
COPPER	48.9	9.7	9.25	8.8	2.6	3.5	4.4	14.4	15.3	16.2	2.3
IRON	9530	5410	4795	4180	6060	6960	7860	29300	24400	19500	5320
LEAD	38.5	15.3	14.85	14.4	21	22.65	24.3	46.4	46.25	46.1	12.7
MAGNESIUM	630	446	405	364	608	624	640	1920	1905	1890	472
MANGANESE	53.5	39.8 J	31.2 J	22.6 J	23.1	23.3	23.5	57.1	57.25	57.4	34.4
MERCURY	0.03 U	0.05 U	0.045 U	0.04 U	0.05	0.065	0.08	1.1	1.45	1.8	0.03 U
NICKEL	10	4.5	4.2	3.9	5.2	5.4	5.6	8.9	8.85	8.8	3.3
POTASSIUM	379	218	192.5	167	253	282.5	312	770	719	668	236
SELENIUM	0.39 U	0.41 U	0.475 U	0.54 U	0.29 U	0.415 U	0.54 U	0.73 U	0.8 U	0.87 U	0.35 U
SILVER	0.13 U	0.1 U	0.09 U	0.08 U	0.1 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
SODIUM	92.3 U	25.1	26.15	27.2	131 U	130.5 U	130 U	126 U	132.5 U	139 U	69.1 U
THALLIUM	0.6 U	0.48 U	0.435 U	0.39 U	0.45 U	0.49 U	0.53 U	0.52 U	0.545 U	0.57 U	0.54 U
VANADIUM	23.7	15.7	13.7	11.7	16.2	18.4	20.6	39.9	39.5	39.1	13.3
ZINC	90.1	29.4	26.8	24.2	11.2	12.1	13	309	347.5	386	8.3 U
Miscellaneous Parameters (mg/kg)											
CYANIDE	1.3 U	1.1 U	1.1 U	1.1 U	1.2 U	1.2 U	1.2 U	1.2 U	1.25 U	1.3 U	1.3 U
TOTAL ORGANIC CARBON											
TOTAL SOLIDS (%)											

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB19	17SB20	17SB21	17SB22	17SB23	17SB24	17SB24	17SB24	17SB25	17SB26	17SB27	17SB28
Sample Number	17-B-19-00	17-B-20-00	17-B-21-00	17-B-22-00	17-B-23-00	17-B-24-00	17-B-24-00-AVG	17-B-24-00-D	17-B-25-00	17-B-26-00	17-B-27-00	17-B-28-00
Depth Range (below ground surface)	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	06/05/01	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03
Volatile Organics (ug/kg)												
1,1,1,2-TETRACHLOROETHANE	8 U											
1,1,1-TRICHLOROETHANE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,1,2,2-TETRACHLOROETHANE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,1,2-TRICHLOROETHANE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,1,2-TRICHLOROTRIFLUOROETHANE		5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,1-DICHLOROETHANE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,1-DICHLOROETHENE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,2,3-TRICHLOROPROPANE	8 U											
1,2,4-TRICHLOROBENZENE		5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,2,4-TRIMETHYLBENZENE		5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DIBROMO-3-CHLOROPROPANE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DIBROMOETHANE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROBENZENE		5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROPROPANE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,3,5-TRIMETHYLBENZENE		5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,3-DICHLOROBENZENE		5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,4-DICHLOROBENZENE		5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
2-BUTANONE	16 U	22 U	27 U	20 U	26 U	25 U	25.5 U	26 U	22 U	24 U	22 U	24 U
2-HEXANONE	16 U	22 U	27 U	20 U	26 U	25 U	25.5 U	26 U	22 U	24 U	22 U	24 U
3-CHLOROPROPENE	16 U											
4-METHYL-2-PENTANONE	16 U	22 U	27 U	20 U	26 U	25 U	25.5 U	26 U	22 U	24 U	22 U	24 U
ACETONE	8 U	22 U	27 U	20 U	26 U	25 U	21 J	21 J	22 U	24 U	22 U	24 U
ACETONITRILE	160 U											
ACROLEIN	80 U											
ACRYLONITRILE	16 U											
BENZENE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
BROMODICHLOROMETHANE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
BROMOFORM	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
BROMOMETHANE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	3 J	6 U	6 U
CARBON DISULFIDE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
CARBON TETRACHLORIDE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
CHLOROBENZENE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
CHLORODIBROMOMETHANE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
CHLOROETHANE	2 J	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
CHLOROFORM	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	3 J	6 U
CHLOROMETHANE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
CHLOROPRENE	16 U											
CIS-1,2-DICHLOROETHENE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
CIS-1,3-DICHLOROPROPENE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
CYCLOHEXANE		5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
DIBROMOMETHANE	8 U											
DICHLORODIFLUOROMETHANE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
ETHYL METHACRYLATE	16 U											
ETHYLBENZENE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
ISOBUTANOL	320 U											
ISOPROPYLBENZENE		5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
M+P-XYLENES		11 U	14 U	10 U	13 U	12 U	12.5 U	13 U	6 U	6 U	11 U	6 U
METHACRYLONITRILE	160 U											

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB19	17SB20	17SB21	17SB22	17SB23	17SB24	17SB24	17SB24	17SB25	17SB26	17SB27	17SB28
Sample Number	17-B-19-00	17-B-20-00	17-B-21-00	17-B-22-00	17-B-23-00	17-B-24-00	17-B-24-00-AVG	17-B-24-00-D	17-B-25-00	17-B-26-00	17-B-27-00	17-B-28-00
Depth Range (below ground surface)	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	06/05/01	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03
METHYL ACETATE		5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
METHYL CYCLOHEXANE		5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
METHYL IODIDE	16 U											
METHYL METHACRYLATE	16 U											
METHYL TERT-BUTYL ETHER		5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
METHYLENE CHLORIDE	8 U	5 U	12 U	5 U	8 U	6 U	6 U	6 U	11 J	14 J	10 U	12 J
O-XYLENE		5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
PENTACHLOROETHANE	16 U											
PROPIONITRILE	160 U											
STYRENE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
TETRACHLOROETHENE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
TOLUENE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
TOTAL 1,2-DICHLOROETHENE		11 U	14 U	10 U	13 U	12 U	12.5 U	13 U	6 U	6 U	11 U	6 U
TOTAL XYLENES	8 U	16 U	20 U	15 U	20 U	19 U	19.5 U	20 U	6 U	6 U	17 U	6 U
TRANS-1,2-DICHLOROETHENE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
TRANS-1,3-DICHLOROPROPENE	8 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
TRANS-1,4-DICHLORO-2-BUTENE	16 U											
TRICHLOROETHENE	8 U	5 U	7 U	5	28	6 U	6 U	6 U	6 U	6 U	6 U	6 U
TRICHLOROFLUOROMETHANE	8 U	7	9	6	6 J	20 J	29 J	38 J	20	47	26	21
VINYL ACETATE	8 U											
VINYL CHLORIDE	16 U	5 U	7 U	5 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
Semivolatile Organics (ug/kg)												
1,1-BIPHENYL												
1,2,4,5-TETRACHLOROBENZENE	460 U											
1,3,5-TRINITROBENZENE	460 U											
1,3-DINITROBENZENE	460 U											
1,4-NAPHTHOQUINONE	460 U											
1,4-PHENYLENEDIAMINE	460 UR											
1-NAPHTHYLAMINE	460 U											
2,2'-OXYBIS(1-CHLOROPROPANE)	460 U											
2,3,4,6-TETRACHLOROPHENOL	460 U											
2,4,5-TRICHLOROPHENOL	1100 U											
2,4,6-TRICHLOROPHENOL	460 U											
2,4-DICHLOROPHENOL	460 U											
2,4-DIMETHYLPHENOL	460 U											
2,4-DINITROPHENOL	1100 U											
2,4-DINITROTOLUENE	460 U											
2,6-DICHLOROPHENOL	460 U											
2,6-DINITROTOLUENE	460 U											
2-ACETYLAMINOFLUORENE	460 U											
2-CHLORONAPHTHALENE	460 U											
2-CHLOROPHENOL	460 U											
2-METHYLNAPHTHALENE	460 U											
2-METHYLPHENOL	460 U											
2-NAPHTHYLAMINE	460 U											
2-NITROANILINE	1100 U											
2-NITROPHENOL	460 U											
2-PICOLINE	460 U											
3&4-METHYLPHENOL	460 U											
3,3'-DICHLOROBENZIDINE	460 U											

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB19	17SB20	17SB21	17SB22	17SB23	17SB24	17SB24	17SB24	17SB25	17SB26	17SB27	17SB28
Sample Number	17-B-19-00	17-B-20-00	17-B-21-00	17-B-22-00	17-B-23-00	17-B-24-00	17-B-24-00-AVG	17-B-24-00-D	17-B-25-00	17-B-26-00	17-B-27-00	17-B-28-00
Depth Range (below ground surface)	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	06/05/01	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03
3,3'-DIMETHYLBENZIDINE	920 U											
3-METHYLCHOLANTHRENE	460 U											
3-NITROANILINE	1100 U											
4,6-DINITRO-2-METHYLPHENOL	1100 U											
4-AMINOBIPHENYL	460 U											
4-BROMOPHENYL PHENYL ETHER	460 U											
4-CHLORO-3-METHYLPHENOL	460 U											
4-CHLOROANILINE	460 U											
4-CHLOROPHENYL PHENYL ETHER	460 U											
4-METHYLPHENOL												
4-NITROANILINE	1100 U											
4-NITROPHENOL	1100 U											
4-NITROQUINOLINE-1-OXIDE	920 UR											
5-NITRO-O-TOLUIDINE	920 U											
7,12-DIMETHYLBENZ(A)ANTHRACENE	460 U											
A,A-DIMETHYLPHENETHYLAMINE	460 U											
ACENAPHTHENE	460 U											
ACENAPHTHYLENE	460 U											
ACETOPHENONE	460 U											
ANILINE	460 U											
ANTHRACENE	460 U											
ARAMITE	920 U											
ATRAZINE												
BENZALDEHYDE												
BENZO(A)ANTHRACENE	460 U											
BENZO(A)PYRENE	460 U											
BENZO(B)FLUORANTHENE	100 J											
BENZO(G,H,I)PERYLENE	460 U											
BENZO(K)FLUORANTHENE	460 U											
BENZYL ALCOHOL	920 U											
BIS(2-CHLOROETHOXY)METHANE	460 U											
BIS(2-CHLOROETHYL)ETHER	460 U											
BIS(2-ETHYLHEXYL)PHTHALATE	460 U											
BUTYL BENZYL PHTHALATE	460 U											
CAPROLACTAM												
CARBAZOLE												
CHLOROBENZILATE	920 U											
CHRYSENE	460 U											
DI-N-BUTYL PHTHALATE	460 U											
DI-N-OCTYL PHTHALATE	460 U											
DIALLATE	920 U											
DIBENZO(A,H)ANTHRACENE	460 U											
DIBENZOFURAN	460 U											
DIETHYL PHTHALATE	460 U											
DIMETHOATE	460 U											
DIMETHYL PHTHALATE	460 U											
ETHYL METHANE SULFONATE	460 U											
FLUORANTHENE	460 U											
FLUORENE	460 U											
HEXACHLOROBENZENE	460 U											

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB19	17SB20	17SB21	17SB22	17SB23	17SB24	17SB24	17SB24	17SB25	17SB26	17SB27	17SB28
Sample Number	17-B-19-00	17-B-20-00	17-B-21-00	17-B-22-00	17-B-23-00	17-B-24-00	17-B-24-00-AVG	17-B-24-00-D	17-B-25-00	17-B-26-00	17-B-27-00	17-B-28-00
Depth Range (below ground surface)	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	06/05/01	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03
HEXACHLOROBUTADIENE	460 U											
HEXACHLOROCYCLOPENTADIENE	460 U											
HEXACHLOROETHANE	460 U											
HEXACHLOROPHENE	460 UR											
HEXACHLOROPROPENE	460 U											
INDENO(1,2,3-CD)PYRENE	460 U											
ISODRIN	920 U											
ISOPHORONE	460 U											
ISOSAFROLE	920 U											
METHAPYRILENE	460 U											
METHYL METHANE SULFONATE	920 U											
N-NITROSO-DI-N-BUTYLAMINE	460 U											
N-NITROSO-DI-N-PROPYLAMINE	460 U											
N-NITROSODIETHYLAMINE	920 U											
N-NITROSODIMETHYLAMINE	920 U											
N-NITROSODIPHENYLAMINE	460 U											
N-NITROSOMETHYLETHYLAMINE	460 U											
N-NITROSOMORPHOLINE	460 U											
N-NITROSOPIPERIDINE	460 U											
N-NITROSOPYRROLIDINE	460 U											
NAPHTHALENE	460 U											
NITROBENZENE	460 U											
O,O,O-TRIETHYL PHOSPHOROTHIOATE	920 U											
O-TOLUIDINE	460 U											
P-(DIMETHYLAMINO)AZOBENZENE	920 U											
PENTACHLOROBENZENE	460 U											
PENTACHLORONITROBENZENE	460 U											
PENTACHLOROPHENOL	1100 U											
PHENACETIN	460 U											
PHENANTHRENE	460 U											
PHENOL	460 U											
PRONAMIDE	460 U											
PYRENE	460 U											
PYRIDINE	2200 U											
SAFROLE	460 U											
SULFOTEPP	460 U											
THIONAZIN	920 U											
Pesticides/PCBs (ug/kg)												
4,4'-DDD	1.8 U											
4,4'-DDE	0.18 R											
4,4'-DDT	0.65 J											
ALDRIN	1.8 U											
ALPHA-BHC	1.8 U											
ALPHA-CHLORDANE	1.8 U											
AROCLOR-1016	23 U											
AROCLOR-1221	23 U											
AROCLOR-1232	23 U											
AROCLOR-1242	23 U											
AROCLOR-1248	23 U											
AROCLOR-1254	23 U											

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB19	17SB20	17SB21	17SB22	17SB23	17SB24	17SB24	17SB24	17SB25	17SB26	17SB27	17SB28
Sample Number	17-B-19-00	17-B-20-00	17-B-21-00	17-B-22-00	17-B-23-00	17-B-24-00	17-B-24-00-AVG	17-B-24-00-D	17-B-25-00	17-B-26-00	17-B-27-00	17-B-28-00
Depth Range (below ground surface)	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	06/05/01	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03
AROCLOR-1260	23 U											
BETA-BHC	1.8 U											
CHLORDANE (TECHNICAL)	18 U											
DELTA-BHC	1.8 U											
DIELDRIN	0.096 R											
ENDOSULFAN I	1.8 U											
ENDOSULFAN II	0.3 R											
ENDOSULFAN SULFATE	1.8 U											
ENDRIN	1.8 U											
ENDRIN ALDEHYDE	1.8 U											
ENDRIN KETONE	0.26 J											
GAMMA-BHC (LINDANE)	1.8 U											
GAMMA-CHLORDANE	1.8 U											
HEPTACHLOR	1.8 U											
HEPTACHLOR EPOXIDE	1.8 U											
KEPONE	36 U											
METHOXYCHLOR	3.6 U											
TOXAPHENE	72 U											
OrganoPhos Pesticides (ug/kg)												
DISULFOTON	36 U											
ETHYL PARATHION	36 U											
FAMPHUR	36 U											
METHYL PARATHION	36 U											
PHORATE	36 U											
Herbicides (ug/kg)												
2,4,5-T	22 U											
2,4,5-TP (SILVEX)	22 U											
2,4-D	86 U											
DINOSEB	13 U											
Explosives (ug/kg)												
1,3,5-TRINITROBENZENE	250 U											
1,3-DINITROBENZENE	250 U											
2,4,6-TRINITROTOLUENE	250 U											
2,4-DINITROTOLUENE	250 U											
2,6-DINITROTOLUENE	250 U											
2-AMINO-4,6-DINITROTOLUENE	250 U											
2-NITROTOLUENE	250 U											
3-NITROTOLUENE	250 U											
4-AMINO-2,6-DINITROTOLUENE	250 U											
4-NITROTOLUENE	250 U											
HMX	500 U											
NITROBENZENE	250 U											
RDX	500 U											
TETRYL	650 U											
Inorganics (mg/kg)												
ALUMINUM	12100											
ANTIMONY	0.44 U											
ARSENIC	2.4 U											
BARIUM	24.7											
BERYLLIUM	0.46 U											

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB19	17SB20	17SB21	17SB22	17SB23	17SB24	17SB24	17SB24	17SB25	17SB26	17SB27	17SB28
Sample Number	17-B-19-00	17-B-20-00	17-B-21-00	17-B-22-00	17-B-23-00	17-B-24-00	17-B-24-00-AVG	17-B-24-00-D	17-B-25-00	17-B-26-00	17-B-27-00	17-B-28-00
Depth Range (below ground surface)	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	06/05/01	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03
CADMIUM	0.96											
CALCIUM	265											
CHROMIUM	15.8											
COBALT	1.4											
COPPER	2.6											
IRON	8860											
LEAD	11.1											
MAGNESIUM	713											
MANGANESE	23.2											
MERCURY	0.03 U											
NICKEL	4.8											
POTASSIUM	337											
SELENIUM	0.37 U											
SILVER	0.12 U											
SODIUM	70 U											
THALLIUM	0.57 U											
VANADIUM	21.5											
ZINC	14.8 J											
Miscellaneous Parameters (mg/kg)												
CYANIDE	1.4 U											
TOTAL ORGANIC CARBON												
TOTAL SOLIDS (%)		84 %	75 %	88 %	81 %	77 %	78 %	79 %	85 %	86 %	79 %	80 %

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	**017**
Sample Location	**17SB29**
Sample Number	**17-B-29-00**
Depth Range (below ground surface)	**0 - 1**
Sample Date	**04/28/03**
Volatile Organics (ug/kg)	
1,1,1,2-TETRACHLOROETHANE	
1,1,1-TRICHLOROETHANE	6 U
1,1,2,2-TETRACHLOROETHANE	6 U
1,1,2-TRICHLOROETHANE	6 U
1,1,2-TRICHLOROTRIFLUOROETHANE	6 U
1,1-DICHLOROETHANE	6 U
1,1-DICHLOROETHENE	6 U
1,2,3-TRICHLOROPROPANE	
1,2,4-TRICHLOROBENZENE	6 U
1,2,4-TRIMETHYLBENZENE	6 U
1,2-DIBROMO-3-CHLOROPROPANE	6 U
1,2-DIBROMOETHANE	6 U
1,2-DICHLOROBENZENE	6 U
1,2-DICHLOROETHANE	6 U
1,2-DICHLOROPROPANE	6 U
1,3,5-TRIMETHYLBENZENE	6 U
1,3-DICHLOROBENZENE	6 U
1,4-DICHLOROBENZENE	6 U
2-BUTANONE	23 U
2-HEXANONE	23 U
3-CHLOROPROPENE	
4-METHYL-2-PENTANONE	23 U
ACETONE	34 J
ACETONITRILE	
ACROLEIN	
ACRYLONITRILE	
BENZENE	6 U
BROMODICHLOROMETHANE	6 U
BROMOFORM	6 U
BROMOMETHANE	6 U
CARBON DISULFIDE	6 U
CARBON TETRACHLORIDE	6 U
CHLOROBENZENE	6 U
CHLORODIBROMOMETHANE	6 U
CHLOROETHANE	6 U
CHLOROFORM	6 U
CHLOROMETHANE	6 U
CHLOROPRENE	
CIS-1,2-DICHLOROETHENE	6 U
CIS-1,3-DICHLOROPROPENE	6 U
CYCLOHEXANE	6 U
DIBROMOMETHANE	
DICHLORODIFLUOROMETHANE	6 U
ETHYL METHACRYLATE	
ETHYLBENZENE	6 U
ISOBUTANOL	
ISOPROPYLBENZENE	6 U
M+P-XYLENES	6 U
METHACRYLONITRILE	

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	**017**
Sample Location	**17SB29**
Sample Number	**17-B-29-00**
Depth Range (below ground surface)	**0 - 1**
Sample Date	**04/28/03**
METHYL ACETATE	6 U
METHYL CYCLOHEXANE	6 U
METHYL IODIDE	
METHYL METHACRYLATE	
METHYL TERT-BUTYL ETHER	6 U
METHYLENE CHLORIDE	11 J
O-XYLENE	6 U
PENTACHLOROETHANE	
PROPIONITRILE	
STYRENE	6 U
TETRACHLOROETHENE	6 U
TOLUENE	6 U
TOTAL 1,2-DICHLOROETHENE	6 U
TOTAL XYLENES	6 U
TRANS-1,2-DICHLOROETHENE	6 U
TRANS-1,3-DICHLOROPROPENE	6 U
TRANS-1,4-DICHLORO-2-BUTENE	
TRICHLOROETHENE	6 U
TRICHLOROFLUOROMETHANE	9
VINYL ACETATE	
VINYL CHLORIDE	6 U
Semivolatile Organics (ug/kg)	
1,1-BIPHENYL	
1,2,4,5-TETRACHLOROBENZENE	
1,3,5-TRINITROBENZENE	
1,3-DINITROBENZENE	
1,4-NAPHTHOQUINONE	
1,4-PHENYLENEDIAMINE	
1-NAPHTHYLAMINE	
2,2'-OXYBIS(1-CHLOROPROPANE)	
2,3,4,6-TETRACHLOROPHENOL	
2,4,5-TRICHLOROPHENOL	
2,4,6-TRICHLOROPHENOL	
2,4-DICHLOROPHENOL	
2,4-DIMETHYLPHENOL	
2,4-DINITROPHENOL	
2,4-DINITROTOLUENE	
2,6-DICHLOROPHENOL	
2,6-DINITROTOLUENE	
2-ACETYLAMINOFLUORENE	
2-CHLORONAPHTHALENE	
2-CHLOROPHENOL	
2-METHYLNAPHTHALENE	
2-METHYLPHENOL	
2-NAPHTHYLAMINE	
2-NITROANILINE	
2-NITROPHENOL	
2-PICOLINE	
3&4-METHYLPHENOL	
3,3'-DICHLOROBENZIDINE	

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017
Sample Location	17SB29
Sample Number	17-B-29-00
Depth Range (below ground surface)	0 - 1
Sample Date	04/28/03
3,3'-DIMETHYLBENZIDINE	
3-METHYLCHOLANTHRENE	
3-NITROANILINE	
4,6-DINITRO-2-METHYLPHENOL	
4-AMINOBIPHENYL	
4-BROMOPHENYL PHENYL ETHER	
4-CHLORO-3-METHYLPHENOL	
4-CHLOROANILINE	
4-CHLOROPHENYL PHENYL ETHER	
4-METHYLPHENOL	
4-NITROANILINE	
4-NITROPHENOL	
4-NITROQUINOLINE-1-OXIDE	
5-NITRO-O-TOLUIDINE	
7,12-DIMETHYLBENZ(A)ANTHRACENE	
A,A-DIMETHYLPHENETHYLAMINE	
ACENAPHTHENE	
ACENAPHTHYLENE	
ACETOPHENONE	
ANILINE	
ANTHRACENE	
ARAMITE	
ATRAZINE	
BENZALDEHYDE	
BENZO(A)ANTHRACENE	
BENZO(A)PYRENE	
BENZO(B)FLUORANTHENE	
BENZO(G,H,I)PERYLENE	
BENZO(K)FLUORANTHENE	
BENZYL ALCOHOL	
BIS(2-CHLOROETHOXY)METHANE	
BIS(2-CHLOROETHYL)ETHER	
BIS(2-ETHYLHEXYL)PHTHALATE	
BUTYL BENZYL PHTHALATE	
CAPROLACTAM	
CARBAZOLE	
CHLOROBENZILATE	
CHRYSENE	
DI-N-BUTYL PHTHALATE	
DI-N-OCTYL PHTHALATE	
DIALLATE	
DIBENZO(A,H)ANTHRACENE	
DIBENZOFURAN	
DIETHYL PHTHALATE	
DIMETHOATE	
DIMETHYL PHTHALATE	
ETHYL METHANE SULFONATE	
FLUORANTHENE	
FLUORENE	
HEXACHLOROBENZENE	

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	**017**
Sample Location	**17SB29**
Sample Number	**17-B-29-00**
Depth Range (below ground surface)	**0 - 1**
Sample Date	**04/28/03**
HEXACHLOROBUTADIENE	
HEXACHLOROCYCLOPENTADIENE	
HEXACHLOROETHANE	
HEXACHLOROPHENE	
HEXACHLOROPROPENE	
INDENO(1,2,3-CD)PYRENE	
ISODRIN	
ISOPHORONE	
ISOSAFROLE	
METHAPYRILENE	
METHYL METHANE SULFONATE	
N-NITROSO-DI-N-BUTYLAMINE	
N-NITROSO-DI-N-PROPYLAMINE	
N-NITROSODIETHYLAMINE	
N-NITROSODIMETHYLAMINE	
N-NITROSODIPHENYLAMINE	
N-NITROSOMETHYLETHYLAMINE	
N-NITROSOMORPHOLINE	
N-NITROSOPIPERIDINE	
N-NITROSOPYRROLIDINE	
NAPHTHALENE	
NITROBENZENE	
O,O,O-TRIETHYL PHOSPHOROTHIOATE	
O-TOLUIDINE	
P-(DIMETHYLAMINO)AZOBENZENE	
PENTACHLOROBENZENE	
PENTACHLORONITROBENZENE	
PENTACHLOROPHENOL	
PHENACETIN	
PHENANTHRENE	
PHENOL	
PRONAMIDE	
PYRENE	
PYRIDINE	
SAFROLE	
SULFOTEPP	
THIONAZIN	
Pesticides/PCBs (ug/kg)	
4,4'-DDD	
4,4'-DDE	
4,4'-DDT	
ALDRIN	
ALPHA-BHC	
ALPHA-CHLORDANE	
AROCLOR-1016	
AROCLOR-1221	
AROCLOR-1232	
AROCLOR-1242	
AROCLOR-1248	
AROCLOR-1254	

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	**017**
Sample Location	**17SB29**
Sample Number	**17-B-29-00**
Depth Range (below ground surface)	**0 - 1**
Sample Date	**04/28/03**
AROCLOR-1260	
BETA-BHC	
CHLORDANE (TECHNICAL)	
DELTA-BHC	
DIELDRIN	
ENDOSULFAN I	
ENDOSULFAN II	
ENDOSULFAN SULFATE	
ENDRIN	
ENDRIN ALDEHYDE	
ENDRIN KETONE	
GAMMA-BHC (LINDANE)	
GAMMA-CHLORDANE	
HEPTACHLOR	
HEPTACHLOR EPOXIDE	
KEPONE	
METHOXYCHLOR	
TOXAPHENE	
OrganoPhos Pesticides (ug/kg)	
DISULFOTON	
ETHYL PARATHION	
FAMPHUR	
METHYL PARATHION	
PHORATE	
Herbicides (ug/kg)	
2,4,5-T	
2,4,5-TP (SILVEX)	
2,4-D	
DINOSEB	
Explosives (ug/kg)	
1,3,5-TRINITROBENZENE	
1,3-DINITROBENZENE	
2,4,6-TRINITROTOLUENE	
2,4-DINITROTOLUENE	
2,6-DINITROTOLUENE	
2-AMINO-4,6-DINITROTOLUENE	
2-NITROTOLUENE	
3-NITROTOLUENE	
4-AMINO-2,6-DINITROTOLUENE	
4-NITROTOLUENE	
HMX	
NITROBENZENE	
RDX	
TETRYL	
Inorganics (mg/kg)	
ALUMINUM	
ANTIMONY	
ARSENIC	
BARIUM	
BERYLLIUM	

SURFACE SOIL DATA (0-1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	**017**
Sample Location	**17SB29**
Sample Number	**17-B-29-00**
Depth Range (below ground surface)	**0 - 1**
Sample Date	**04/28/03**
CADMIUM	
CALCIUM	
CHROMIUM	
COBALT	
COPPER	
IRON	
LEAD	
MAGNESIUM	
MANGANESE	
MERCURY	
NICKEL	
POTASSIUM	
SELENIUM	
SILVER	
SODIUM	
THALLIUM	
VANADIUM	
ZINC	
Miscellaneous Parameters (mg/kg)	
CYANIDE	
TOTAL ORGANIC CARBON	
TOTAL SOLIDS (%)	83 %

APPENDIX E-2
SUBSURFACE SOIL ANALYTICAL RESULTS

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	016	016	016	016
Sample Location	16SB01	16SB01	16SB01	16SB02	16SB02	16SB03	16SB03	16SB03	16SB03	16SB03	16SB04	16SB04	16SB04
Sample Number	16-B-01-01	16-B-01-03	16-B-01-05	16-B-02-01	16-B-02-05	16-B-03-01	16-B-03-01-AVG	16-B-03-01-D	16-B-03-03	16-B-03-05	16-B-04-01	16-B-04-03	16-B-04-03-AVG
Depth Range (below ground surface)	1 - 3	3 - 5	5 - 7	1 - 3	5 - 7	1 - 3	1 - 3	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	3 - 5
Sample Date	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01
Volatile Organics (ug/kg)													
1,1,1,2-TETRACHLOROETHANE									600 U		160 U		
1,1,1-TRICHLOROETHANE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
1,1,2,2-TETRACHLOROETHANE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
1,1,2-TRICHLOROETHANE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U		250 U		5 U	5.5 U
1,1-DICHLOROETHANE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
1,1-DICHLOROETHENE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
1,2,3-TRICHLOROPROPANE									600 U		160 U		
1,2,4-TRICHLOROBENZENE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U		250 U		5 U	5.5 U
1,2,4-TRIMETHYLBENZENE													
1,2-DIBROMO-3-CHLOROPROPANE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
1,2-DIBROMOETHANE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
1,2-DICHLOROBENZENE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U		250 U		5 U	5.5 U
1,2-DICHLOROETHANE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
1,2-DICHLOROPROPANE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
1,3,5-TRIMETHYLBENZENE													
1,3-DICHLOROBENZENE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U		250 U		5 U	5.5 U
1,4-DICHLOROBENZENE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U		250 U		5 U	5.5 U
1,4-DIOXANE													
2-BUTANONE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	4 J	4 J	1200 U	250 U	320 U	5 U	5.5 U
2-HEXANONE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	1200 U	250 U	320 U	5 U	5.5 U
3-CHLOROPROPENE									1200 U		320 U		
4-METHYL-2-PENTANONE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	1200 U	250 U	320 U	5 U	5.5 U
ACETONE	2100 U	6000 U	5300 U	610 U	2000 U	1900 U	1650 U	1400 U	2100 U	1400 U	500 U	42 U	70.5 J
ACETONITRILE									12000 U		3200 U		
ACROLEIN									6000 U		1600 U		
ACRYLONITRILE									1200 U		320 U		
BENZENE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
BROMODICHLOROMETHANE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
BROMOFORM	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
BROMOMETHANE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
CARBON DISULFIDE	27 J	34 J	950 UJ	140 U	50	160 U	1 J	1 J	600 U	250 U	160 U	5 U	5.5 U
CARBON TETRACHLORIDE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
CHLOROBENZENE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
CHLORODIBROMOMETHANE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
CHLOROETHANE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
CHLOROFORM	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
CHLOROMETHANE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
CHLOROPRENE									1200 U		320 U		
CIS-1,2-DICHLOROETHENE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
CIS-1,3-DICHLOROPROPENE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
CYCLOHEXANE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U		250 U		5 U	5.5 U
DIBROMOMETHANE									600 U		160 U		
DICHLORODIFLUOROMETHANE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
ETHYL METHACRYLATE									1200 U		320 U		
ETHYLBENZENE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
ISOBUTANOL									24000 U		6400 U		
ISOPROPYLBENZENE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U		250 U		5 U	5.5 U
M+P-XYLENES													

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	016	016	016	016
Sample Location	16SB01	16SB01	16SB01	16SB02	16SB02	16SB03	16SB03	16SB03	16SB03	16SB03	16SB04	16SB04	16SB04
Sample Number	16-B-01-01	16-B-01-03	16-B-01-05	16-B-02-01	16-B-02-05	16-B-03-01	16-B-03-01-AVG	16-B-03-01-D	16-B-03-03	16-B-03-05	16-B-04-01	16-B-04-03	16-B-04-03-AVG
Depth Range (below ground surface)	1 - 3	3 - 5	5 - 7	1 - 3	5 - 7	1 - 3	1 - 3	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	3 - 5
Sample Date	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01
METHACRYLONITRILE									12000 U		3200 U		
METHYL ACETATE	31 U	34 UJ	2300 J	330	18 U	400	201.5	6 U		580		5 U	5.5 U
METHYL CYCLOHEXANE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U		250 U		5 U	5.5 U
METHYL IODIDE									1200 U		320 U		
METHYL METHACRYLATE									1200 U		320 U		
METHYL TERT-BUTYL ETHER	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U		250 U		5 U	5.5 U
METHYLENE CHLORIDE	38 U	34 U	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
O-XYLENE													
PENTACHLOROETHANE									1200 U		320 U		
PROPIONITRILE									12000 U		3200 U		
STYRENE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
TETRACHLOROETHENE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
TOLUENE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
TOTAL 1,2-DICHLOROETHENE													
TOTAL XYLENES	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
TRANS-1,2-DICHLOROETHENE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
TRANS-1,3-DICHLOROPROPENE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
TRANS-1,4-DICHLORO-2-BUTENE									1200 U		320 U		
TRICHLOROETHENE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
TRICHLOROFLUOROMETHANE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	600 U	250 U	160 U	5 U	5.5 U
VINYL ACETATE									600 U		160 U		
VINYL CHLORIDE	31 U	34 UJ	950 UJ	140 U	18 U	160 U	83 U	6 U	1200 U	250 U	320 U	5 U	5.5 U
Semivolatile Organics (ug/kg)													
1,1-BIPHENYL	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U		790 U		400 U	415 U
1,2,4,5-TETRACHLOROBENZENE									1000 U		460 U		
1,3,5-TRINITROBENZENE									1000 U		460 U		
1,3-DINITROBENZENE									1000 U		460 U		
1,4-NAPHTHOQUINONE									1000 U		460 U		
1,4-PHENYLENEDIAMINE									1000 UR		460 UR		
1-NAPHTHYLAMINE									1000 U		460 U		
2,2'-OXYBIS(1-CHLOROPROPANE)	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
2,3,4,6-TETRACHLOROPHENOL									1000 U		460 U		
2,4,5-TRICHLOROPHENOL	2500 U	3600 UJ	3700 UJ	1100 U	2100 U	1200 U	1100 U	1000 U	2500 U	2000 U	1100 U	1000 U	1050 U
2,4,6-TRICHLOROPHENOL	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
2,4-DICHLOROPHENOL	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
2,4-DIMETHYLPHENOL	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
2,4-DINITROPHENOL	2500 U	3600 UJ	3700 UJ	1100 U	2100 U	1200 U	1100 U	1000 U	2500 U	2000 U	1100 U	1000 U	1050 U
2,4-DINITROTOLUENE	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
2,6-DICHLOROPHENOL									1000 U		460 U		
2,6-DINITROTOLUENE	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
2-ACETYLAMINOFLUORENE									1000 U		460 U		
2-CHLORONAPHTHALENE	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
2-CHLOROPHENOL	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
2-METHYLNAPHTHALENE	990 U	1400 UJ	1500 UJ	200 J	300 J	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
2-METHYLPHENOL	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
2-NAPHTHYLAMINE									1000 U		460 U		
2-NITROANILINE	2500 U	3600 UJ	3700 UJ	1100 U	2100 U	1200 U	1100 U	1000 U	2500 U	2000 U	1100 U	1000 U	1050 U
2-NITROPHENOL	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
2-PICOLINE									1000 U		460 U		
3&4-METHYLPHENOL									1000 U		460 U		

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	016	016	016	016
Sample Location	16SB01	16SB01	16SB01	16SB02	16SB02	16SB03	16SB03	16SB03	16SB03	16SB03	16SB04	16SB04	16SB04
Sample Number	16-B-01-01	16-B-01-03	16-B-01-05	16-B-02-01	16-B-02-05	16-B-03-01	16-B-03-01-AVG	16-B-03-01-D	16-B-03-03	16-B-03-05	16-B-04-01	16-B-04-03	16-B-04-03-AVG
Depth Range (below ground surface)	1 - 3	3 - 5	5 - 7	1 - 3	5 - 7	1 - 3	1 - 3	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	3 - 5
Sample Date	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01
3,3'-DICHLOROBENZIDINE	990 UR	1400 UR	1500 UR	430 UR	820 UR	460 UR	430 UR	400 UR	1000 U	790 UR	460 U	400 UR	415 UR
3,3'-DIMETHYLBENZIDINE									2000 U		920 U		
3-METHYLCHOLANTHRENE									1000 U		460 U		
3-NITROANILINE	2500 U	3600 UJ	3700 UJ	1100 U	2100 U	1200 U	1100 U	1000 U	2500 U	2000 U	1100 U	1000 U	1050 U
4,6-DINITRO-2-METHYLPHENOL	2500 U	3600 UJ	3700 UJ	1100 U	2100 U	1200 U	1100 U	1000 U	2500 U	2000 U	1100 U	1000 U	1050 U
4-AMINOBIPHENYL									1000 U		460 U		
4-BROMOPHENYL PHENYL ETHER	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
4-CHLORO-3-METHYLPHENOL	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
4-CHLOROANILINE	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
4-CHLOROPHENYL PHENYL ETHER	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
4-METHYLPHENOL	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U		790 U		400 U	415 U
4-NITROANILINE	2500 U	3600 UJ	3700 UJ	1100 U	2100 U	1200 U	1100 U	1000 U	2500 U	2000 U	1100 U	1000 U	1050 U
4-NITROPHENOL	2500 U	3600 UJ	3700 UJ	1100 U	2100 U	1200 U	1100 U	1000 U	2500 U	2000 U	1100 U	1000 U	1050 U
4-NITROQUINOLINE-1-OXIDE									2000 UR		920 UR		
5-NITRO-O-TOLUIDINE									2000 U		920 U		
7,12-DIMETHYLBENZ(A)ANTHRACENE									1000 U		460 U		
A,A-DIMETHYLPHENETHYLAMINE									1000 U		460 U		
ACENAPHTHENE	990 U	1400 UJ	1500 UJ	300 J	1200	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
ACENAPHTHYLENE	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
ACETOPHENONE	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
ANILINE									1000 U		460 U		
ANTHRACENE	990 U	1400 UJ	1500 UJ	80 J	400 J	460 U	430 U	400 U	100 J	790 U	460 U	400 U	415 U
ARAMITE									2000 U		920 U		
ATRAZINE	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U		790 U		400 U	415 U
BENZALDEHYDE	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U		790 U		400 U	415 U
BENZO(A)ANTHRACENE	70 J	100 J	1500 UJ	100 J	400 J	460 U	430 U	400 U	400 J	80 J	70 J	400 U	20 J
BENZO(A)PYRENE	50 J	1400 UJ	1500 UJ	60 J	200 J	460 U	430 U	400 U	500 J	70 J	90 J	400 U	415 U
BENZO(B)FLUORANTHENE	60 J	1400 UJ	70 J	90 J	300 J	460 U	430 U	400 U	700 J	100 J	200 J	400 U	415 U
BENZO(G,H,I)PERYLENE	990 U	1400 UJ	1500 UJ	30 J	70 J	460 U	430 U	400 U	300 J	50 J	70 J	400 U	415 U
BENZO(K)FLUORANTHENE	990 U	1400 UJ	1500 UJ	40 J	100 J	460 U	430 U	400 U	300 J	790 U	460 U	400 U	415 U
BENZYL ALCOHOL									2000 U		920 U		
BIS(2-CHLOROETHOXY)METHANE	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
BIS(2-CHLOROETHYL)ETHER	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
BIS(2-CHLOROISOPROPYL)ETHER													
BIS(2-ETHYLHEXYL)PHTHALATE	990 U	500 J	1500 UJ	570	820 U	460 U	430 U	400 U	900 J	700 J	460 U	400 U	415 U
BUTYL BENZYL PHTHALATE	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
CAPROLACTAM	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U		790 U		400 U	415 U
CARBAZOLE	990 U	1400 UJ	1500 UJ	70 J	200 J	460 U	430 U	400 U		790 U		400 U	415 U
CHLOROBENZILATE									2000 U		920 U		
CHRYSENE	990 U	1400 UJ	1500 UJ	80 J	300 J	460 U	430 U	400 U	500 J	90 J	100 J	400 U	415 U
DI-N-BUTYL PHTHALATE	990 U	1400 UJ	1500 UJ	200 J	820 U	460 U	430 U	400 U	200 J	790 U	460 U	400 U	415 U
DI-N-OCTYL PHTHALATE	990 U	1400 UJ	200 J	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
DIALLATE									2000 U		920 U		
DIBENZO(A,H)ANTHRACENE	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
DIBENZOFURAN	990 U	1400 UJ	1500 UJ	100 J	500 J	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
DIETHYL PHTHALATE	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
DIMETHOATE									1000 U		460 U		
DIMETHYL PHTHALATE	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
DINOSEB													
ETHYL METHANE SULFONATE									1000 U		460 U		

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	016	016	016	016
Sample Location	16SB01	16SB01	16SB01	16SB02	16SB02	16SB03	16SB03	16SB03	16SB03	16SB03	16SB04	16SB04	16SB04
Sample Number	16-B-01-01	16-B-01-03	16-B-01-05	16-B-02-01	16-B-02-05	16-B-03-01	16-B-03-01-AVG	16-B-03-01-D	16-B-03-03	16-B-03-05	16-B-04-01	16-B-04-03	16-B-04-03-AVG
Depth Range (below ground surface)	1 - 3	3 - 5	5 - 7	1 - 3	5 - 7	1 - 3	1 - 3	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	3 - 5
Sample Date	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01
ETHYL PARATHION													
FLUORANTHENE	100 J	100 J	1500 UJ	400 J	2000	460 U	430 U	400 U	800 J	200 J	80 J	400 U	415 U
FLUORENE	990 U	1400 UJ	1500 UJ	200 J	700 J	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
HEXACHLOROBENZENE	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
HEXACHLOROBUTADIENE	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
HEXACHLOROCYCLOPENTADIENE	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
HEXACHLOROETHANE	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
HEXACHLOROPHENE									1000 UR		460 UR		
HEXACHLOROPROPENE									1000 U		460 U		
INDENO(1,2,3-CD)PYRENE	990 U	1400 UJ	1500 UJ	40 J	80 J	460 U	430 U	400 U	300 J	50 J	60 J	400 U	415 U
ISODRIN									2000 U		920 U		
ISOPHORONE	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
ISOSAFROLE									2000 U		920 U		
KEPONE													
METHAPYRILENE									1000 U		460 U		
METHYL METHANE SULFONATE									2000 U		920 U		
N-NITROSO-DI-N-BUTYLAMINE									1000 U		460 U		
N-NITROSO-DI-N-PROPYLAMINE	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
N-NITROSODIETHYLAMINE									2000 U		920 U		
N-NITROSODIMETHYLAMINE									2000 U		920 U		
N-NITROSODIPHENYLAMINE	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
N-NITROSOMETHYLETHYLAMINE									1000 U		460 U		
N-NITROSOMORPHOLINE									1000 U		460 U		
N-NITROSOPIPERIDINE									1000 U		460 U		
N-NITROSOPYRROLIDINE									1000 U		460 U		
NAPHTHALENE	990 U	1400 UJ	1500 UJ	460	700 J	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
NITROBENZENE	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE									2000 U		920 U		
O-TOLUIDINE									1000 U		460 U		
P-(DIMETHYLAMINO)AZOBENZENE									2000 U		920 U		
PENTACHLOROBENZENE									1000 U		460 U		
PENTACHLORONITROBENZENE									1000 U		460 U		
PENTACHLOROPHENOL	2500 U	3600 UJ	3700 UJ	1100 U	2100 U	1200 U	1100 U	1000 U	2500 U	2000 U	1100 U	1000 U	1050 U
PHENACETIN									1000 U		460 U		
PHENANTHRENE	990 U	1400 UJ	1500 UJ	530	2700	460 U	430 U	400 U	300 J	60 J	460 U	400 U	415 U
PHENOL	990 U	1400 UJ	1500 UJ	430 U	820 U	460 U	430 U	400 U	1000 U	790 U	460 U	400 U	415 U
PRONAMIDE									1000 U		460 U		
PYRENE	100 J	100 J	90 J	300 J	1300	460 U	430 U	400 U	1000	200 J	80 J	400 U	415 U
PYRIDINE									5000 U		2200 U		
SAFROLE									1000 U		460 U		
SULFOTEPP									1000 U		460 U		
THIONAZIN									2000 U		920 U		
Pesiticides/PCBs (ug/kg)													
4,4'-DDD	9.9 U	14 UJ	15 UJ	4.1 U	7.8 J	4.6 U	4.3 U	4 U	310	380	0.42 J	4 U	4.2 U
4,4'-DDE	1.6 J	14 UJ	15 UJ	8.9	7 J	4.6 U	4.3 U	4 U	29 J	80 U	0.14 J	4 U	4.2 U
4,4'-DDT	9.9 U	14 UJ	15 UJ	4.1 U	3.7 J	4.6 U	4.3 U	4 U	220	100	0.17 J	4 U	4.2 U
ALDRIN	5.1 U	7.3 UJ	7.6 UJ	2.1 U	4.2 U	2.4 U	2.25 U	2.1 U	45 U	41 U	2 U	2.1 U	2.15 U
ALPHA-BHC	5.1 U	7.3 UJ	7.6 UJ	0.7 J	3.3 J	2.4 U	2.25 U	2.1 U	45 U	41 U	2 U	2.1 U	2.15 U
ALPHA-CHLORDANE	5.1 U	7.3 UJ	7.6 UJ	1.5 J	4.2 U	2.4 U	2.25 U	2.1 U	45 U	41 U	2 U	2.1 U	2.15 U
AROCLOR-1016	51 U	73 UJ	76 UJ	21 U	42 U	24 U	22.5 U	21 U	53 U	41 U	23 U	21 U	21.5 U

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	016	016	016	016
Sample Location	16SB01	16SB01	16SB01	16SB02	16SB02	16SB03	16SB03	16SB03	16SB03	16SB03	16SB04	16SB04	16SB04
Sample Number	16-B-01-01	16-B-01-03	16-B-01-05	16-B-02-01	16-B-02-05	16-B-03-01	16-B-03-01-AVG	16-B-03-01-D	16-B-03-03	16-B-03-05	16-B-04-01	16-B-04-03	16-B-04-03-AVG
Depth Range (below ground surface)	1 - 3	3 - 5	5 - 7	1 - 3	5 - 7	1 - 3	1 - 3	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	3 - 5
Sample Date	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01
AROCLOR-1221	51 U	73 UJ	76 UJ	21 U	42 U	24 U	22.5 U	21 U	53 U	41 U	23 U	21 U	21.5 U
AROCLOR-1232	51 U	73 UJ	76 UJ	21 U	42 U	24 U	22.5 U	21 U	53 U	41 U	23 U	21 U	21.5 U
AROCLOR-1242	51 U	73 UJ	76 UJ	21 U	42 U	24 U	22.5 U	21 U	53 U	41 U	23 U	21 U	21.5 U
AROCLOR-1248	51 U	73 UJ	76 UJ	21 U	42 U	24 U	22.5 U	21 U	53 U	41 U	23 U	21 U	21.5 U
AROCLOR-1254	51 U	73 UJ	76 UJ	66 J	42 U	24 U	22.5 U	21 U	1000	41 U	23 U	21 U	21.5 U
AROCLOR-1260	51 U	73 UJ	76 UJ	36 J	42 U	24 U	22.5 U	21 U	320	41 U	23 U	21 U	21.5 U
BETA-BHC	5.1 U	7.3 UJ	7.6 UJ	2.1 U	4.2 U	2.4 U	2.25 U	2.1 U	45 U	41 U	2 U	2.1 U	2.15 U
CHLORDANE													
CHLORDANE (TECHNICAL)									450 U		20 U		
DELTA-BHC	5.1 U	7.3 UJ	7.6 UJ	2.1 U	4.2 U	2.4 U	2.25 U	2.1 U	45 U	41 U	2 U	2.1 U	2.15 U
DIELDRIN	9.9 U	14 UJ	15 UJ	4.1 U	8.1 U	4.6 U	4.3 U	4 U	45 U	80 U	2 U	4 U	4.2 U
ENDOSULFAN I	5.1 U	7.3 UJ	7.6 UJ	2.1 U	4.2 U	2.4 U	2.25 U	2.1 U	12 J	41 U	2 U	2.1 U	2.15 U
ENDOSULFAN II	9.9 U	14 UJ	15 UJ	4.1 U	8.1 U	4.6 U	4.3 U	4 U	2.5 J	80 U	2 U	4 U	4.2 U
ENDOSULFAN SULFATE	1.8 J	2.1 J	3.3 J	4.1 U	8.1 U	4.6 U	4.3 U	4 U	45 U	80 U	2 U	4 U	4.2 U
ENDRIN	9.9 U	14 UJ	15 UJ	4.1 U	8.1 U	4.6 U	4.3 U	4 U	45 U	80 U	2 U	4 U	4.2 U
ENDRIN ALDEHYDE	9.9 U	14 UJ	15 UJ	4.1 U	8.1 U	4.6 U	4.3 U	4 U	4 J	80 U	2 U	4 U	4.2 U
ENDRIN KETONE	9.9 U	14 UJ	15 UJ	1.1 J	1.8 J	4.6 U	4.3 U	4 U	3.9 J	80 U	2 U	4 U	4.2 U
GAMMA-BHC (LINDANE)	5.1 U	7.3 UJ	7.6 UJ	2.1 U	4.2 U	2.4 U	2.25 U	2.1 U	45 U	41 U	2 U	2.1 U	2.15 U
GAMMA-CHLORDANE	5.1 U	7.3 UJ	7.6 UJ	4.1 U	4.2 U	2.4 U	2.25 U	2.1 U	11 J	41 U	0.14 J	2.1 U	2.15 U
HEPTACHLOR	5.1 U	7.3 UJ	7.6 UJ	0.58 J	4.2 U	2.4 U	2.25 U	2.1 U	45 U	41 U	2 U	2.1 U	2.15 U
HEPTACHLOR EPOXIDE	5.1 U	7.3 UJ	7.6 UJ	2.1 U	1.5 J	2.4 U	2.25 U	2.1 U	45 U	12 J	2 U	2.1 U	2.15 U
KEPONE									880 U		39 U		
METHOXYCHLOR	51 U	73 UJ	76 UJ	21 U	42 U	24 U	22.5 U	21 U	88 U	410 U	3.9 U	21 U	2.9 J
TOXAPHENE	99 U	140 UJ	150 UJ	41 U	81 U	46 U	43 U	40 U	1800 U	800 U	80 U	40 U	42 U
OrganoPhos Pesticides (ug/kg)													
DIMETHOATE													
DISULFOTON									44 U		39 U		
ETHYL PARATHION									44 U		39 U		
FAMPHUR									44 U		39 U		
METHYL PARATHION									44 U		39 U		
O,O,O-TRIETHYL PHOSPHOROTHIOATE													
PHORATE									44 U		39 U		
SULFOTEPP													
THIONAZIN													
Herbicides (ug/kg)													
2,4,5-T									130 U		24 U		
2,4,5-TP (SILVEX)									130 U		24 U		
2,4-D									530 U		95 U		
DINOSEB									80 U		14 U		
Explosives (ug/kg)													
1,3,5-TRINITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
1,3-DINITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4,6-TRINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2-AMINO-4,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
3-NITROTOLUENE	250 U	250 U	490 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-AMINO-2,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	016	016	016	016
Sample Location	16SB01	16SB01	16SB01	16SB02	16SB02	16SB03	16SB03	16SB03	16SB03	16SB03	16SB04	16SB04	16SB04
Sample Number	16-B-01-01	16-B-01-03	16-B-01-05	16-B-02-01	16-B-02-05	16-B-03-01	16-B-03-01-AVG	16-B-03-01-D	16-B-03-03	16-B-03-05	16-B-04-01	16-B-04-03	16-B-04-03-AVG
Depth Range (below ground surface)	1 - 3	3 - 5	5 - 7	1 - 3	5 - 7	1 - 3	1 - 3	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	3 - 5
Sample Date	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01	06/11/01
HMX	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
NITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
RDX	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
TETRYL	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U
Inorganics (mg/kg)													
ALUMINUM	18600	55800 J	48000 J	11700	39800	12400	13150	13900	27000	30600	30900	23600	24800
ANTIMONY	0.95 U	1.4 UJ	1.6 UJ	1.2 U	2.2	0.31 U	0.295 U	0.28 U	4.6 U	0.68 U	0.84 U	0.43 U	0.44 U
ARSENIC	29	21.4 J	34 J	4.8	15	1.8 U	1.8 U	1.8 U	10.3	14.8	12.2	6.4	6.55
BARIUM	21.3	57.3 J	49.3 J	31.5	47.4	21.1	20.75	20.4	60.7	33.6	63.1	47.5	59.35
BERYLLIUM	1 U	2.4 J	2.3 J	0.53	1.4	0.56	0.5	0.44	1.6	1.5	0.57	0.32	0.375
CADMIUM	0.06 U	0.09 UJ	0.1 UJ	0.19 U	0.57 U	0.02 U	0.025 U	0.03 U	1.1	0.13 U	0.03 U	0.03 U	0.03 U
CALCIUM	1560	4120 J	3080 J	15900	3350	656	644	632	7060	2660	1290	749	894.5
CHROMIUM	28.9	75.7 J	75.8 J	23.7	61.1	23.2	23.4	23.6	132	56.9	39.4	40.2	37.1
COBALT	8.3	12.6 J	12.9 J	2.4	8.5	2	1.9	1.8	17	7.6	3.5	2.4	2.6
COPPER	17.7	18.2 J	6.2 J	60	33.4	2	2.1	2.2	937	36.3	3.1	1.6 U	11.4
IRON	44200	47200 J	67800 J	12100	37800	13300	12100	10900	68800	31500	30700	27500	25400
LEAD	18.6	29.1 J	16.8 J	20.2	29.9	6.8	6.6	6.4	171	29.8	12.9	8.1	23.7
MAGNESIUM	3690	9440 J	9640 J	1860	5970	1720	1710	1700	3170	5860	1950	1540	1645
MANGANESE	190	459 J	229 J	103	250	19.1	19.95	20.8	494	299	62.5	28.1	32.15
MERCURY	0.11	0.1 J	0.04 J	0.15	0.17	0.02	0.02	0.02	0.08	0.07	0.05	0.05	0.05
NICKEL	11.3	27.1 J	24.3 J	61.5	22.9	3.7	3.65	3.6	114	18.5	8	5.6	6
POTASSIUM	1830	4540 J	5060 J	904	2940	804	757.5	711	1700	2980	1070	901	948.5
SELENIUM	0.79 U	1.2 UJ	1.3 UJ	0.32 U	0.74 U	0.32 U	0.42 U	0.52 U	1.44 U	1.4 U	0.35 U	0.36 U	0.37 U
SILVER	0.4 U	0.47 U	0.44 UJ	0.16 U	0.25 U	0.09 U	0.085 U	0.08 U	0.63 U	0.25 U	0.14 U	0.12 U	0.15 U
SODIUM	6790	12700 J	15700 J	2000	7570	3400	3345	3290	4280	6500	1880	1010	1050
THALLIUM	1.2 U	2.1 J	2 UJ	0.79	2.6	0.4 U	0.385 U	0.37 U	2.25 U	0.88 U	1.5	0.68	0.75
VANADIUM	47.9	108 J	89.5 J	20.4	71.4	27.2	27.5	27.8	59	65	51.3	44.8	43.6
ZINC	75.2	72.6 J	48.4 J	81.1	142	12	11.25	10.5	536 J	93.7	29.5 J	18.8 J	37.45 J
Miscellaneous Parameters (mg/kg)													
CYANIDE	3 U	4.3 UJ	4.5 UJ	1.3 U	2.4 U	1.4 U	1.3 U	1.2 U	3.1 U	2.4 U	1.4 U	1.2 U	1.25 U
TOTAL ORGANIC CARBON													
TOTAL SOLIDS													

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	017	017	017	017	017	017	017	017	017	017
Sample Location	16SB04	16SB04	17MIP27-TW36	17MIP41-TW50-MW17S	17SB01	17SB01	17SB01	17SB02	17SB02	17SB02	17SB03	17SB03
Sample Number	16-B-04-03-D	16-B-04-05	17-B-33-03	17-B-34-06	17-B-01-01	17-B-01-03	17-B-01-05	17-B-02-01	17-B-02-03	17-B-02-05	17-B-03-01	17-B-03-03
Depth Range (below ground surface)	3 - 5	5 - 7	3 - 5	6 - 8	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5
Sample Date	06/11/01	06/11/01	01/18/05	01/18/05	06/07/01	06/07/01	06/07/01	06/07/01	06/07/01	06/07/01	06/06/01	06/06/01
Volatile Organics (ug/kg)												
1,1,1,2-TETRACHLOROETHANE												
1,1,1-TRICHLOROETHANE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
1,1,2,2-TETRACHLOROETHANE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
1,1,2-TRICHLOROETHANE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
1,1,2-TRICHLOROTRIFLUOROETHANE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
1,1-DICHLOROETHANE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
1,1-DICHLOROETHENE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
1,2,3-TRICHLOROPROPANE												
1,2,4-TRICHLOROBENZENE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
1,2,4-TRIMETHYLBENZENE												
1,2-DIBROMO-3-CHLOROPROPANE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
1,2-DIBROMOETHANE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
1,2-DICHLOROBENZENE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
1,2-DICHLOROETHANE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
1,2-DICHLOROPROPANE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
1,3,5-TRIMETHYLBENZENE												
1,3-DICHLOROBENZENE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
1,4-DICHLOROBENZENE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
1,4-DIOXANE												
2-BUTANONE	6 U	6 U	13 J	30 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
2-HEXANONE	6 U	6 U	41 U	30 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
3-CHLOROPROPENE												
4-METHYL-2-PENTANONE	6 U	6 U	41 U	30 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
ACETONE	120 J	100 J	120 J	12 J	91 U	120 J	660 J	230	250	130	34 U	140
ACETONITRILE												
ACROLEIN												
ACRYLONITRILE												
BENZENE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
BROMODICHLOROMETHANE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
BROMOFORM	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
BROMOMETHANE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
CARBON DISULFIDE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
CARBON TETRACHLORIDE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
CHLOROBENZENE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
CHLORODIBROMOMETHANE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
CHLOROETHANE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
CHLOROFORM	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
CHLOROMETHANE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
CHLOROPRENE												
CIS-1,2-DICHLOROETHENE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
CIS-1,3-DICHLOROPROPENE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
CYCLOHEXANE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
DIBROMOMETHANE												
DICHLORODIFLUOROMETHANE	6 U	2 J	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
ETHYL METHACRYLATE												
ETHYLBENZENE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
ISOBUTANOL												
ISOPROPYLBENZENE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
M+P-XYLENES			16 U	12 U								

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	017	017	017	017	017	017	017	017	017	017
Sample Location	16SB04	16SB04	17MIP27-TW36	17MIP41-TW50-MW17S	17SB01	17SB01	17SB01	17SB02	17SB02	17SB02	17SB03	17SB03
Sample Number	16-B-04-03-D	16-B-04-05	17-B-33-03	17-B-34-06	17-B-01-01	17-B-01-03	17-B-01-05	17-B-02-01	17-B-02-03	17-B-02-05	17-B-03-01	17-B-03-03
Depth Range (below ground surface)	3 - 5	5 - 7	3 - 5	6 - 8	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5
Sample Date	06/11/01	06/11/01	01/18/05	01/18/05	06/07/01	06/07/01	06/07/01	06/07/01	06/07/01	06/07/01	06/06/01	06/06/01
METHACRYLONITRILE												
METHYL ACETATE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	14	6 U
METHYL CYCLOHEXANE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
METHYL IODIDE												
METHYL METHACRYLATE												
METHYL TERT-BUTYL ETHER	6 U	6 U	16 U	12 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
METHYLENE CHLORIDE	6 U	8 U	12 U	12 U	6 U	9 U	6 U	6 U	7 U	6 U	5 U	6 U
O-XYLENE			8 U	6 U								
PENTACHLOROETHANE												
PROPIONITRILE												
STYRENE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
TETRACHLOROETHENE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
TOLUENE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
TOTAL 1,2-DICHLOROETHENE			16 U	12 U								
TOTAL XYLENES	6 U	6 U	25 U	18 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
TRANS-1,2-DICHLOROETHENE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
TRANS-1,3-DICHLOROPROPENE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 UR	7 UR	6 UR	5 U	6 U
TRANS-1,4-DICHLORO-2-BUTENE												
TRICHLOROETHENE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
TRICHLOROFLUOROMETHANE	6 U	6 U	8 U	3 J	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
VINYL ACETATE												
VINYL CHLORIDE	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U	7 U	6 U	5 U	6 U
Semivolatile Organics (ug/kg)												
1,1-BIPHENYL	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
1,2,4,5-TETRACHLOROBENZENE												
1,3,5-TRINITROBENZENE												
1,3-DINITROBENZENE												
1,4-NAPHTHOQUINONE												
1,4-PHENYLENEDIAMINE												
1-NAPHTHYLAMINE												
2,2'-OXYBIS(1-CHLOROPROPANE)	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
2,3,4,6-TETRACHLOROPHENOL												
2,4,5-TRICHLOROPHENOL	1100 U	1300 U	460 U	420 U	910 U	1100 U	1000 U	1100 U	1200 U	1000 U	1000 U	910 U
2,4,6-TRICHLOROPHENOL	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
2,4-DICHLOROPHENOL	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
2,4-DIMETHYLPHENOL	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
2,4-DINITROPHENOL	1100 U	1300 U	1100 U	1000 U	910 U	1100 U	1000 U	1100 U	1200 U	1000 U	1000 U	910 U
2,4-DINITROTOLUENE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
2,6-DICHLOROPHENOL												
2,6-DINITROTOLUENE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
2-ACETYLAMINOFLUORENE												
2-CHLORONAPHTHALENE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
2-CHLOROPHENOL	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
2-METHYLNAPHTHALENE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
2-METHYLPHENOL	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
2-NAPHTHYLAMINE												
2-NITROANILINE	1100 U	1300 U	1100 U	1000 U	910 U	1100 U	1000 U	1100 U	1200 U	1000 U	1000 U	910 U
2-NITROPHENOL	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
2-PICOLINE												
3&4-METHYLPHENOL												

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	017	017	017	017	017	017	017	017	017	017
Sample Location	16SB04	16SB04	17MIP27-TW36	17MIP41-TW50-MW17S	17SB01	17SB01	17SB01	17SB02	17SB02	17SB02	17SB03	17SB03
Sample Number	16-B-04-03-D	16-B-04-05	17-B-33-03	17-B-34-06	17-B-01-01	17-B-01-03	17-B-01-05	17-B-02-01	17-B-02-03	17-B-02-05	17-B-03-01	17-B-03-03
Depth Range (below ground surface)	3 - 5	5 - 7	3 - 5	6 - 8	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5
Sample Date	06/11/01	06/11/01	01/18/05	01/18/05	06/07/01	06/07/01	06/07/01	06/07/01	06/07/01	06/07/01	06/06/01	06/06/01
3,3'-DICHLOROBENZIDINE	430 UR	530 UR	460 U	420 U	360 UR	430 UR	400 UR	430 UR	460 UR	400 UR	400 UR	360 UR
3,3'-DIMETHYLBENZIDINE												
3-METHYLCHOLANTHRENE												
3-NITROANILINE	1100 U	1300 U	1100 U	1000 U	910 U	1100 U	1000 U	1100 U	1200 U	1000 U	1000 U	910 U
4,6-DINITRO-2-METHYLPHENOL	1100 U	1300 U	1100 U	1000 U	910 U	1100 U	1000 U	1100 U	1200 U	1000 U	1000 U	910 U
4-AMINOBIPHENYL												
4-BROMOPHENYL PHENYL ETHER	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
4-CHLORO-3-METHYLPHENOL	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
4-CHLOROANILINE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
4-CHLOROPHENYL PHENYL ETHER	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
4-METHYLPHENOL	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
4-NITROANILINE	1100 U	1300 U	1100 U	1000 U	910 UJ	1100 UJ	1000 UJ	1100 UJ	1200 UJ	1000 UJ	1000 U	910 U
4-NITROPHENOL	1100 U	1300 U	1100 U	1000 U	910 U	1100 U	1000 U	1100 U	1200 U	1000 U	1000 U	910 U
4-NITROQUINOLINE-1-OXIDE												
5-NITRO-O-TOLUIDINE												
7,12-DIMETHYLBENZ(A)ANTHRACENE												
A,A-DIMETHYLPHENETHYLAMINE												
ACENAPHTHENE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
ACENAPHTHYLENE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
ACETOPHENONE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
ANILINE												
ANTHRACENE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
ARAMITE												
ATRAZINE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
BENZALDEHYDE	430 U	530 U	810	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
BENZO(A)ANTHRACENE	20 J	80 J	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
BENZO(A)PYRENE	430 U	70 J	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
BENZO(B)FLUORANTHENE	430 U	90 J	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
BENZO(G,H,I)PERYLENE	430 U	60 J	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
BENZO(K)FLUORANTHENE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
BENZYL ALCOHOL												
BIS(2-CHLOROETHOXY)METHANE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
BIS(2-CHLOROETHYL)ETHER	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
BIS(2-CHLOROISOPROPYL)ETHER												
BIS(2-ETHYLHEXYL)PHTHALATE	430 U	530 U	260 J	240 J	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
BUTYL BENZYL PHTHALATE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
CAPROLACTAM	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
CARBAZOLE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
CHLOROBENZILATE												
CHRYSENE	430 U	70 J	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
DI-N-BUTYL PHTHALATE	430 U	530 U	1000	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
DI-N-OCTYL PHTHALATE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
DIALLATE												
DIBENZO(A,H)ANTHRACENE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
DIBENZOFURAN	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
DIETHYL PHTHALATE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
DIMETHOATE												
DIMETHYL PHTHALATE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
DINOSEB												
ETHYL METHANE SULFONATE												

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	017	017	017	017	017	017	017	017	017	017
Sample Location	16SB04	16SB04	17MIP27-TW36	17MIP41-TW50-MW17S	17SB01	17SB01	17SB01	17SB02	17SB02	17SB02	17SB03	17SB03
Sample Number	16-B-04-03-D	16-B-04-05	17-B-33-03	17-B-34-06	17-B-01-01	17-B-01-03	17-B-01-05	17-B-02-01	17-B-02-03	17-B-02-05	17-B-03-01	17-B-03-03
Depth Range (below ground surface)	3 - 5	5 - 7	3 - 5	6 - 8	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5
Sample Date	06/11/01	06/11/01	01/18/05	01/18/05	06/07/01	06/07/01	06/07/01	06/07/01	06/07/01	06/07/01	06/06/01	06/06/01
ETHYL PARATHION												
FLUORANTHENE	430 U	200 J	210 J	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
FLUORENE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
HEXACHLOROBENZENE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
HEXACHLOROBUTADIENE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
HEXACHLOROCYCLOPENTADIENE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
HEXACHLOROETHANE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
HEXACHLOROPHENE												
HEXACHLOROPROPENE												
INDENO(1,2,3-CD)PYRENE	430 U	60 J	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
ISODRIN												
ISOPHORONE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
ISOSAFROLE												
KEPONE												
METHAPYRILENE												
METHYL METHANE SULFONATE												
N-NITROSO-DI-N-BUTYLAMINE												
N-NITROSO-DI-N-PROPYLAMINE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
N-NITROSODIETHYLAMINE												
N-NITROSODIMETHYLAMINE												
N-NITROSODIPHENYLAMINE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
N-NITROSOMETHYLETHYLAMINE												
N-NITROSOMORPHOLINE												
N-NITROSOPIPERIDINE												
N-NITROSOPYRROLIDINE												
NAPHTHALENE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
NITROBENZENE	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE												
O-TOLUIDINE												
P-(DIMETHYLAMINO)AZOBENZENE												
PENTACHLOROBENZENE												
PENTACHLORONITROBENZENE												
PENTACHLOROPHENOL	1100 U	1300 U	1100 U	1000 U	910 U	1100 U	1000 U	1100 U	1200 U	1000 U	1000 U	910 U
PHENACETIN												
PHENANTHRENE	430 U	50 J	160 J	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
PHENOL	430 U	530 U	460 U	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
PRONAMIDE												
PYRENE	430 U	100 J	170 J	420 U	360 U	430 U	400 U	430 U	460 U	400 U	400 U	360 U
PYRIDINE												
SAFROLE												
SULFOTEPP												
THIONAZIN												
Pesiticides/PCBs (ug/kg)												
4,4'-DDD	4.4 U	77	7.3	4.2 U	3.7 U	4.4 U	3.9 U	4.2 U	4.4 U	4.1 U	3.9 U	3.8 U
4,4'-DDE	4.4 U	26	6	4.2 U	3.7 U	4.4 U	3.9 U	4.2 U	4.4 U	4.1 U	3.9 U	3.8 U
4,4'-DDT	4.4 U	35	2.1 J	4.2 U	3.7 U	4.4 U	3.9 U	4.2 U	4.4 U	4.1 U	3.9 U	3.8 U
ALDRIN	2.2 U	2.8 U	2.3 U	2.2 U	1.9 U	2.3 U	2 U	2.2 U	2.3 U	2.1 U	2 U	2 U
ALPHA-BHC	2.2 U	2.8 U	2.3 U	2.2 U	1.9 U	2.3 U	2 U	2.2 U	2.3 U	2.1 U	2 U	2 U
ALPHA-CHLORDANE	2.2 U	2.8 U	2.3 U	2.2 U	1.9 U	2.3 U	2 U	2.2 U	2.3 U	2.1 U	2 U	2 U
AROCLOR-1016	22 U	28 U	23 U	22 U	19 U	23 U	20 U	22 U	23 U	21 U	20 U	20 U

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	017	017	017	017	017	017	017	017	017	017
Sample Location	16SB04	16SB04	17MIP27-TW36	17MIP41-TW50-MW17S	17SB01	17SB01	17SB01	17SB02	17SB02	17SB02	17SB03	17SB03
Sample Number	16-B-04-03-D	16-B-04-05	17-B-33-03	17-B-34-06	17-B-01-01	17-B-01-03	17-B-01-05	17-B-02-01	17-B-02-03	17-B-02-05	17-B-03-01	17-B-03-03
Depth Range (below ground surface)	3 - 5	5 - 7	3 - 5	6 - 8	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5
Sample Date	06/11/01	06/11/01	01/18/05	01/18/05	06/07/01	06/07/01	06/07/01	06/07/01	06/07/01	06/07/01	06/06/01	06/06/01
AROCLOR-1221	22 U	28 U	23 U	22 U	19 U	23 U	20 U	22 U	23 U	21 U	20 U	20 U
AROCLOR-1232	22 U	28 U	23 U	22 U	19 U	23 U	20 U	22 U	23 U	21 U	20 U	20 U
AROCLOR-1242	22 U	28 U	23 U	22 U	19 U	23 U	20 U	22 U	23 U	21 U	20 U	20 U
AROCLOR-1248	22 U	28 U	23 U	22 U	19 U	23 U	20 U	22 U	23 U	21 U	20 U	20 U
AROCLOR-1254	22 U	28 U	23 U	22 U	19 U	23 U	20 U	22 U	23 U	21 U	20 U	20 U
AROCLOR-1260	22 U	28 U	23 U	22 U	19 U	23 U	20 U	22 U	23 U	21 U	20 U	20 U
BETA-BHC	2.2 U	2.8 U	2.3 U	2.2 U	1.9 U	2.3 U	2 U	2.2 U	2.3 U	2.1 U	2 U	2 U
CHLORDANE												
CHLORDANE (TECHNICAL)												
DELTA-BHC	2.2 U	2.8 U	2.3 U	2.2 U	1.9 U	2.3 U	2 U	2.2 U	2.3 U	2.1 U	2 U	2 U
DIELDRIN	4.4 U	5.3 U	4.6 U	4.2 U	3.7 U	4.4 U	3.9 U	4.2 U	4.4 U	4.1 U	3.9 U	3.8 U
ENDOSULFAN I	2.2 U	2.8 U	2.3 U	2.2 U	1.9 U	2.3 U	2 U	2.2 U	2.3 U	2.1 U	2 U	2 U
ENDOSULFAN II	4.4 U	5.3 U	4.6 U	4.2 U	3.7 U	4.4 U	3.9 U	4.2 U	4.4 U	4.1 U	3.9 U	3.8 U
ENDOSULFAN SULFATE	4.4 U	5.3 U	4.6 U	4.2 U	3.7 U	4.4 U	3.9 U	4.2 U	4.4 U	4.1 U	3.9 U	3.8 U
ENDRIN	4.4 U	5.3 U	4.6 U	4.2 U	3.7 U	4.4 U	3.9 U	4.2 U	4.4 U	4.1 U	3.9 U	3.8 U
ENDRIN ALDEHYDE	4.4 U	5.3 U	4.6 U	4.2 U	3.7 U	4.4 U	3.9 U	4.2 U	4.4 U	4.1 U	3.9 U	3.8 U
ENDRIN KETONE	4.4 U	5.3 U	4.6 U	4.2 U	3.7 U	4.4 U	3.9 U	4.2 U	4.4 U	4.1 U	3.9 U	3.8 U
GAMMA-BHC (LINDANE)	2.2 U	2 J	2.3 U	2.2 U	1.9 U	2.3 U	2 U	2.2 U	2.3 U	2.1 U	2 U	2 U
GAMMA-CHLORDANE	2.2 U	2.8 U	2.3 U	2.2 U	1.9 U	2.3 U	2 U	2.2 U	2.3 U	2.1 U	2 U	2 U
HEPTACHLOR	2.2 U	2.8 U	2.3 U	2.2 U	1.9 U	2.3 U	2 U	2.2 U	2.3 U	2.1 U	2 U	2 U
HEPTACHLOR EPOXIDE	2.2 U	2.8 U	2.3 U	2.2 U	1.9 U	2.3 U	2 U	2.2 U	2.3 U	2.1 U	2 U	2 U
KEPONE												
METHOXYCHLOR	2.9 J	28 U	23 U	22 U	19 U	23 U	20 U	22 U	23 U	21 U	20 U	20 U
TOXAPHENE	44 U	53 U	46 U	42 U	37 U	44 U	39 U	42 U	44 U	41 U	39 U	38 U
OrganoPhos Pesticides (ug/kg)												
DIMETHOATE												
DISULFOTON												
ETHYL PARATHION												
FAMPHUR												
METHYL PARATHION												
O,O,O-TRIETHYL PHOSPHOROTHIOATE												
PHORATE												
SULFOTEPP												
THIONAZIN												
Herbicides (ug/kg)												
2,4,5-T												
2,4,5-TP (SILVEX)												
2,4-D												
DINOSEB												
Explosives (ug/kg)												
1,3,5-TRINITROBENZENE	250 U	250 U	100 U	100 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
1,3-DINITROBENZENE	250 U	250 U	100 U	100 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4,6-TRINITROTOLUENE	250 U	250 U	100 U	100 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4-DINITROTOLUENE	250 U	250 U	100 U	100 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,6-DINITROTOLUENE	250 U	250 U	200 U	200 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2-AMINO-4,6-DINITROTOLUENE	250 U	250 U	200 U	200 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2-NITROTOLUENE	250 U	250 U	200 U	200 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
3-NITROTOLUENE	250 U	250 U	200 U	200 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-AMINO-2,6-DINITROTOLUENE	250 U	250 U	200 U	200 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-NITROTOLUENE	250 U	250 U	200 U	200 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	017	017	017	017	017	017	017	017	017	017
Sample Location	16SB04	16SB04	17MIP27-TW36	17MIP41-TW50-MW17S	17SB01	17SB01	17SB01	17SB02	17SB02	17SB02	17SB03	17SB03
Sample Number	16-B-04-03-D	16-B-04-05	17-B-33-03	17-B-34-06	17-B-01-01	17-B-01-03	17-B-01-05	17-B-02-01	17-B-02-03	17-B-02-05	17-B-03-01	17-B-03-03
Depth Range (below ground surface)	3 - 5	5 - 7	3 - 5	6 - 8	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5
Sample Date	06/11/01	06/11/01	01/18/05	01/18/05	06/07/01	06/07/01	06/07/01	06/07/01	06/07/01	06/07/01	06/06/01	06/06/01
HMX	500 U	500 U	200 U	200 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
NITROBENZENE	250 U	250 U	100 U	100 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
RDX	500 U	500 U	200 U	200 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
TETRYL	650 U	650 U	250 U	250 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U
Inorganics (mg/kg)												
ALUMINUM	26000	8820	6100	9120	14200	15000	15500	8780	8220	12700	38000	19700
ANTIMONY	0.45 U	11	0.85 U	0.23 U	0.36 U	0.42 U	0.42 U	0.4 U	0.31 U	0.44 U	0.35 U	0.31 U
ARSENIC	6.7	16.4	5.2	4.1	4.5	2.5 U	2 U	4	1.8 U	5.7	11.5	6.6
BARIUM	71.2	580	68.2	64.1	29.6	45.6	29.4	21.9	32.7	34.7	38.2	21.4
BERYLLIUM	0.43	0.26 U	0.21	0.87	0.33 U	0.39 U	0.38 U	0.47 U	0.3 U	0.4 U	0.46 U	0.28 U
CADMIUM	0.03 U	17.3	0.56	0.18	0.04 U	0.03 U	0.03 U	0.03 U	0.02 U	0.03 U	0.14 U	0.09 U
CALCIUM	1040	2970	1100	1010	967	967	1110	1120	1340	2600	3420	1330
CHROMIUM	34	33.4	12.4	15.4	15.8	18.3	25	17.4	14.4	20.5	48.8	23.5
COBALT	2.8	5.3	1.1	4	1.4	1.8	1.9	1.5	1.4	1.4	3	1.4
COPPER	22	992	39.7	0.95	0.94 U	3.3	2 U	0.5 U	0.93 U	0.64 U	2.7	1.6 U
IRON	23300	76000	10400	15200	12400	11400	14100	17000	10500	16000	31800	16200
LEAD	39.3	398	77.1	5.8	8.4	6	6.9	4.4	5.4	6	10.3	8.6
MAGNESIUM	1750	1740	584	1130	842	1120	1490	878	1040	1250	2140	1010
MANGANESE	36.2	310	29.9 J	26.8 J	34	42.7	27.9	19.9	20.8	12.2	49.4	34.3
MERCURY	0.05	0.32	0.08	0.01	0.02 U	0.02 U	0.01 U	0.02 U	0.01 U	0.03 U	0.14	0.01 U
NICKEL	6.4	36.7	7.6	4.1	4	5.4	5.1	2.5	2.4	2.6	8.2	4.2
POTASSIUM	996	530	277	313	422	658	983	420	487	359	1220	619
SELENIUM	0.38 U	0.43 U	0.29 U	0.36 U	0.3 U	0.35 U	0.35 U	0.33 U	0.26 U	0.36 U	0.29 U	0.26 U
SILVER	0.18 U	14.8	0.2	0.07 U	0.1 U	0.12 U	0.12 U	0.11 U	0.09 U	0.12 U	0.1 U	0.09 U
SODIUM	1090	4720	333	981	92 U	85.3 U	21.1 U	72.8 U	72.3 U	92.7 U	65.8 U	48.9 U
THALLIUM	0.82	2.2	0.32 U	0.97 U	0.47 U	0.54 U	0.54 U	0.51 U	0.41 U	0.57 U	0.9 U	0.4 U
VANADIUM	42.4	15.4	13.5	19.5	22.5	22.2	27.4	25.9	16.1	29.9	62.2	29.6
ZINC	56.1 J	15700	302	13.9	10.5	12.3	14.3	10.1	9.9	14.1	25.8	13.7
Miscellaneous Parameters (mg/kg)												
CYANIDE	1.3 U	1.6 U	0.41 J	0.3 J	1.1 U	1.3 U	1.2 U	1.3 U	1.4 U	1.3 U	1.2 U	1.2 U
TOTAL ORGANIC CARBON			26000	720								
TOTAL SOLIDS			72 %	78 %								

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB03	17SB04	17SB04	17SB04	17SB04	17SB04	17SB05	17SB05	17SB05	17SB06	17SB06	17SB06	17SB07
Sample Number	17-B-03-05	17-B-04-01	17-B-04-03	17-B-04-05	17-B-04-05-AVG	17-B-04-05-D	17-B-05-01	17-B-05-03	17-B-05-05	17-B-06-01	17-B-06-03	17-B-06-05	17-B-07-01
Depth Range (below ground surface)	5 - 7	1 - 3	3 - 5	5 - 7	5 - 7	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01
Volatile Organics (ug/kg)													
1,1,1,2-TETRACHLOROETHANE													
1,1,1-TRICHLOROETHANE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
1,1,2,2-TETRACHLOROETHANE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
1,1,2-TRICHLOROETHANE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
1,1,2-TRICHLOROTRIFLUOROETHANE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
1,1-DICHLOROETHANE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
1,1-DICHLOROETHENE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
1,2,3-TRICHLOROPROPANE													
1,2,4-TRICHLOROBENZENE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
1,2,4-TRIMETHYLBENZENE													
1,2-DIBROMO-3-CHLOROPROPANE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
1,2-DIBROMOETHANE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
1,2-DICHLOROBENZENE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
1,2-DICHLOROPROPANE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
1,3,5-TRIMETHYLBENZENE													
1,3-DICHLOROBENZENE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
1,4-DICHLOROBENZENE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
1,4-DIOXANE													
2-BUTANONE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
2-HEXANONE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
3-CHLOROPROPENE													
4-METHYL-2-PENTANONE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
ACETONE	27 U	540	160	80 U	90 U	100 U	1100	720	59 U	1300	2000	1200	24 U
ACETONITRILE													
ACROLEIN													
ACRYLONITRILE													
BENZENE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
BROMODICHLOROMETHANE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
BROMOFORM	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
BROMOMETHANE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
CARBON DISULFIDE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
CARBON TETRACHLORIDE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
CHLOROBENZENE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
CHLORODIBROMOMETHANE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
CHLOROETHANE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
CHLOROFORM	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
CHLOROMETHANE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
CHLOROPRENE													
CIS-1,2-DICHLOROETHENE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
CIS-1,3-DICHLOROPROPENE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
CYCLOHEXANE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
DIBROMOMETHANE													
DICHLORODIFLUOROMETHANE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
ETHYL METHACRYLATE													
ETHYLBENZENE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
ISOBUTANOL													
ISOPROPYLBENZENE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
M+P-XYLENES													

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB03	17SB04	17SB04	17SB04	17SB04	17SB04	17SB05	17SB05	17SB05	17SB06	17SB06	17SB06	17SB07
Sample Number	17-B-03-05	17-B-04-01	17-B-04-03	17-B-04-05	17-B-04-05-AVG	17-B-04-05-D	17-B-05-01	17-B-05-03	17-B-05-05	17-B-06-01	17-B-06-03	17-B-06-05	17-B-07-01
Depth Range (below ground surface)	5 - 7	1 - 3	3 - 5	5 - 7	5 - 7	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01
METHACRYLONITRILE													
METHYL ACETATE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
METHYL CYCLOHEXANE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
METHYL IODIDE													
METHYL METHACRYLATE													
METHYL TERT-BUTYL ETHER	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
METHYLENE CHLORIDE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
O-XYLENE													
PENTACHLOROETHANE													
PROPIONITRILE													
STYRENE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
TETRACHLOROETHENE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
TOLUENE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
TOTAL 1,2-DICHLOROETHENE													
TOTAL XYLENES	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
TRANS-1,2-DICHLOROETHENE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
TRANS-1,3-DICHLOROPROPENE	6 U	6 U	6 U	6 UR	5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 UR
TRANS-1,4-DICHLORO-2-BUTENE													
TRICHLOROETHENE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
TRICHLOROFLUOROMETHANE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
VINYL ACETATE													
VINYL CHLORIDE	6 U	6 U	6 U	6 U	5.5 U	5 U	6 U	6 U	5 U	6 U	6 U	6 U	6 U
Semivolatile Organics (ug/kg)													
1,1-BIPHENYL	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
1,2,4,5-TETRACHLOROBENZENE													
1,3,5-TRINITROBENZENE													
1,3-DINITROBENZENE													
1,4-NAPHTHOQUINONE													
1,4-PHENYLENEDIAMINE													
1-NAPHTHYLAMINE													
2,2'-OXYBIS(1-CHLOROPROPANE)	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
2,3,4,6-TETRACHLOROPHENOL													
2,4,5-TRICHLOROPHENOL	1000 U	1000 U	1100 U	5000 U	3000 U	1000 U	1000 U	1000 U	1000 U	1100 U	1000 U	1100 U	1000 U
2,4,6-TRICHLOROPHENOL	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
2,4-DICHLOROPHENOL	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
2,4-DIMETHYLPHENOL	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
2,4-DINITROPHENOL	1000 U	1000 U	1100 U	5000 U	3000 U	1000 U	1000 U	1000 U	1000 U	1100 U	1000 U	1100 U	1000 U
2,4-DINITROTOLUENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
2,6-DICHLOROPHENOL													
2,6-DINITROTOLUENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
2-ACETYLAMINOFLUORENE													
2-CHLORONAPHTHALENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
2-CHLOROPHENOL	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
2-METHYLNAPHTHALENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
2-METHYLPHENOL	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
2-NAPHTHYLAMINE													
2-NITROANILINE	1000 U	1000 U	1100 U	5000 U	3000 U	1000 U	1000 U	1000 U	1000 U	1100 U	1000 U	1100 U	1000 U
2-NITROPHENOL	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
2-PICOLINE													
3&4-METHYLPHENOL													

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB03	17SB04	17SB04	17SB04	17SB04	17SB04	17SB05	17SB05	17SB05	17SB06	17SB06	17SB06	17SB07
Sample Number	17-B-03-05	17-B-04-01	17-B-04-03	17-B-04-05	17-B-04-05-AVG	17-B-04-05-D	17-B-05-01	17-B-05-03	17-B-05-05	17-B-06-01	17-B-06-03	17-B-06-05	17-B-07-01
Depth Range (below ground surface)	5 - 7	1 - 3	3 - 5	5 - 7	5 - 7	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01
3,3'-DICHLOROBENZIDINE	400 UR	400 UR	430 UR	2000 UR	1200 UR	400 UR	400 UR	400 UR	400 UR	430 UR	400 UR	430 UR	400 UR
3,3'-DIMETHYLBENZIDINE													
3-METHYLCHOLANTHRENE													
3-NITROANILINE	1000 U	1000 U	1100 U	5000 U	3000 U	1000 U	1000 U	1000 U	1000 U	1100 U	1000 U	1100 U	1000 U
4,6-DINITRO-2-METHYLPHENOL	1000 U	1000 U	1100 U	5000 U	3000 U	1000 U	1000 U	1000 U	1000 U	1100 U	1000 U	1100 U	1000 U
4-AMINOBIPHENYL													
4-BROMOPHENYL PHENYL ETHER	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
4-CHLORO-3-METHYLPHENOL	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
4-CHLOROANILINE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
4-CHLOROPHENYL PHENYL ETHER	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
4-METHYLPHENOL	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
4-NITROANILINE	1000 U	1000 U	1100 U	5000 U	3000 U	1000 U	1000 U	1000 U	1000 U	1100 U	1000 U	1100 U	1000 U
4-NITROPHENOL	1000 U	1000 U	1100 U	5000 U	3000 U	1000 U	1000 U	1000 U	1000 U	1100 U	1000 U	1100 U	1000 U
4-NITROQUINOLINE-1-OXIDE													
5-NITRO-O-TOLUIDINE													
7,12-DIMETHYLBENZ(A)ANTHRACENE													
A,A-DIMETHYLPHENETHYLAMINE													
ACENAPHTHENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
ACENAPHTHYLENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
ACETOPHENONE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
ANILINE													
ANTHRACENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
ARAMITE													
ATRAZINE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
BENZALDEHYDE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
BENZO(A)ANTHRACENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
BENZO(A)PYRENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
BENZO(B)FLUORANTHENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
BENZO(G,H,I)PERYLENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
BENZO(K)FLUORANTHENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
BENZYL ALCOHOL													
BIS(2-CHLOROETHOXY)METHANE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
BIS(2-CHLOROETHYL)ETHER	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
BIS(2-CHLOROISOPROPYL)ETHER													
BIS(2-ETHYLHEXYL)PHTHALATE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
BUTYL BENZYL PHTHALATE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
CAPROLACTAM	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
CARBAZOLE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
CHLOROBENZILATE													
CHRYSENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
DI-N-BUTYL PHTHALATE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
DI-N-OCTYL PHTHALATE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
DIALLATE													
DIBENZO(A,H)ANTHRACENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
DIBENZOFURAN	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
DIETHYL PHTHALATE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
DIMETHOATE													
DIMETHYL PHTHALATE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
DINOSEB													
ETHYL METHANE SULFONATE													

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB03	17SB04	17SB04	17SB04	17SB04	17SB04	17SB05	17SB05	17SB05	17SB06	17SB06	17SB06	17SB07
Sample Number	17-B-03-05	17-B-04-01	17-B-04-03	17-B-04-05	17-B-04-05-AVG	17-B-04-05-D	17-B-05-01	17-B-05-03	17-B-05-05	17-B-06-01	17-B-06-03	17-B-06-05	17-B-07-01
Depth Range (below ground surface)	5 - 7	1 - 3	3 - 5	5 - 7	5 - 7	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01
ETHYL PARATHION													
FLUORANTHENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
FLUORENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
HEXACHLOROBENZENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
HEXACHLOROBUTADIENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
HEXACHLOROCYCLOPENTADIENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
HEXACHLOROETHANE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
HEXACHLOROPHENE													
HEXACHLOROPROPENE													
INDENO(1,2,3-CD)PYRENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
ISODRIN													
ISOPHORONE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
ISOSAFROLE													
KEPONE													
METHAPYRILENE													
METHYL METHANE SULFONATE													
N-NITROSO-DI-N-BUTYLAMINE													
N-NITROSO-DI-N-PROPYLAMINE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
N-NITROSODIETHYLAMINE													
N-NITROSODIMETHYLAMINE													
N-NITROSODIPHENYLAMINE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
N-NITROSOMETHYLETHYLAMINE													
N-NITROSOMORPHOLINE													
N-NITROSOPIPERIDINE													
N-NITROSOPYRROLIDINE													
NAPHTHALENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
NITROBENZENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE													
O-TOLUIDINE													
P-(DIMETHYLAMINO)AZOBENZENE													
PENTACHLOROBENZENE													
PENTACHLORONITROBENZENE													
PENTACHLOROPHENOL	1000 U	1000 U	1100 U	5000 U	3000 U	1000 U	1000 U	1000 U	1000 U	1100 U	1000 U	1100 U	1000 U
PHENACETIN													
PHENANTHRENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
PHENOL	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
PRONAMIDE													
PYRENE	400 U	400 U	430 U	2000 U	1200 U	400 U	400 U	400 U	400 U	430 U	400 U	430 U	400 U
PYRIDINE													
SAFROLE													
SULFOTEPP													
THIONAZIN													
Pesiticides/PCBs (ug/kg)													
4,4'-DDD	4 U	3.8 U	4.1 U	4 U	3.95 U	3.9 U	4 U	4 U	4 U	4.2 U	4.1 U	4.3 U	3.8 U
4,4'-DDE	4 U	3.8 U	4.1 U	4 U	3.95 U	3.9 U	4 U	4 U	4 U	4.2 U	4.1 U	4.3 U	3.8 U
4,4'-DDT	4 U	3.8 U	4.1 U	4 U	3.95 U	3.9 U	4 U	4 U	4 U	4.2 U	4.1 U	4.3 U	3.8 U
ALDRIN	2 U	2 U	2.1 U	2 U	2 U	2 U	2 U	2.1 U	2.1 U	2.2 U	2.1 U	2.2 U	2 U
ALPHA-BHC	2 U	2 U	2.1 U	2 U	2 U	2 U	2 U	2.1 U	2.1 U	2.2 U	2.1 U	2.2 U	2 U
ALPHA-CHLORDANE	2 U	2 U	2.1 U	2 U	2 U	2 U	2 U	2.1 U	2.1 U	2.2 U	2.1 U	2.2 U	2 U
AROCLOR-1016	20 U	20 U	21 U	20 U	20 U	20 U	20 U	21 U	21 U	22 U	21 U	22 U	20 U

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB03	17SB04	17SB04	17SB04	17SB04	17SB04	17SB05	17SB05	17SB05	17SB06	17SB06	17SB06	17SB07
Sample Number	17-B-03-05	17-B-04-01	17-B-04-03	17-B-04-05	17-B-04-05-AVG	17-B-04-05-D	17-B-05-01	17-B-05-03	17-B-05-05	17-B-06-01	17-B-06-03	17-B-06-05	17-B-07-01
Depth Range (below ground surface)	5 - 7	1 - 3	3 - 5	5 - 7	5 - 7	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01
AROCLOR-1221	20 U	20 U	21 U	20 U	20 U	20 U	20 U	21 U	21 U	22 U	21 U	22 U	20 U
AROCLOR-1232	20 U	20 U	21 U	20 U	20 U	20 U	20 U	21 U	21 U	22 U	21 U	22 U	20 U
AROCLOR-1242	20 U	20 U	21 U	20 U	20 U	20 U	20 U	21 U	21 U	22 U	21 U	22 U	20 U
AROCLOR-1248	20 U	20 U	21 U	20 U	20 U	20 U	20 U	21 U	21 U	22 U	21 U	22 U	20 U
AROCLOR-1254	20 U	20 U	21 U	20 U	20 U	20 U	20 U	21 U	21 U	22 U	21 U	22 U	20 U
AROCLOR-1260	20 U	20 U	21 U	20 U	20 U	20 U	20 U	21 U	21 U	22 U	21 U	22 U	20 U
BETA-BHC	2 U	2 U	2.1 U	2 U	2 U	2 U	2 U	2.1 U	2.1 U	2.2 U	2.1 U	2.2 U	2 U
CHLORDANE													
CHLORDANE (TECHNICAL)													
DELTA-BHC	2 U	2 U	2.1 U	2 U	2 U	2 U	2 U	2.1 U	2.1 U	2.2 U	2.1 U	2.2 U	2 U
DIELDRIN	4 U	3.8 U	4.1 U	4 U	3.95 U	3.9 U	4 U	4 U	4 U	4.2 U	4.1 U	4.3 U	3.8 U
ENDOSULFAN I	2 U	2 U	2.1 U	2 U	2 U	2 U	2 U	2.1 U	2.1 U	2.2 U	2.1 U	2.2 U	2 U
ENDOSULFAN II	4 U	3.8 U	4.1 U	4 U	3.95 U	3.9 U	4 U	4 U	4 U	4.2 U	4.1 U	4.3 U	3.8 U
ENDOSULFAN SULFATE	4 U	3.8 U	4.1 U	4 U	3.95 U	3.9 U	4 U	4 U	4 U	4.2 U	4.1 U	4.3 U	3.8 U
ENDRIN	4 U	3.8 U	4.1 U	4 U	3.95 U	3.9 U	4 U	4 U	4 U	4.2 U	4.1 U	4.3 U	3.8 U
ENDRIN ALDEHYDE	4 U	3.8 U	4.1 U	4 U	3.95 U	3.9 U	4 U	4 U	4 U	4.2 U	4.1 U	4.3 U	3.8 U
ENDRIN KETONE	4 U	3.8 U	4.1 U	4 U	3.95 U	3.9 U	0.79 J	4 U	4 U	4.2 U	4.1 U	4.3 U	3.8 U
GAMMA-BHC (LINDANE)	2 U	2 U	2.1 U	2 U	2 U	2 U	2 U	2.1 U	2.1 U	2.2 U	2.1 U	2.2 U	2 U
GAMMA-CHLORDANE	2 U	2 U	2.1 U	2 U	2 U	2 U	2 U	2.1 U	2.1 U	2.2 U	2.1 U	2.2 U	2 U
HEPTACHLOR	2 U	2 U	2.1 U	2 U	2 U	2 U	2 U	2.1 U	2.1 U	2.2 U	2.1 U	2.2 U	2 U
HEPTACHLOR EPOXIDE	2 U	2 U	2.1 U	2 U	2 U	2 U	2 U	2.1 U	2.1 U	2.2 U	2.1 U	2.2 U	2 U
KEPONE													
METHOXYCHLOR	20 U	20 U	21 U	20 U	20 U	20 U	20 U	21 U	21 U	22 U	21 U	22 U	20 U
TOXAPHENE	40 U	38 U	41 U	40 U	39.5 U	39 U	40 U	40 U	40 U	42 U	41 U	43 U	38 U
OrganoPhos Pesticides (ug/kg)													
DIMETHOATE													
DISULFOTON													
ETHYL PARATHION													
FAMPHUR													
METHYL PARATHION													
O,O,O-TRIETHYL PHOSPHOROTHIOATE													
PHORATE													
SULFOTEPP													
THIONAZIN													
Herbicides (ug/kg)													
2,4,5-T													
2,4,5-TP (SILVEX)													
2,4-D													
DINOSEB													
Explosives (ug/kg)													
1,3,5-TRINITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
1,3-DINITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4,6-TRINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2-AMINO-4,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
3-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-AMINO-2,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB03	17SB04	17SB04	17SB04	17SB04	17SB04	17SB05	17SB05	17SB05	17SB06	17SB06	17SB06	17SB07
Sample Number	17-B-03-05	17-B-04-01	17-B-04-03	17-B-04-05	17-B-04-05-AVG	17-B-04-05-D	17-B-05-01	17-B-05-03	17-B-05-05	17-B-06-01	17-B-06-03	17-B-06-05	17-B-07-01
Depth Range (below ground surface)	5 - 7	1 - 3	3 - 5	5 - 7	5 - 7	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01
HMX	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
NITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
RDX	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
TETRYL	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U
Inorganics (mg/kg)													
ALUMINUM	13200	28400	18300	14500	15250	16000	32700	21900	7430	27400	31600	19700	18800
ANTIMONY	0.3 U	0.33 U	0.31 U	0.37 U	0.365 U	0.36 U	0.44 U	0.27 U	0.42 U	0.64 U	0.34 U	0.35 U	0.36 U
ARSENIC	3.4	11.7	6.5	2.4 U	2.45	3.7	4.3	1.8	2.4	10.4	2.3	1.9	4.5
BARIUM	35.8	56.7	27.7	41.8	38.2	34.6	34	22	8.9	54	48.3	24.9	29.8
BERYLLIUM	0.23 U	0.43 U	0.28 U	0.36 U	0.375 U	0.39 U	0.55	0.36 U	0.22 U	0.78	0.76	0.53 U	0.4 U
CADMIUM	0.11 U	0.11 U	0.1 U	0.14 U	0.12 U	0.1 U	0.03 U	0.09 U	0.1 U	0.04 U	0.02 U	0.02 U	0.12 U
CALCIUM	715	2010	1310	1190	1185	1180	509	239	155	564	459	478	1430
CHROMIUM	25	38.5	22.4	21.4	22.25	23.1	43.2	29.1	9.9	39.9	42.9	26.9	30.1
COBALT	2.5	1.7	1.6	1.8	1.7	1.6	4.4	2.1	2.7	5.3	5.9	3.5	2.2
COPPER	1.7 U	2	1.3	2.1 U	1.925	2.8	2.5	2.2	1.6	1.5 U	2.5	1.7	1.5 U
IRON	14000	25400	16100	13700	14400	15100	21400	9460	4620	30800	16500	14000	22200
LEAD	11.8	9.5	7.9	6	6.35	6.7	10.7	10.2	4.7	15.4	14.8	8.7	7.7
MAGNESIUM	1350	1850	1180	1430	1400	1370	2160	1220	385	2140	2180	1360	1420
MANGANESE	29.9	37.2	31.5	39.3	37.55	35.8	33	24.1	15.1	23.4	35.3	26.3	39.2
MERCURY	0.01 U	0.01	0.01	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01	0.01 U	0.02 U
NICKEL	6.1	3.4	3.4	2.8	2.85	2.9	10.1	5.1	5.8	9.6	11.6	7	5.4
POTASSIUM	1270	612	438	557	552.5	548	867	562	928	576	831	720	637
SELENIUM	0.25 U	0.28 U	0.25 U	0.31 U	0.305 U	0.3 U	0.36 U	0.23 U	0.35 U	0.54 U	0.28 U	0.29 U	0.3 U
SILVER	0.09 U	0.16 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.08 U	0.12 U	0.09 U	0.1 U	0.1 U	0.1 U
SODIUM	164 U	54.1 U	37.6 U	18.5 U	34.75 U	51 U	235 U	72.4 U	30.3 U	75.5 U	107 U	77.6 U	51.6 U
THALLIUM	0.39 U	0.87 U	0.4 U	0.48 U	0.475 U	0.47 U	0.57 U	0.35 U	0.55 U	0.83 U	0.44 U	0.45 U	0.46 U
VANADIUM	28.6	51.1	30.2	28.2	28.05	27.9	48.2	31.3	13.9	45.3	43.6	30.2	31.6
ZINC	14.4	20.8	13.9	14.6	14.3	14	24.5	13.6	5.8	25	27.5	19.2	15.8
Miscellaneous Parameters (mg/kg)													
CYANIDE	1.2 U	1.2 U	1.3 U	1.2 U	1.2 U	1.2 U	1.2 U	2	1.2 U	1.3 U	1.2 U	1.3 U	1.2 U
TOTAL ORGANIC CARBON													
TOTAL SOLIDS													

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB07	17SB07	17SB07	17SB07	17SB08	17SB08	17SB08	17SB09	17SB09	17SB09	17SB10	17SB10	17SB10
Sample Number	17-B-07-03	17-B-07-05	17-B-07-05-AVG	17-B-07-05-D	17-B-08-01	17-B-08-03	17-B-08-05	17-B-09-01	17-B-09-03	17-B-09-05	17-B-10-01	17-B-10-03	17-B-10-05
Depth Range (below ground surface)	3 - 5	5 - 7	5 - 7	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/05/01	06/05/01	06/05/01
Volatile Organics (ug/kg)													
1,1,1,2-TETRACHLOROETHANE					6 U						7 U		
1,1,1-TRICHLOROETHANE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
1,1,2,2-TETRACHLOROETHANE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
1,1,2-TRICHLOROETHANE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
1,1,2-TRICHLOROTRIFLUOROETHANE	6 U	6 U	5.5 U	5 U		6 U	6 U	8 U	6 U	6 U		5 U	6 U
1,1-DICHLOROETHANE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
1,1-DICHLOROETHENE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
1,2,3-TRICHLOROPROPANE					6 U						7 U		
1,2,4-TRICHLOROBENZENE	6 U	6 U	5.5 U	5 U		6 U	6 U	8 U	6 U	6 U		5 U	6 U
1,2,4-TRIMETHYLBENZENE													
1,2-DIBROMO-3-CHLOROPROPANE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
1,2-DIBROMOETHANE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
1,2-DICHLOROBENZENE	6 U	6 U	5.5 U	5 U		6 U	6 U	8 U	6 U	6 U		5 U	6 U
1,2-DICHLOROETHANE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
1,2-DICHLOROPROPANE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
1,3,5-TRIMETHYLBENZENE													
1,3-DICHLOROBENZENE	6 U	6 U	5.5 U	5 U		6 U	6 U	8 U	6 U	6 U		5 U	6 U
1,4-DICHLOROBENZENE	6 U	6 U	5.5 U	5 U		6 U	6 U	8 U	6 U	6 U		5 U	6 U
1,4-DIOXANE													
2-BUTANONE	6 U	6 U	5.5 U	5 U	13 U	6 U	6 U	8 U	6 U	6 U	15 U	5 U	6 U
2-HEXANONE	6 U	6 U	5.5 U	5 U	13 U	6 U	6 U	8 U	6 U	6 U	15 U	5 U	6 U
3-CHLOROPROPENE					13 U						15 U		
4-METHYL-2-PENTANONE	6 U	6 U	5.5 U	5 U	13 U	6 U	6 U	8 U	6 U	6 U	15 U	5 U	6 U
ACETONE	670	65 J	302.5 J	540 J	84	42 U	590	860	1600	680	1300 U	21 U	67
ACETONITRILE					130 U						150 U		
ACROLEIN					65 U						75 U		
ACRYLONITRILE					13 U						15 U		
BENZENE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
BROMODICHLOROMETHANE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
BROMOFORM	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
BROMOMETHANE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
CARBON DISULFIDE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
CARBON TETRACHLORIDE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
CHLOROBENZENE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
CHLORODIBROMOMETHANE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
CHLOROETHANE	6 U	6 U	5.5 U	5 U	2 J	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
CHLOROFORM	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
CHLOROMETHANE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
CHLOROPRENE					13 U						15 U		
CIS-1,2-DICHLOROETHENE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
CIS-1,3-DICHLOROPROPENE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
CYCLOHEXANE	6 U	6 U	5.5 U	5 U		6 U	6 U	8 U	6 U	6 U		5 U	6 U
DIBROMOMETHANE					6 U						7 U		
DICHLORODIFLUOROMETHANE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
ETHYL METHACRYLATE					13 U						15 U		
ETHYLBENZENE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
ISOBUTANOL					260 U						300 U		
ISOPROPYLBENZENE	6 U	6 U	5.5 U	5 U		6 U	6 U	8 U	6 U	6 U		5 U	6 U
M+P-XYLENES													

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB07	17SB07	17SB07	17SB07	17SB08	17SB08	17SB08	17SB09	17SB09	17SB09	17SB10	17SB10	17SB10
Sample Number	17-B-07-03	17-B-07-05	17-B-07-05-AVG	17-B-07-05-D	17-B-08-01	17-B-08-03	17-B-08-05	17-B-09-01	17-B-09-03	17-B-09-05	17-B-10-01	17-B-10-03	17-B-10-05
Depth Range (below ground surface)	3 - 5	5 - 7	5 - 7	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/05/01	06/05/01	06/05/01
METHACRYLONITRILE					130 U						150 U		
METHYL ACETATE	6 U	6 U	5.5 U	5 U		6 U	6 U	8 U	6 U	6 U		10	6 U
METHYL CYCLOHEXANE	6 U	6 U	5.5 U	5 U		6 U	6 U	8 U	6 U	6 U		5 U	6 U
METHYL IODIDE					13 U						15 U		
METHYL METHACRYLATE					13 U						15 U		
METHYL TERT-BUTYL ETHER	6 U	6 U	5.5 U	5 U		6 U	6 U	8 U	6 U	6 U		5 U	6 U
METHYLENE CHLORIDE	7 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
O-XYLENE													
PENTACHLOROETHANE					13 U						15 U		
PROPIONITRILE					130 U						150 U		
STYRENE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
TETRACHLOROETHENE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
TOLUENE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
TOTAL 1,2-DICHLOROETHENE													
TOTAL XYLENES	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
TRANS-1,2-DICHLOROETHENE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
TRANS-1,3-DICHLOROPROPENE	6 UR	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
TRANS-1,4-DICHLORO-2-BUTENE					13 U						15 U		
TRICHLOROETHENE	6 U	6 U	5.5 U	5 U	2 J	6 U	6 U	8 U	6 U	6 U	5 J	5 U	6 U
TRICHLOROFLUOROMETHANE	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	8 U	6 U	6 U	7 U	5 U	6 U
VINYL ACETATE					6 U						7 U		
VINYL CHLORIDE	6 U	6 U	5.5 U	5 U	13 U	6 U	6 U	8 U	6 U	6 U	15 U	5 U	6 U
Semivolatile Organics (ug/kg)													
1,1-BIPHENYL	400 U	400 U	415 U	430 U		460 U	400 U	460 U	400 U	400 U		430 U	430 U
1,2,4,5-TETRACHLOROBENZENE					500 U						500 U		
1,3,5-TRINITROBENZENE					500 U						500 U		
1,3-DINITROBENZENE					500 U						500 U		
1,4-NAPHTHOQUINONE					500 U						500 U		
1,4-PHENYLENEDIAMINE					500 UR						500 UR		
1-NAPHTHYLAMINE					500 U						500 U		
2,2'-OXYBIS(1-CHLOROPROPANE)	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
2,3,4,6-TETRACHLOROPHENOL					500 U						500 U		
2,4,5-TRICHLOROPHENOL	1000 U	1000 U	1050 U	1100 U	1200 U	1200 U	1000 U	1200 U	1000 U	1000 U	1200 U	1100 U	1100 U
2,4,6-TRICHLOROPHENOL	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
2,4-DICHLOROPHENOL	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
2,4-DIMETHYLPHENOL	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
2,4-DINITROPHENOL	1000 U	1000 U	1050 U	1100 U	1200 U	1200 U	1000 U	1200 U	1000 U	1000 U	1200 U	1100 U	1100 U
2,4-DINITROTOLUENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
2,6-DICHLOROPHENOL					500 U						500 U		
2,6-DINITROTOLUENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
2-ACETYLAMINOFLUORENE					500 U						500 U		
2-CHLORONAPHTHALENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
2-CHLOROPHENOL	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
2-METHYLNAPHTHALENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
2-METHYLPHENOL	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
2-NAPHTHYLAMINE					500 U						500 U		
2-NITROANILINE	1000 U	1000 U	1050 U	1100 U	1200 U	1200 U	1000 U	1200 U	1000 U	1000 U	1200 U	1100 U	1100 U
2-NITROPHENOL	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
2-PICOLINE					500 U						500 U		
3&4-METHYLPHENOL					500 U						500 U		

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB07	17SB07	17SB07	17SB07	17SB08	17SB08	17SB08	17SB09	17SB09	17SB09	17SB10	17SB10	17SB10
Sample Number	17-B-07-03	17-B-07-05	17-B-07-05-AVG	17-B-07-05-D	17-B-08-01	17-B-08-03	17-B-08-05	17-B-09-01	17-B-09-03	17-B-09-05	17-B-10-01	17-B-10-03	17-B-10-05
Depth Range (below ground surface)	3 - 5	5 - 7	5 - 7	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/05/01	06/05/01	06/05/01
3,3'-DICHLOROBENZIDINE	400 UR	400 UR	415 UR	430 UR	500 U	460 UR	400 UR	460 UR	400 UR	400 UR	500 U	430 UR	430 UR
3,3'-DIMETHYLBENZIDINE					990 U						990 U		
3-METHYLCHOLANTHRENE					500 U						500 U		
3-NITROANILINE	1000 U	1000 U	1050 U	1100 U	1200 U	1200 U	1000 U	1200 U	1000 U	1000 U	1200 U	1100 U	1100 U
4,6-DINITRO-2-METHYLPHENOL	1000 U	1000 U	1050 U	1100 U	1200 U	1200 U	1000 U	1200 U	1000 U	1000 U	1200 U	1100 U	1100 U
4-AMINOBIPHENYL					500 U						500 U		
4-BROMOPHENYL PHENYL ETHER	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
4-CHLORO-3-METHYLPHENOL	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
4-CHLOROANILINE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
4-CHLOROPHENYL PHENYL ETHER	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
4-METHYLPHENOL	400 U	400 U	415 U	430 U		460 U	400 U	460 U	400 U	400 U		430 U	430 U
4-NITROANILINE	1000 U	1000 U	1050 U	1100 U	1200 U	1200 U	1000 U	1200 U	1000 U	1000 U	1200 U	1100 U	1100 U
4-NITROPHENOL	1000 U	1000 U	1050 U	1100 U	1200 U	1200 U	1000 U	1200 U	1000 U	1000 U	1200 U	1100 U	1100 U
4-NITROQUINOLINE-1-OXIDE					990 UR						990 UR		
5-NITRO-O-TOLUIDINE					990 U						990 U		
7,12-DIMETHYLBENZ(A)ANTHRACENE					500 U						500 U		
A,A-DIMETHYLPHENETHYLAMINE					500 U						500 U		
ACENAPHTHENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
ACENAPHTHYLENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
ACETOPHENONE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
ANILINE					500 U						500 U		
ANTHRACENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
ARAMITE					990 U						990 U		
ATRAZINE	400 U	400 U	415 U	430 U		460 U	400 U	460 U	400 U	400 U		430 U	430 U
BENZALDEHYDE	400 U	400 U	415 U	430 U		460 U	400 U	460 U	400 U	400 U		430 U	430 U
BENZO(A)ANTHRACENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
BENZO(A)PYRENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
BENZO(B)FLUORANTHENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
BENZO(G,H,I)PERYLENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
BENZO(K)FLUORANTHENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
BENZYL ALCOHOL					990 U						990 U		
BIS(2-CHLOROETHOXY)METHANE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
BIS(2-CHLOROETHYL)ETHER	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
BIS(2-CHLOROISOPROPYL)ETHER													
BIS(2-ETHYLHEXYL)PHTHALATE	400 U	3400	1807.5	430 U	500 U	5200	400 U	460 U	400 U	400 U	500 U	430 U	430 U
BUTYL BENZYL PHTHALATE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
CAPROLACTAM	400 U	400 U	415 U	430 U		460 U	400 U	460 U	400 U	400 U		430 U	430 U
CARBAZOLE	400 U	400 U	415 U	430 U		460 U	400 U	460 U	400 U	400 U		430 U	430 U
CHLOROBENZILATE					990 U						990 U		
CHRYSENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
DI-N-BUTYL PHTHALATE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
DI-N-OCTYL PHTHALATE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
DIALLATE					990 U						990 U		
DIBENZO(A,H)ANTHRACENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
DIBENZOFURAN	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
DIETHYL PHTHALATE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
DIMETHOATE					500 U						500 U		
DIMETHYL PHTHALATE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
DINOSEB													
ETHYL METHANE SULFONATE					500 U						500 U		

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB07	17SB07	17SB07	17SB07	17SB08	17SB08	17SB08	17SB09	17SB09	17SB09	17SB10	17SB10	17SB10
Sample Number	17-B-07-03	17-B-07-05	17-B-07-05-AVG	17-B-07-05-D	17-B-08-01	17-B-08-03	17-B-08-05	17-B-09-01	17-B-09-03	17-B-09-05	17-B-10-01	17-B-10-03	17-B-10-05
Depth Range (below ground surface)	3 - 5	5 - 7	5 - 7	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/05/01	06/05/01	06/05/01
ETHYL PARATHION													
FLUORANTHENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
FLUORENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
HEXACHLOROBENZENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
HEXACHLOROBUTADIENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
HEXACHLOROCYCLOPENTADIENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
HEXACHLOROETHANE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
HEXACHLOROPHENE					500 UR						500 UR		
HEXACHLOROPROPENE					500 U						500 U		
INDENO(1,2,3-CD)PYRENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
ISODRIN					990 U						990 U		
ISOPHORONE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
ISOSAFROLE					990 U						990 U		
KEPONE													
METHAPYRILENE					500 U						500 U		
METHYL METHANE SULFONATE					990 U						990 U		
N-NITROSO-DI-N-BUTYLAMINE					500 U						500 U		
N-NITROSO-DI-N-PROPYLAMINE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
N-NITROSODIETHYLAMINE					990 U						990 U		
N-NITROSODIMETHYLAMINE					990 U						990 U		
N-NITROSODIPHENYLAMINE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
N-NITROSOMETHYLETHYLAMINE					500 U						500 U		
N-NITROSOMORPHOLINE					500 U						500 U		
N-NITROSOPIPERIDINE					500 U						500 U		
N-NITROSOPYRROLIDINE					500 U						500 U		
NAPHTHALENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
NITROBENZENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE					990 U						990 U		
O-TOLUIDINE					500 U						500 U		
P-(DIMETHYLAMINO)AZOBENZENE					990 U						990 U		
PENTACHLOROBENZENE					500 U						500 U		
PENTACHLORONITROBENZENE					500 U						500 U		
PENTACHLOROPHENOL	1000 U	1000 U	1050 U	1100 U	1200 U	1200 U	1000 U	1200 U	1000 U	1000 U	1200 U	1100 U	1100 U
PHENACETIN					500 U						500 U		
PHENANTHRENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
PHENOL	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
PRONAMIDE					500 U						500 U		
PYRENE	400 U	400 U	415 U	430 U	500 U	460 U	400 U	460 U	400 U	400 U	500 U	430 U	430 U
PYRIDINE					2400 U						2400 U		
SAFROLE					500 U						500 U		
SULFOTEPP					500 U						500 U		
THIONAZIN					990 U						990 U		
Pesiticides/PCBs (ug/kg)													
4,4'-DDD	4 U	4 U	4.15 U	4.3 U	2 U	4.4 U	4.1 U	4.5 U	4 U	3.9 U	2.3 U	4.3 U	4.2 U
4,4'-DDE	4 U	4 U	4.15 U	4.3 U	2 U	4.4 U	4.1 U	4.5 U	4 U	3.9 U	2.3 U	4.3 U	4.2 U
4,4'-DDT	4 U	4 U	4.15 U	4.3 U	2 U	4.4 U	4.1 U	4.5 U	4 U	3.9 U	0.38 J	3.9 J	4.2 U
ALDRIN	2.1 U	2 U	2.1 U	2.2 U	2 U	2.2 U	2.1 U	2.3 U	2 U	2 U	2.3 U	2.2 U	2.2 U
ALPHA-BHC	2.1 U	2 U	2.1 U	2.2 U	2 U	2.2 U	2.1 U	2.3 U	2 U	2 U	2.3 U	2.2 U	2.2 U
ALPHA-CHLORDANE	2.1 U	2 U	2.1 U	2.2 U	2 U	2.2 U	2.1 U	2.3 U	2 U	2 U	2.3 U	2.2 U	2.2 U
AROCLOR-1016	21 U	20 U	21 U	22 U	25 U	22 U	21 U	23 U	20 U	20 U	26 U	22 U	22 U

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB07	17SB07	17SB07	17SB07	17SB08	17SB08	17SB08	17SB09	17SB09	17SB09	17SB10	17SB10	17SB10
Sample Number	17-B-07-03	17-B-07-05	17-B-07-05-AVG	17-B-07-05-D	17-B-08-01	17-B-08-03	17-B-08-05	17-B-09-01	17-B-09-03	17-B-09-05	17-B-10-01	17-B-10-03	17-B-10-05
Depth Range (below ground surface)	3 - 5	5 - 7	5 - 7	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/05/01	06/05/01	06/05/01
AROCLOR-1221	21 U	20 U	21 U	22 U	25 U	22 U	21 U	23 U	20 U	20 U	26 U	22 U	22 U
AROCLOR-1232	21 U	20 U	21 U	22 U	25 U	22 U	21 U	23 U	20 U	20 U	26 U	22 U	22 U
AROCLOR-1242	21 U	20 U	21 U	22 U	25 U	22 U	21 U	23 U	20 U	20 U	26 U	22 U	22 U
AROCLOR-1248	21 U	20 U	21 U	22 U	25 U	22 U	21 U	23 U	20 U	20 U	26 U	22 U	22 U
AROCLOR-1254	21 U	20 U	21 U	22 U	25 U	22 U	21 U	23 U	20 U	20 U	26 U	22 U	22 U
AROCLOR-1260	21 U	20 U	21 U	22 U	25 U	22 U	21 U	23 U	20 U	20 U	26 U	22 U	22 U
BETA-BHC	2.1 U	2 U	2.1 U	2.2 U	2 U	2.2 U	2.1 U	2.3 U	2 U	2 U	2.3 U	2.2 U	2.2 U
CHLORDANE													
CHLORDANE (TECHNICAL)					20 U						23 U		
DELTA-BHC	2.1 U	2 U	1.4 J	1.4 J	2 U	2.2 U	2.1 U	2.3 U	2 U	2 U	2.3 U	2.2 U	2.2 U
DIELDRIN	4 U	4 U	4.15 U	4.3 U	2 U	4.4 U	4.1 U	4.5 U	4 U	3.9 U	2.3 U	4.3 U	4.2 U
ENDOSULFAN I	2.1 U	2 U	2.1 U	2.2 U	2 U	2.2 U	2.1 U	2.3 U	2 U	2 U	2.3 U	2.2 U	2.2 U
ENDOSULFAN II	4 U	4 U	4.15 U	4.3 U	2 U	4.4 U	4.1 U	4.5 U	4 U	3.9 U	2.3 U	4.3 U	4.2 U
ENDOSULFAN SULFATE	4 U	4 U	4.15 U	4.3 U	2 U	4.4 U	4.1 U	4.5 U	4 U	3.9 U	2.3 U	4.3 U	4.2 U
ENDRIN	4 U	4 U	4.15 U	4.3 U	2 U	4.4 U	4.1 U	4.5 U	4 U	3.9 U	2.3 U	4.3 U	4.2 U
ENDRIN ALDEHYDE	4 U	4 U	1.3 J	1.3 J	2 U	4.4 U	4.1 U	4.5 U	4 U	3.9 U	0.72 J	4.3 U	4.2 U
ENDRIN KETONE	4 U	4 U	4.15 U	4.3 U	2 U	4.4 U	4.1 U	4.5 U	4 U	3.9 U	2.3 U	4.3 U	4.2 U
GAMMA-BHC (LINDANE)	2.1 U	2 U	2.1 U	2.2 U	2 U	2.2 U	2.1 U	2.3 U	2 U	2 U	2.3 U	2.2 U	2.2 U
GAMMA-CHLORDANE	2.1 U	2 U	2.1 U	2.2 U	2 U	2.2 U	2.1 U	2.3 U	2 U	2 U	2.3 U	2.2 U	2.2 U
HEPTACHLOR	2.1 U	2 U	2.1 U	2.2 U	2 U	2.2 U	2.1 U	2.3 U	2 U	2 U	2.3 U	2.2 U	2.2 U
HEPTACHLOR EPOXIDE	2.1 U	2 U	2.1 U	2.2 U	2 U	2.2 U	2.1 U	2.3 U	2 U	2 U	2.3 U	2.2 U	2.2 U
KEPONE					38 U						46 U		
METHOXYCHLOR	21 U	20 U	21 U	22 U	3.8 U	22 U	21 U	23 U	20 U	20 U	4.6 U	22 U	22 U
TOXAPHENE	40 U	40 U	41.5 U	43 U	77 U	44 U	41 U	45 U	40 U	39 U	93 U	43 U	42 U
OrganoPhos Pesticides (ug/kg)													
DIMETHOATE													
DISULFOTON					38 U						46 U		
ETHYL PARATHION					38 U						46 U		
FAMPHUR					38 U						46 U		
METHYL PARATHION					38 U						46 U		
O,O,O-TRIETHYL PHOSPHOROTHIOATE													
PHORATE					38 U						46 U		
SULFOTEPP													
THIONAZIN													
Herbicides (ug/kg)													
2,4,5-T					23 U						28 U		
2,4,5-TP (SILVEX)					23 U						28 U		
2,4-D					92 U						110 U		
DINOSEB					14 U						17 U		
Explosives (ug/kg)													
1,3,5-TRINITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
1,3-DINITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4,6-TRINITROTOLUENE	250 U	250 U	250 U	250 U	350	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4-DINITROTOLUENE	250 U	250 U	250 U	250 U	510	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2-AMINO-4,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
3-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-AMINO-2,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB07	17SB07	17SB07	17SB07	17SB08	17SB08	17SB08	17SB09	17SB09	17SB09	17SB10	17SB10	17SB10
Sample Number	17-B-07-03	17-B-07-05	17-B-07-05-AVG	17-B-07-05-D	17-B-08-01	17-B-08-03	17-B-08-05	17-B-09-01	17-B-09-03	17-B-09-05	17-B-10-01	17-B-10-03	17-B-10-05
Depth Range (below ground surface)	3 - 5	5 - 7	5 - 7	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/05/01	06/05/01	06/05/01
HMX	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
NITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
RDX	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
TETRYL	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U
Inorganics (mg/kg)													
ALUMINUM	17000	17300	17800	18300	22100	19600	22000	35800	34400	26400	26800	24000	20700
ANTIMONY	0.33 U	0.36 U	0.365 U	0.37 U	0.3 U	0.31 U	0.37 U	0.3 U	0.27 U	0.4 U	0.34 U	0.3 U	0.37 U
ARSENIC	2.4	2.8	2.3	1.8	3	3	4.7	7.1	6.7	3.4	7.3	5.1	7.2
BARIUM	34.4	16.5	17.75	19	25.6	24.4	37.9	66.4	39.2	24.3	43.6	32.1	23.3
BERYLLIUM	0.36 U	0.39 U	0.36 U	0.33 U	0.4	0.38 U	0.49 U	0.75	0.65	0.42 U	0.65	0.44	0.69
CADMIUM	0.02 U	0.1 U	0.1 U	0.1 U	0.12 U	0.09 U	0.05 U	0.07 U	0.14 U	0.13 U	0.02 U	0.03 U	0.08 U
CALCIUM	1310	2940	2580	2220	860	573	1920	932	573	805	365	391	315
CHROMIUM	25	28.5	28.85	29.2	34.4	31.4	31.4	41.2	44.5	38.4	38.4	37.2	34.2
COBALT	2.5	3.2	2.25	2.6 U	2.7	2.5	2.8	3.9	3.8	2.9	3.4	2.8	2.2
COPPER	2 U	1 U	0.955 U	0.91 U	2	2.2	1.3	4.2	3.3	1.8	1.7	1.6 U	2.1 U
IRON	18000	19000	17600	16200	19500	20100	20000	21700	24200	21800	29000	23900	34400
LEAD	6.8	7	7.8	8.6	12.8	9.6	10	19.5	11.9	8.2	11.7	12.5	10.5
MAGNESIUM	1680	1970	1865	1760	2090	1640	2030	1940	2060	1630	1690	1930	1430
MANGANESE	30.1	23.9	23.55	23.2	29.3	26.8	23.4	65.5	30.2	23.5	28	20.3	18.6
MERCURY	0.01 U	0.01 U	0.015 U	0.02 U	0.01 U	0.01 U	0.01 U	0.03	0.01	0.01 U	0.14	0.01 U	0.01 U
NICKEL	5.3	6.8	6.25	5.7	5.7	5.3	4.8	9.6	9.4	6.1	8.6	5.6	4.6
POTASSIUM	874	1080	1009	938	746	721	566	953	1010	689	668	586	639
SELENIUM	0.28 U	0.3 U	0.305 U	0.31 U	0.25 U	0.26 U	0.31 U	0.42 U	0.46 U	0.36 U	0.29 U	0.42 U	0.43 U
SILVER	0.09 U	0.1 U	0.1 U	0.1 U	0.09 U	0.1 U	0.1 U	0.08 U	0.13 U	0.11 U	0.1 U	0.09 U	0.1 U
SODIUM	64.2 U	245	165.5	172 U	211	501	157 U	74.58 U	93.5 U	115 U	57 U	116 U	88.9 U
THALLIUM	0.43 U	0.46 U	0.47 U	0.48 U	0.44	0.73 U	0.48 U	0.74 U	0.71 U	0.52 U	0.89 U	0.76 U	0.48 U
VANADIUM	28.3	28.6	27.25	25.9	35.2	34.3	31.6	52.3	56	35.4	46.7	43.7	53.5
ZINC	15.7	20.3	20.75	21.2	19.7 J	17.2	21.5	25.6	24.3	25	19.6 J	21.6	16.3
Miscellaneous Parameters (mg/kg)													
CYANIDE	1.2 U	1.2 U	1.25 U	1.3 U	1.5 U	1.4 U	1.3 U	1.4 U	1.2 U	1.2 U	1.5 U	1.3 U	1.3 U
TOTAL ORGANIC CARBON													
TOTAL SOLIDS													

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB11	17SB11	17SB11	17SB11	17SB11	17SB12	17SB12	17SB12	17SB13	17SB13	17SB13	17SB14	17SB14	17SB14
Sample Number	17-B-11-01	17-B-11-01-AVG	17-B-11-01-D	17-B-11-03	17-B-11-05	17-B-12-01	17-B-12-03	17-B-12-05	17-B-13-01	17-B-13-03	17-B-13-05	17-B-14-01	17-B-14-03	17-B-14-05
Depth Range (below ground surface)	1 - 3	1 - 3	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/07/01	06/07/01	06/07/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01
Volatile Organics (ug/kg)														
1,1,1,2-TETRACHLOROETHANE	7 U	6.5 U	6 U			140 U								
1,1,1-TRICHLOROETHANE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
1,1,2,2-TETRACHLOROETHANE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	210	58 J
1,1,2-TRICHLOROETHANE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	180	49 J
1,1,2-TRICHLOROTRIFLUOROETHANE				5 U	6 U		6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
1,1-DICHLOROETHANE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
1,1-DICHLOROETHENE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
1,2,3-TRICHLOROPROPANE	7 U	6.5 U	6 U			140 U								
1,2,4-TRICHLOROBENZENE				5 U	6 U		6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
1,2,4-TRIMETHYLBENZENE														
1,2-DIBROMO-3-CHLOROPROPANE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
1,2-DIBROMOETHANE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
1,2-DICHLOROBENZENE				5 U	6 U		6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
1,2-DICHLOROETHANE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
1,2-DICHLOROPROPANE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
1,3,5-TRIMETHYLBENZENE														
1,3-DICHLOROBENZENE				5 U	6 U		6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
1,4-DICHLOROBENZENE				5 U	6 U		6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
1,4-DIOXANE														
2-BUTANONE	14 U	13.5 U	13 U	5 U	6 U	280 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
2-HEXANONE	14 U	13.5 U	13 U	5 U	6 U	280 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
3-CHLOROPROPENE	14 U	13.5 U	13 U			280 U								
4-METHYL-2-PENTANONE	14 U	13.5 U	13 U	5 U	6 U	280 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
ACETONE	51 U	49.5 U	48 U	59 U	150	440 U	91 U	620	23 U	280	67	16000	720	520
ACETONITRILE	140 U	135 U	130 U			2800 U								
ACROLEIN	70 U	67.5 U	65 U			1400 U								
ACRYLONITRILE	14 U	13.5 U	13 U			280 U								
BENZENE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
BROMODICHLOROMETHANE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 J	93 J
BROMOFORM	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
BROMOMETHANE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
CARBON DISULFIDE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
CARBON TETRACHLORIDE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	5200	420
CHLOROBENZENE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
CHLORODIBROMOMETHANE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
CHLOROETHANE	2 J	2 J	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
CHLOROFORM	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	29	9100	1500
CHLOROMETHANE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	88 J	55 J
CHLOROPRENE	14 U	13.5 U	13 U			280 U								
CIS-1,2-DICHLOROETHENE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
CIS-1,3-DICHLOROPROPENE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
CYCLOHEXANE				5 U	6 U		6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
DIBROMOMETHANE	7 U	6.5 U	6 U			140 U								
DICHLORODIFLUOROMETHANE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
ETHYL METHACRYLATE	14 U	13.5 U	13 U			280 U								
ETHYLBENZENE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
ISOBUTANOL	280 U	270 U	260 U			5600 U								
ISOPROPYLBENZENE				5 U	6 U		6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
M+P-XYLENES														

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB11	17SB11	17SB11	17SB11	17SB11	17SB12	17SB12	17SB12	17SB13	17SB13	17SB13	17SB14	17SB14	17SB14
Sample Number	17-B-11-01	17-B-11-01-AVG	17-B-11-01-D	17-B-11-03	17-B-11-05	17-B-12-01	17-B-12-03	17-B-12-05	17-B-13-01	17-B-13-03	17-B-13-05	17-B-14-01	17-B-14-03	17-B-14-05
Depth Range (below ground surface)	1 - 3	1 - 3	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/07/01	06/07/01	06/07/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01
METHACRYLONITRILE	140 U	135 U	130 U			2800 U								
METHYL ACETATE				5 U	6 U		6 U	5 U	5 U	5 U	5 U	8 U	490	400
METHYL CYCLOHEXANE				5 U	6 U		6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
METHYL IODIDE	14 U	13.5 U	13 U			280 U								
METHYL METHACRYLATE	14 U	13.5 U	13 U			280 U								
METHYL TERT-BUTYL ETHER				5 U	6 U		6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
METHYLENE CHLORIDE	7 U	6.5 U	6 U	4 U	5 U	140 U	8 U	5 U	5 U	4 U	4 U	14 U	160 U	140 U
O-XYLENE														
PENTACHLOROETHANE	14 U	13.5 U	13 U			280 U								
PROPIONITRILE	140 U	135 U	130 U			2800 U								
STYRENE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
TETRACHLOROETHENE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	56 J	140 U
TOLUENE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
TOTAL 1,2-DICHLOROETHENE														
TOTAL XYLENES	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
TRANS-1,2-DICHLOROETHENE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
TRANS-1,3-DICHLOROPROPENE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 UR	5 UR	5 U	5 U	5 U	8 U	160 U	140 U
TRANS-1,4-DICHLORO-2-BUTENE	14 U	13.5 U	13 U			280 U								
TRICHLOROETHENE	2 J	1.5 J	1 J	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	450	170	180
TRICHLOROFLUOROMETHANE	7 U	6.5 U	6 U	5 U	6 U	140 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
VINYL ACETATE	7 U	6.5 U	6 U			140 U								
VINYL CHLORIDE	14 U	13.5 U	13 U	5 U	6 U	280 U	6 U	5 U	5 U	5 U	5 U	8 U	160 U	140 U
Semivolatile Organics (ug/kg)														
1,1-BIPHENYL				400 U	400 U		430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
1,2,4,5-TETRACHLOROBENZENE	460 U	445 U	430 U			400 U								
1,3,5-TRINITROBENZENE	460 U	445 U	430 U			400 U								
1,3-DINITROBENZENE	460 U	445 U	430 U			400 U								
1,4-NAPHTHOQUINONE	460 U	445 U	430 U			400 U								
1,4-PHENYLENEDIAMINE	460 UR	445 UR	430 UR			400 UR								
1-NAPHTHYLAMINE	460 U	445 U	430 U			400 U								
2,2'-OXYBIS(1-CHLOROPROPANE)	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
2,3,4,6-TETRACHLOROPHENOL	460 U	445 U	430 U			400 U								
2,4,5-TRICHLOROPHENOL	1100 U	1100 U	1100 U	1000 U	1000 U	980 U	1100 U	1000 U	1100 U	1100 U	1000 U	910 U	52000 U	1000 UR
2,4,6-TRICHLOROPHENOL	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 UR
2,4-DICHLOROPHENOL	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 UR
2,4-DIMETHYLPHENOL	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 UR
2,4-DINITROPHENOL	1100 U	1100 U	1100 U	1000 U	1000 U	980 U	1100 U	1000 U	1100 U	1100 U	1000 U	910 U	52000 U	1000 UR
2,4-DINITROTOLUENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
2,6-DICHLOROPHENOL	460 U	445 U	430 U			400 U								
2,6-DINITROTOLUENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
2-ACETYLAMINOFLUORENE	460 U	445 U	430 U			400 U								
2-CHLORONAPHTHALENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
2-CHLOROPHENOL	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 UR
2-METHYLNAPHTHALENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
2-METHYLPHENOL	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 UR
2-NAPHTHYLAMINE	460 U	445 U	430 U			400 U								
2-NITROANILINE	1100 U	1100 U	1100 U	1000 U	1000 U	980 U	1100 U	1000 U	1100 U	1100 U	1000 U	910 U	52000 U	1000 U
2-NITROPHENOL	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 UR
2-PICOLINE	460 U	445 U	430 U			400 U								
3&4-METHYLPHENOL	460 U	445 U	430 U			400 U								

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB11	17SB11	17SB11	17SB11	17SB11	17SB12	17SB12	17SB12	17SB13	17SB13	17SB13	17SB14	17SB14	17SB14
Sample Number	17-B-11-01	17-B-11-01-AVG	17-B-11-01-D	17-B-11-03	17-B-11-05	17-B-12-01	17-B-12-03	17-B-12-05	17-B-13-01	17-B-13-03	17-B-13-05	17-B-14-01	17-B-14-03	17-B-14-05
Depth Range (below ground surface)	1 - 3	1 - 3	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/07/01	06/07/01	06/07/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01
3,3'-DICHLOROBENZIDINE	460 U	445 U	430 U	400 UR	400 UR	400 U	430 UR	400 UR	430 UR	430 UR	400 UR	360 UR	21000 UR	400 UR
3,3'-DIMETHYLBENZIDINE	920 U	890 U	860 U			790 U								
3-METHYLCHOLANTHRENE	460 U	445 U	430 U			400 U								
3-NITROANILINE	1100 U	1100 U	1100 U	1000 U	1000 U	980 U	1100 U	1000 U	1100 U	1100 U	1000 U	910 U	52000 U	1000 U
4,6-DINITRO-2-METHYLPHENOL	1100 U	1100 U	1100 U	1000 U	1000 U	980 U	1100 U	1000 U	1100 U	1100 U	1000 U	910 U	52000 U	1000 UR
4-AMINOBIPHENYL	460 U	445 U	430 U			400 U								
4-BROMOPHENYL PHENYL ETHER	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
4-CHLORO-3-METHYLPHENOL	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 UR
4-CHLOROANILINE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
4-CHLOROPHENYL PHENYL ETHER	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
4-METHYLPHENOL				400 U	400 U		430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 UR
4-NITROANILINE	1100 U	1100 U	1100 U	1000 U	1000 UR	980 U	1100 UJ	1000 UJ	1100 U	1100 U	1000 U	910 U	52000 U	1000 U
4-NITROPHENOL	1100 U	1100 U	1100 U	1000 U	1000 U	980 U	1100 U	1000 U	1100 U	1100 U	1000 U	910 U	52000 U	1000 UR
4-NITROQUINOLINE-1-OXIDE	920 UR	890 UR	860 UR			790 UR								
5-NITRO-O-TOLUIDINE	920 U	890 U	860 U			790 U								
7,12-DIMETHYLBENZ(A)ANTHRACENE	460 U	445 U	430 U			400 U								
A,A-DIMETHYLPHENETHYLAMINE	460 U	445 U	430 U			400 U								
ACENAPHTHENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
ACENAPHTHYLENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
ACETOPHENONE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
ANILINE	460 U	445 U	430 U			400 U								
ANTHRACENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
ARAMITE	920 U	890 U	860 U			790 U								
ATRAZINE				400 U	400 U		430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
BENZALDEHYDE				400 U	400 U		430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
BENZO(A)ANTHRACENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
BENZO(A)PYRENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 UR
BENZO(B)FLUORANTHENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	29 J	430 U	430 U	400 U	360 U	21000 U	400 UR
BENZO(G,H,I)PERYLENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 UR
BENZO(K)FLUORANTHENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 UR
BENZYL ALCOHOL	920 U	890 U	860 U			790 U								
BIS(2-CHLOROETHOXY)METHANE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
BIS(2-CHLOROETHYL)ETHER	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
BIS(2-CHLOROISOPROPYL)ETHER														
BIS(2-ETHYLHEXYL)PHTHALATE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
BUTYL BENZYL PHTHALATE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
CAPROLACTAM				400 U	400 U		430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
CARBAZOLE				400 U	400 U		430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
CHLOROBENZILATE	920 U	890 U	860 U			790 U								
CHRYSENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
DI-N-BUTYL PHTHALATE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
DI-N-OCTYL PHTHALATE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	370	21000 U	400 UR
DIALLATE	920 U	890 U	860 U			790 U								
DIBENZO(A,H)ANTHRACENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 UR
DIBENZOFURAN	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
DIETHYL PHTHALATE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
DIMETHOATE	460 U	445 U	430 U			400 U								
DIMETHYL PHTHALATE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
DINOSEB														
ETHYL METHANE SULFONATE	460 U	445 U	430 U			400 U								

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB11	17SB11	17SB11	17SB11	17SB11	17SB12	17SB12	17SB12	17SB13	17SB13	17SB13	17SB14	17SB14	17SB14
Sample Number	17-B-11-01	17-B-11-01-AVG	17-B-11-01-D	17-B-11-03	17-B-11-05	17-B-12-01	17-B-12-03	17-B-12-05	17-B-13-01	17-B-13-03	17-B-13-05	17-B-14-01	17-B-14-03	17-B-14-05
Depth Range (below ground surface)	1 - 3	1 - 3	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/07/01	06/07/01	06/07/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01
ETHYL PARATHION														
FLUORANTHENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
FLUORENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
HEXACHLOROBENZENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
HEXACHLOROBUTADIENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
HEXACHLOROCYCLOPENTADIENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
HEXACHLOROETHANE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
HEXACHLOROPHENE	460 UR	445 UR	430 UR			400 UR								
HEXACHLOROPROPENE	460 U	445 U	430 U			400 U								
INDENO(1,2,3-CD)PYRENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 UR
ISODRIN	920 U	890 U	860 U			790 U								
ISOPHORONE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
ISOSAFROLE	920 U	890 U	860 U			790 U								
KEPONE														
METHAPYRILENE	460 U	445 U	430 U			400 U								
METHYL METHANE SULFONATE	920 U	890 U	860 U			790 U								
N-NITROSO-DI-N-BUTYLAMINE	460 U	445 U	430 U			400 U								
N-NITROSO-DI-N-PROPYLAMINE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
N-NITROSODIETHYLAMINE	920 U	890 U	860 U			790 U								
N-NITROSODIMETHYLAMINE	920 U	890 U	860 U			790 U								
N-NITROSODIPHENYLAMINE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
N-NITROSOMETHYLETHYLAMINE	460 U	445 U	430 U			400 U								
N-NITROSOMORPHOLINE	460 U	445 U	430 U			400 U								
N-NITROSOPIPERIDINE	460 U	445 U	430 U			400 U								
N-NITROSOPYRROLIDINE	460 U	445 U	430 U			400 U								
NAPHTHALENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
NITROBENZENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE	920 U	890 U	860 U			790 U								
O-TOLUIDINE	460 U	445 U	430 U			400 U								
P-(DIMETHYLAMINO)AZOBENZENE	920 U	890 U	860 U			790 U								
PENTACHLOROBENZENE	460 U	445 U	430 U			400 U								
PENTACHLORONITROBENZENE	460 U	445 U	430 U			400 U								
PENTACHLOROPHENOL	1100 U	1100 U	1100 U	1000 U	1000 U	980 U	1100 U	1000 U	1100 U	1100 U	1000 U	910 U	52000 U	1000 UR
PHENACETIN	460 U	445 U	430 U			400 U								
PHENANTHRENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 U
PHENOL	460 U	445 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U	430 U	400 U	360 U	21000 U	400 UR
PRONAMIDE	460 U	445 U	430 U			400 U								
PYRENE	460 U	445 U	430 U	400 U	400 U	400 U	430 U	33 J	430 U	430 U	400 U	360 U	21000 U	400 U
PYRIDINE	2200 U	2150 U	2100 U			1900 U								
SAFROLE	460 U	445 U	430 U			400 U								
SULFOTEPP	460 U	445 U	430 U			400 U								
THIONAZIN	920 U	890 U	860 U			790 U								
Pesiticides/PCBs (ug/kg)														
4,4'-DDD	2.4 U	2.2 U	2 U	4 U	3.8 U	2 U	4.3 U	3.9 U	4.2 U	4.2 U	4 U	3.8 U	410 U	390 U
4,4'-DDE	0.19 R	2 U	2 U	4 U	3.8 U	2 U	4.3 U	3.9 U	4.2 U	4.2 U	4 U	3.8 U	410 U	390 U
4,4'-DDT	0.45 J	0.31 J	0.17 J	4 U	3.8 U	0.18 J	4.3 U	3.9 U	4.2 U	4.2 U	4 U	3.8 U	410 U	390 U
ALDRIN	2.4 U	2.2 U	2 U	2 U	2 U	2 U	2.2 U	2 U	2.2 U	2.2 U	2 U	1.9 U	210 U	200 U
ALPHA-BHC	2.4 U	2.2 U	2 U	2 U	2 U	2 U	2.2 U	2 U	2.2 U	2.2 U	2 U	1.9 U	210 U	200 U
ALPHA-CHLORDANE	2.4 U	2.2 U	2 U	2 U	2 U	2 U	2.2 U	2 U	2.2 U	2.2 U	2 U	1.9 U	210 U	200 U
AROCLOR-1016	24 U	23.5 U	23 U	20 U	20 U	20 U	22 U	20 U	22 U	22 U	20 U	19 U	21 U	20 U

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB11	17SB11	17SB11	17SB11	17SB11	17SB12	17SB12	17SB12	17SB13	17SB13	17SB13	17SB14	17SB14	17SB14
Sample Number	17-B-11-01	17-B-11-01-AVG	17-B-11-01-D	17-B-11-03	17-B-11-05	17-B-12-01	17-B-12-03	17-B-12-05	17-B-13-01	17-B-13-03	17-B-13-05	17-B-14-01	17-B-14-03	17-B-14-05
Depth Range (below ground surface)	1 - 3	1 - 3	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/07/01	06/07/01	06/07/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01
AROCLOR-1221	24 U	23.5 U	23 U	20 U	20 U	20 U	22 U	20 U	22 U	22 U	20 U	19 U	21 U	20 U
AROCLOR-1232	24 U	23.5 U	23 U	20 U	20 U	20 U	22 U	20 U	22 U	22 U	20 U	19 U	21 U	20 U
AROCLOR-1242	24 U	23.5 U	23 U	20 U	20 U	20 U	22 U	20 U	22 U	22 U	20 U	19 U	21 U	20 U
AROCLOR-1248	24 U	23.5 U	23 U	20 U	20 U	20 U	22 U	20 U	22 U	22 U	20 U	19 U	21 U	20 U
AROCLOR-1254	24 U	23.5 U	23 U	20 U	20 U	20 U	22 U	20 U	22 U	22 U	20 U	19 U	21 U	20 U
AROCLOR-1260	24 U	23.5 U	23 U	20 U	20 U	20 U	22 U	20 U	22 U	22 U	20 U	19 U	21 U	20 U
BETA-BHC	2.4 U	2.2 U	2 U	2 U	2 U	2 U	2.2 U	2 U	2.2 U	2.2 U	2 U	1.9 U	210 U	200 U
CHLORDANE														
CHLORDANE (TECHNICAL)	24 U	22 U	20 U			20 U								
DELTA-BHC	2.4 U	2.2 U	2 U	2 U	2 U	2 U	2.2 U	2 U	2.2 U	2.2 U	2 U	1.9 U	73 J	200 U
DIELDRIN	0.21 J	0.175 J	0.14 J	4 U	3.8 U	2 U	4.3 U	3.9 U	4.2 U	4.2 U	4 U	3.8 U	410 U	390 U
ENDOSULFAN I	2.4 U	2.2 U	2 U	2 U	2 U	2 U	2.2 U	2 U	2.2 U	2.2 U	2 U	1.9 U	210 U	200 U
ENDOSULFAN II	2.4 U	2.2 U	2 U	4 U	3.8 U	0.12 R	4.3 U	3.9 U	4.2 U	4.2 U	4 U	3.8 U	410 U	390 U
ENDOSULFAN SULFATE	2.4 U	2.2 U	2 U	4 U	3.8 U	2 U	4.3 U	3.9 U	4.2 U	4.2 U	4 U	3.8 U	410 U	390 U
ENDRIN	2.4 U	2.2 U	2 U	4 U	3.8 U	2 U	4.3 U	3.9 U	4.2 U	4.2 U	4 U	3.8 U	410 U	390 U
ENDRIN ALDEHYDE	2.4 U	2.2 U	2 U	4 U	3.8 U	2 U	4.3 U	3.9 U	4.2 U	4.2 U	4 U	3.8 U	410 U	390 U
ENDRIN KETONE	2.4 U	2.2 U	2 U	4 U	3.8 U	2 U	4.3 U	3.9 U	4.2 U	4.2 U	4 U	3.8 U	410 U	390 U
GAMMA-BHC (LINDANE)	2.4 U	2.2 U	2 U	2 U	2 U	2 U	2.2 U	2 U	2.2 U	2.2 U	2 U	1.9 U	210 U	200 U
GAMMA-CHLORDANE	2.4 U	2.2 U	2 U	2 U	2 U	2 U	2.2 U	2 U	2.2 U	2.2 U	2 U	1.9 U	67 J	200 U
HEPTACHLOR	2.4 U	2.2 U	2 U	2 U	2 U	2 U	2.2 U	2 U	2.2 U	2.2 U	2 U	1.9 U	210 U	200 U
HEPTACHLOR EPOXIDE	2.4 U	2.2 U	2 U	2 U	2 U	2 U	2.2 U	2 U	2.2 U	2.2 U	2 U	1.9 U	210 U	200 U
KEPONE	46 U	42.5 U	39 U			38 U								
METHOXYCHLOR	4.6 U	4.25 U	3.9 U	20 U	20 U	3.8 U	22 U	20 U	22 U	22 U	20 U	19 U	2100 U	2000 U
TOXAPHENE	94 U	87 U	80 U	40 U	38 U	77 U	43 U	39 U	42 U	42 U	40 U	38 U	4100 U	3900 U
OrganoPhos Pesticides (ug/kg)														
DIMETHOATE														
DISULFOTON	46 U	42.5 U	39 U			38 U								
ETHYL PARATHION	46 U	42.5 U	39 U			38 U								
FAMPHUR	46 U	42.5 U	39 U			38 U								
METHYL PARATHION	46 U	42.5 U	39 U			38 U								
O,O,O-TRIETHYL PHOSPHOROTHIOATE														
PHORATE	46 U	42.5 U	39 U			38 U								
SULFOTEPP														
THIONAZIN														
Herbicides (ug/kg)														
2,4,5-T	28 U	26 U	24 U			23 U								
2,4,5-TP (SILVEX)	28 U	26 U	24 U			23 U								
2,4-D	110 U	103 U	96 U			92 U								
DINOSEB	17 U	15.5 U	14 U			14 U								
Explosives (ug/kg)														
1,3,5-TRINITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
1,3-DINITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4,6-TRINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2-AMINO-4,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	1300 U	250 U
3-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-AMINO-2,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB11	17SB11	17SB11	17SB11	17SB11	17SB12	17SB12	17SB12	17SB13	17SB13	17SB13	17SB14	17SB14	17SB14
Sample Number	17-B-11-01	17-B-11-01-AVG	17-B-11-01-D	17-B-11-03	17-B-11-05	17-B-12-01	17-B-12-03	17-B-12-05	17-B-13-01	17-B-13-03	17-B-13-05	17-B-14-01	17-B-14-03	17-B-14-05
Depth Range (below ground surface)	1 - 3	1 - 3	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7
Sample Date	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/07/01	06/07/01	06/07/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01
HMX	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
NITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
RDX	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
TETRYL	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U
Inorganics (mg/kg)														
ALUMINUM	24000	21050	18100	28800	14700	21400	17500	18800	27200	31300	15200	30700	11400	25800
ANTIMONY	0.46 U	0.38 U	0.3 U	0.42 U	0.32 U	0.37 U	0.35 U	0.36 U	0.31 U	0.3 U	0.37 U	0.68 U	0.32 U	0.34 U
ARSENIC	7.8	6.35	4.9	8.4	2	4.9	4.8	3.9	4.4	5.1	2.5	6.6	8.6	5.9
BARIUM	36.4	35.7	35	43.6	31	36.4	37.5	28.2	46	160	62.7	35.6	17.4	44.5
BERYLLIUM	0.49 U	0.46	0.46	0.59	0.36 U	0.44	0.4 U	0.37 U	0.89	1.1	0.86	0.5	0.49	0.55
CADMIUM	0.16 U	0.105 U	0.05 U	0.24 U	0.11 U	0.11 U	0.04 U	0.02 U	0.12 U	0.08 U	0.04 U	0.04 U	0.31 U	0.4 U
CALCIUM	1380	1210	1040	1200	718	1460	1600	1480	384	674	746	444	243	828
CHROMIUM	35.3	30.45	25.6	48.2	22.5	37	31.4	33.2	30	41.2	24.3	49.3	21.8	37.4
COBALT	2.6	2.5	2.4	3.4	2.2	3.1	2.3	2.4	3.9	5.1	2.9	2.8	1.5	3
COPPER	8.2	5.95	3.7	8.8	3.6	11	6.1	0.92 U	1.7 U	3	1.8 U	2.9	1.1 U	1 U
IRON	21800	19950	18100	28200	13300	27100	17800	23500	20300	24000	14500	33300	19800	22500
LEAD	13.9	11.3	8.7	15.5	7.2	13.4	14.2	8.8	8.9	20.7	6.7	10.8	6.8	8.4
MAGNESIUM	1510	1405	1300	2120	1260	1990	1900	1930	1200	2140	1220	1960	1000	2050
MANGANESE	27.8	24.75	21.7	38.2	20.8	33.6	28	27.4	25.2	27.9	17.6	29.2	15.8	24.2
MERCURY	0.03 U	0.025 U	0.02 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.04 U	0.02 U	0.01 U	0.02 U	0.01 U	0.01 U
NICKEL	9.2	8.15	7.1	9.3	4.7	7.6	5.5	5.6	6.5	9.5	4.6	8	2.8	5.8
POTASSIUM	865	780.5	696	1140	562	865	759	534	504	722	444	795	370	598
SELENIUM	0.38 U	0.315 U	0.25 U	0.35 U	0.27 U	0.3 U	0.29 U	0.3 U	0.26 U	0.25 U	0.31 U	0.68 U	0.43 U	0.97 U
SILVER	0.13 U	0.105 U	0.08 U	0.12 U	0.09 U	0.1 U	0.1 U	0.1 U	0.09 U	0.08 U	0.1 U	0.13 U	0.09 U	0.1 U
SODIUM	103 U	86.9 U	70.8 U	111 U	96.4 U	45.9 U	62 U	88.5 U	67.6 U	212	122 U	81.9 U	239	234
THALLIUM	0.59 U	0.6475	1	1.7 U	0.42 U	0.49	0.45 U	0.47 U	0.4 U	0.7 U	0.57 U	0.88 U	0.42 U	0.44 U
VANADIUM	43.5	37.05	30.6	53.8	21.4	43.1	40.7	36.2	40	43.6	23.2	53.3	32	39.6
ZINC	30.5 U	18.2 J	18.2 J	30.5	15	25.4 J	20.3	19.7	17.2	25.3	15.5	26.4	1240	913
Miscellaneous Parameters (mg/kg)														
CYANIDE	1.4 U	1.35 U	1.3 U	1.2 U	1.2 U	1.2 U	1.3 U	1.2 U	1.3 U	1.3 U	1.2 U	1.1 U	1.2 U	1.2 U
TOTAL ORGANIC CARBON														
TOTAL SOLIDS														

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB15	17SB15	17SB15	17SB16	17SB16	17SB16	17SB17	17SB17	17SB17	17SB18	17SB18	17SB18	17SB19	17SB19
Sample Number	17-B-15-01	17-B-15-03	17-B-15-05	17-B-16-01	17-B-16-03	17-B-16-05	17-B-17-01	17-B-17-03	17-B-17-05	17-B-18-01	17-B-18-03	17-B-18-05	17-B-19-01	17-B-19-03
Depth Range (below ground surface)	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5
Sample Date	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01
Volatile Organics (ug/kg)														
1,1,1,2-TETRACHLOROETHANE						6 U	6 U							
1,1,1-TRICHLOROETHANE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	2 J	5 U	6 U	6 U	2 J	5 U	5 U
1,1,2-TRICHLOROETHANE	5 U	5 U	150 U	5 U	100 U	6 U	2 J	42	270 J	6 U	2 J	7	5 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	5 U	5 U	150 U	5 U	100 U			6 U	5 U	6 U	6 U	6 U	5 U	5 U
1,1-DICHLOROETHANE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
1,1-DICHLOROETHENE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
1,2,3-TRICHLOROPROPANE						6 U	6 U							
1,2,4-TRICHLOROBENZENE	5 U	5 U	150 U	5 U	100 U			6 U	2 J	6 U	6 U	6 U	5 U	5 U
1,2,4-TRIMETHYLBENZENE														
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	150 U	5 U	100 U			6 U	2 J	6 U	6 U	6 U	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	4 J	6 U	6 U	6 U	5 U	5 U
1,3,5-TRIMETHYLBENZENE														
1,3-DICHLOROBENZENE	5 U	5 U	150 U	5 U	100 U			6 U	3 J	6 U	6 U	6 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	150 U	5 U	100 U			6 U	2 J	6 U	6 U	6 U	5 U	5 U
1,4-DIOXANE														
2-BUTANONE	5 U	5 U	150 U	5 U	100 U	11 U	12 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
2-HEXANONE	5 U	5 U	150 U	5 U	100 U	11 U	12 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
3-CHLOROPROPENE						11 U	12 U							
4-METHYL-2-PENTANONE	5 U	5 U	150 U	5 U	100 U	11 U	12 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
ACETONE	12 U	25 U	3100	40 U	1200	1300 U	21 U	47 U	540	110	240	770	48 U	6 U
ACETONITRILE						110 U	120 U							
ACROLEIN						55 U	60 U							
ACRYLONITRILE						11 U	12 U							
BENZENE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	2 J	6 U	6 U	2 J	5 U	5 U
BROMODICHLOROMETHANE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
BROMOFORM	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
BROMOMETHANE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	2 J	6 U	6 U	6 U	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
CHLOROBENZENE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
CHLORODIBROMOMETHANE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
CHLOROETHANE	5 U	5 U	150 U	5 U	100 U	2 J	6 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
CHLOROFORM	5 U	5 U	18 J	5 U	100 U	6 U	6 U	2 J	5 U	6 U	5 J	28	5 U	5 U
CHLOROMETHANE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
CHLOROPRENE						11 U	12 U							
CIS-1,2-DICHLOROETHENE	5 U	5 U	150 U	5 U	100 U	6 U	300	1300	300	9	84	200	5 U	5 U
CIS-1,3-DICHLOROPROPENE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
CYCLOHEXANE	5 U	5 U	150 U	5 U	100 U			6 U	5 U	6 U	6 U	6 U	5 U	5 U
DIBROMOMETHANE						6 U	6 U							
DICHLORODIFLUOROMETHANE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	5 U	6 U	6 U	2 J	5 U	5 U
ETHYL METHACRYLATE						11 U	12 U							
ETHYLBENZENE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
ISOBUTANOL						220 U	240 U							
ISOPROPYLBENZENE	5 U	5 U	150 U	5 U	100 U			6 U	5 U	6 U	6 U	6 U	5 U	5 U
M+P-XYLENES														

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB15	17SB15	17SB15	17SB16	17SB16	17SB16	17SB17	17SB17	17SB17	17SB18	17SB18	17SB18	17SB19	17SB19
Sample Number	17-B-15-01	17-B-15-03	17-B-15-05	17-B-16-01	17-B-16-03	17-B-16-05	17-B-17-01	17-B-17-03	17-B-17-05	17-B-18-01	17-B-18-03	17-B-18-05	17-B-19-01	17-B-19-03
Depth Range (below ground surface)	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5
Sample Date	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01
METHACRYLONITRILE						110 U	120 U							
METHYL ACETATE	5 U	12	410	5 U	100 U			6 U	5 U	6 U	6 U	6 U	5 U	5 U
METHYL CYCLOHEXANE	5 U	5 U	150 U	5 U	100 U			6 U	5 U	6 U	6 U	6 U	5 U	5 U
METHYL IODIDE						11 U	12 U							
METHYL METHACRYLATE						11 U	12 U							
METHYL TERT-BUTYL ETHER	5 U	5 U	150 U	5 U	100 U			6 U	5 U	6 U	6 U	6 U	5 U	5 U
METHYLENE CHLORIDE	7 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	7 U	6 U	6 U	7 U	5 U	5 U
O-XYLENE														
PENTACHLOROETHANE						11 U	12 U							
PROPIONITRILE						110 U	120 U							
STYRENE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
TETRACHLOROETHENE	5 U	5 U	150 U	5 U	100 U	3 J	6 U	2 J	11	6 U	6 U	6 U	5 U	5 U
TOLUENE	5 U	5 U	150 U	5 U	100 U	6 U	0.7 J	6 U	3 J	6 U	6 U	6 U	5 U	5 U
TOTAL 1,2-DICHLOROETHENE														
TOTAL XYLENES	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
TRANS-1,2-DICHLOROETHENE	5 U	5 U	150 U	5 U	100 U	6 U	2 J	2 J	5 U	6 U	6 U	6 U	5 U	5 U
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
TRANS-1,4-DICHLORO-2-BUTENE						11 U	12 U							
TRICHLOROETHENE	5 U	5 U	150 U	5 U	100 U	10	32000	910000	170000	33	1000	3300	5 U	5 U
TRICHLOROFLUOROMETHANE	5 U	5 U	150 U	5 U	100 U	6 U	6 U	6 U	5 U	6 U	6 U	6 U	5 U	5 U
VINYL ACETATE						6 U	6 U							
VINYL CHLORIDE	5 U	5 U	150 U	5 U	100 U	11 U	12 U	5 J	5 U	6 U	6 U	6 U	5 U	5 U
Semivolatile Organics (ug/kg)														
1,1-BIPHENYL	400 U	400 U	430 U	360 U	460 U			430 U	400 U	400 U	400 U	430 U	400 U	430 U
1,2,4,5-TETRACHLOROBENZENE						400 U	400 U							
1,3,5-TRINITROBENZENE						400 U	400 U							
1,3-DINITROBENZENE						400 U	400 U							
1,4-NAPHTHOQUINONE						400 U	400 U							
1,4-PHENYLENEDIAMINE						400 UR	400 UR							
1-NAPHTHYLAMINE						400 U	400 U							
2,2'-OXYBIS(1-CHLOROPROPANE)	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
2,3,4,6-TETRACHLOROPHENOL						400 U	400 U							
2,4,5-TRICHLOROPHENOL	1000 U	1000 U	1100 U	910 U	1200 U	980 U	980 U	1100 U	1000 U	1000 U	1000 U	1100 U	1000 U	1100 U
2,4,6-TRICHLOROPHENOL	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
2,4-DICHLOROPHENOL	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
2,4-DIMETHYLPHENOL	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
2,4-DINITROPHENOL	1000 U	1000 U	1100 U	910 U	1200 U	980 U	980 U	1100 U	1000 U	1000 U	1000 U	1100 U	1000 U	1100 U
2,4-DINITROTOLUENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
2,6-DICHLOROPHENOL						400 U	400 U							
2,6-DINITROTOLUENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
2-ACETYLAMINOFLUORENE						400 U	400 U							
2-CHLORONAPHTHALENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
2-CHLOROPHENOL	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
2-METHYLNAPHTHALENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	53 J	400 U	400 U	430 U	400 U	430 U
2-METHYLPHENOL	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
2-NAPHTHYLAMINE						400 U	400 U							
2-NITROANILINE	1000 U	1000 U	1100 U	910 U	1200 U	980 U	980 U	1100 U	1000 U	1000 U	1000 U	1100 U	1000 U	1100 U
2-NITROPHENOL	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
2-PICOLINE						400 U	400 U							
3&4-METHYLPHENOL						400 U	400 U							

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB15	17SB15	17SB15	17SB16	17SB16	17SB16	17SB17	17SB17	17SB17	17SB18	17SB18	17SB18	17SB19	17SB19
Sample Number	17-B-15-01	17-B-15-03	17-B-15-05	17-B-16-01	17-B-16-03	17-B-16-05	17-B-17-01	17-B-17-03	17-B-17-05	17-B-18-01	17-B-18-03	17-B-18-05	17-B-19-01	17-B-19-03
Depth Range (below ground surface)	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5
Sample Date	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01
3,3'-DICHLOROBENZIDINE	400 UR	400 UR	430 UR	360 UR	460 UR	400 U	400 U	430 UR	400 UR	400 UR	400 UR	430 UR	400 UR	430 UR
3,3'-DIMETHYLBENZIDINE						790 U	790 U							
3-METHYLCHOLANTHRENE						400 U	400 U							
3-NITROANILINE	1000 U	1000 U	1100 U	910 U	1200 U	980 U	980 U	1100 U	1000 U	1000 U	1000 U	1100 U	1000 U	1100 U
4,6-DINITRO-2-METHYLPHENOL	1000 U	1000 U	1100 U	910 U	1200 U	980 U	980 U	1100 U	1000 U	1000 U	1000 U	1100 U	1000 U	1100 U
4-AMINOBIPHENYL						400 U	400 U							
4-BROMOPHENYL PHENYL ETHER	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
4-CHLORO-3-METHYLPHENOL	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
4-CHLOROANILINE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
4-CHLOROPHENYL PHENYL ETHER	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
4-METHYLPHENOL	400 U	400 U	430 U	360 U	460 U			430 U	400 U	400 U	400 U	430 U	400 U	430 U
4-NITROANILINE	1000 U	1000 U	1100 U	910 U	1200 U	980 U	980 U	1100 U	1000 U	1000 U	1000 U	1100 U	1000 U	1100 U
4-NITROPHENOL	1000 U	1000 U	1100 U	910 U	1200 U	980 U	980 U	1100 U	1000 U	1000 U	1000 U	1100 U	1000 U	1100 U
4-NITROQUINOLINE-1-OXIDE						790 UR	790 UR							
5-NITRO-O-TOLUIDINE						790 U	790 U							
7,12-DIMETHYLBENZ(A)ANTHRACENE						400 U	400 U							
A,A-DIMETHYLPHENETHYLAMINE						400 U	400 U							
ACENAPHTHENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
ACENAPHTHYLENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
ACETOPHENONE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
ANILINE						400 U	400 U							
ANTHRACENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
ARAMITE						790 U	790 U							
ATRAZINE	400 U	400 U	430 U	360 U	460 U			430 U	400 U	400 U	400 U	430 U	400 U	430 U
BENZALDEHYDE	400 U	400 U	430 U	360 U	470			430 U	400 U	400 U	400 U	430 U	400 U	430 U
BENZO(A)ANTHRACENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	24 J	400 U	400 U	400 U	430 U	400 U	430 U
BENZO(A)PYRENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
BENZO(B)FLUORANTHENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
BENZO(G,H,I)PERYLENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
BENZO(K)FLUORANTHENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
BENZYL ALCOHOL						790 U	790 U							
BIS(2-CHLOROETHOXY)METHANE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
BIS(2-CHLOROETHYL)ETHER	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
BIS(2-CHLOROISOPROPYL)ETHER														
BIS(2-ETHYLHEXYL)PHTHALATE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	540 U	400 U	400 U	430 U	400 U	430 U
BUTYL BENZYL PHTHALATE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	24 J	33 J	400 U	400 U	430 U	400 U	430 U
CAPROLACTAM	400 U	400 U	430 U	360 U	460 U			430 U	400 U	400 U	400 U	430 U	400 U	430 U
CARBAZOLE	400 U	400 U	430 U	360 U	460 U			430 U	400 U	400 U	400 U	430 U	400 U	430 U
CHLOROBENZILATE						790 U	790 U							
CHRYSENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
DI-N-BUTYL PHTHALATE	400 U	400 U	430 U	360 U	460 U	80 J	40 J	430 U	140 J	400 U	400 U	430 U	400 U	430 U
DI-N-OCTYL PHTHALATE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
DIALLATE						790 U	790 U							
DIBENZO(A,H)ANTHRACENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
DIBENZOFURAN	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
DIETHYL PHTHALATE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
DIMETHOATE						400 U	400 U							
DIMETHYL PHTHALATE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
DINOSEB														
ETHYL METHANE SULFONATE						400 U	400 U							

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB15	17SB15	17SB15	17SB16	17SB16	17SB16	17SB17	17SB17	17SB17	17SB18	17SB18	17SB18	17SB19	17SB19
Sample Number	17-B-15-01	17-B-15-03	17-B-15-05	17-B-16-01	17-B-16-03	17-B-16-05	17-B-17-01	17-B-17-03	17-B-17-05	17-B-18-01	17-B-18-03	17-B-18-05	17-B-19-01	17-B-19-03
Depth Range (below ground surface)	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5
Sample Date	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01
ETHYL PARATHION														
FLUORANTHENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	35 J	400 U	400 U	400 U	430 U	400 U	430 U
FLUORENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
HEXACHLOROBENZENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
HEXACHLOROBUTADIENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
HEXACHLOROCYCLOPENTADIENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
HEXACHLOROETHANE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
HEXACHLOROPHENE						400 UR	400 UR							
HEXACHLOROPROPENE						400 U	400 U							
INDENO(1,2,3-CD)PYRENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
ISODRIN						790 U	790 U							
ISOPHORONE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
ISOSAFROLE						790 U	790 U							
KEPONE														
METHAPYRILENE						400 U	400 U							
METHYL METHANE SULFONATE						790 U	790 U							
N-NITROSO-DI-N-BUTYLAMINE						400 U	400 U							
N-NITROSO-DI-N-PROPYLAMINE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
N-NITROSODIETHYLAMINE						790 U	790 U							
N-NITROSODIMETHYLAMINE						790 U	790 U							
N-NITROSODIPHENYLAMINE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
N-NITROSOMETHYLETHYLAMINE						400 U	400 U							
N-NITROSOMORPHOLINE						400 U	400 U							
N-NITROSOPIPERIDINE						400 U	400 U							
N-NITROSOPYRROLIDINE						400 U	400 U							
NAPHTHALENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	73 J	400 U	400 U	430 U	400 U	430 U
NITROBENZENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE						790 U	790 U							
O-TOLUIDINE						400 U	400 U							
P-(DIMETHYLAMINO)AZOBENZENE						790 U	790 U							
PENTACHLOROBENZENE						400 U	400 U							
PENTACHLORONITROBENZENE						400 U	400 U							
PENTACHLOROPHENOL	1000 U	1000 U	1100 U	910 U	1200 U	980 U	980 U	1100 U	380 J	1000 U	1000 U	1100 U	1000 U	1100 U
PHENACETIN						400 U	400 U							
PHENANTHRENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	25 J	400 U	400 U	430 U	400 U	430 U
PHENOL	400 U	400 U	430 U	360 U	460 U	400 U	400 U	430 U	400 U	400 U	400 U	430 U	400 U	430 U
PRONAMIDE						400 U	400 U							
PYRENE	400 U	400 U	430 U	360 U	460 U	400 U	400 U	42 J	400 U	400 U	400 U	430 U	400 U	430 U
PYRIDINE						1900 U	1900 U							
SAFROLE						400 U	400 U							
SULFOTEPP						400 U	400 U							
THIONAZIN						790 U	790 U							
Pesticides/PCBs (ug/kg)														
4,4'-DDD	4.1 U	4 U	4.3 U	3.6 U	4.6 U	2.1 U	2 U	4.3 U	4.1 U	3.9 U	4.1 U	4.2 U	3.9 U	4.4 U
4,4'-DDE	4.1 U	4 U	4.3 U	3.6 U	4.6 U	2.1 U	2 U	4.3 U	4.1 U	3.9 U	4.1 U	4.2 U	3.9 U	4.4 U
4,4'-DDT	4.1 U	4 U	4.3 U	3.6 U	4.6 U	2.1 U	0.31 J	1.4 J	2.9 J	3.9 U	4.1 U	4.2 U	3.9 U	4.4 U
ALDRIN	2.1 U	2 U	2.2 U	1.8 U	2.4 U	2.1 U	2 U	2.2 U	2.1 U	0.75 J	2.1 U	2.2 U	2 U	2.2 U
ALPHA-BHC	2.1 U	2 U	2.2 U	1.8 U	2.4 U	2.1 U	2 U	2.2 U	2.1 U	2 U	2.1 U	2.2 U	2 U	2.2 U
ALPHA-CHLORDANE	2.1 U	2 U	2.2 U	1.8 U	2.4 U	2.1 U	2 U	2.2 U	2.1 U	2 U	2.1 U	2.2 U	2 U	2.2 U
AROCLOR-1016	21 U	20 U	22 U	18 U	24 U	20 U	21 U	22 U	21 U	20 U	21 U	22 U	20 U	22 U

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB15	17SB15	17SB15	17SB16	17SB16	17SB16	17SB17	17SB17	17SB17	17SB18	17SB18	17SB18	17SB19	17SB19
Sample Number	17-B-15-01	17-B-15-03	17-B-15-05	17-B-16-01	17-B-16-03	17-B-16-05	17-B-17-01	17-B-17-03	17-B-17-05	17-B-18-01	17-B-18-03	17-B-18-05	17-B-19-01	17-B-19-03
Depth Range (below ground surface)	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5
Sample Date	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01
AROCLOR-1221	21 U	20 U	22 U	18 U	24 U	20 U	21 U	22 U	21 U	20 U	21 U	22 U	20 U	22 U
AROCLOR-1232	21 U	20 U	22 U	18 U	24 U	20 U	21 U	22 U	21 U	20 U	21 U	22 U	20 U	22 U
AROCLOR-1242	21 U	20 U	22 U	18 U	24 U	20 U	21 U	22 U	21 U	20 U	21 U	22 U	20 U	22 U
AROCLOR-1248	21 U	20 U	22 U	18 U	24 U	20 U	21 U	22 U	21 U	20 U	21 U	22 U	20 U	22 U
AROCLOR-1254	21 U	20 U	22 U	18 U	24 U	20 U	21 U	14 J	30	20 U	21 U	22 U	20 U	22 U
AROCLOR-1260	21 U	20 U	22 U	18 U	24 U	20 U	21 U	22 U	21 U	20 U	21 U	22 U	20 U	22 U
BETA-BHC	2.1 U	2 U	2.2 U	1.8 U	2.4 U	2.1 U	2 U	2.2 U	2.1 U	2 U	2.1 U	2.2 U	2 U	2.2 U
CHLORDANE														
CHLORDANE (TECHNICAL)						21 U	20 U							
DELTA-BHC	2.1 U	2 U	2.2 U	1.8 U	2.4 U	2.1 U	2 U	2.2 U	2.1 U	2 U	2.1 U	2.2 U	2 U	2.2 U
DIELDRIN	4.1 U	4 U	4.3 U	3.6 U	4.6 U	2.1 U	2 U	4.3 U	4.1 U	3.9 U	4.1 U	4.2 U	3.9 U	4.4 U
ENDOSULFAN I	2.1 U	2 U	2.2 U	1.8 U	2.4 U	2.1 U	2 U	2.2 U	2.1 U	2 U	2.1 U	2.2 U	2 U	2.2 U
ENDOSULFAN II	4.1 U	4 U	4.3 U	3.6 U	4.6 U	2.1 U	2 U	4.3 U	4.1 U	3.9 U	4.1 U	4.2 U	3.9 U	4.4 U
ENDOSULFAN SULFATE	4.1 U	4 U	4.3 U	3.6 U	4.6 U	2.1 U	2 U	4.3 U	4.1 U	3.9 U	4.1 U	4.2 U	3.9 U	4.4 U
ENDRIN	4.1 U	4 U	4.3 U	3.6 U	4.6 U	2.1 U	2 U	4.3 U	4.1 U	3.9 U	4.1 U	4.2 U	3.9 U	4.4 U
ENDRIN ALDEHYDE	4.1 U	4 U	4.3 U	3.6 U	4.6 U	2.1 U	2 U	4.3 U	0.75 J	3.9 U	4.1 U	4.2 U	3.9 U	4.4 U
ENDRIN KETONE	1.2 J	4 U	4.3 U	3.6 U	4.6 U	2.1 U	2 U	4.3 U	4.1 U	3.9 U	4.1 U	4.2 U	3.9 U	4.4 U
GAMMA-BHC (LINDANE)	2.1 U	2 U	2.2 U	1.8 U	2.4 U	2.1 U	2 U	2.2 U	2.1 U	2 U	2.1 U	2.2 U	2 U	2.2 U
GAMMA-CHLORDANE	2.1 U	2 U	2.2 U	1.8 U	2.4 U	2.1 U	2 U	2.2 U	2.1 U	2 U	2.1 U	2.2 U	2 U	2.2 U
HEPTACHLOR	2.1 U	2 U	2.2 U	1.8 U	2.4 U	2.1 U	2 U	2.2 U	2.1 U	2 U	2.1 U	2.2 U	2 U	2.2 U
HEPTACHLOR EPOXIDE	2.1 U	2 U	2.2 U	1.8 U	2.4 U	2.1 U	2 U	2.2 U	2.1 U	2 U	2.1 U	2.2 U	2 U	2.2 U
KEPONE						41 U	39 U							
METHOXYCHLOR	21 U	20 U	22 U	18 U	24 U	4.1 U	3.9 U	22 U	21 U	20 U	21 U	22 U	20 U	22 U
TOXAPHENE	41 U	40 U	43 U	36 U	46 U	84 U	79 U	43 U	41 U	39 U	41 U	42 U	39 U	44 U
OrganoPhos Pesticides (ug/kg)														
DIMETHOATE														
DISULFOTON						41 U	39 U							
ETHYL PARATHION						41 U	39 U							
FAMPHUR						41 U	39 U							
METHYL PARATHION						41 U	39 U							
O,O,O-TRIETHYL PHOSPHOROTHIOATE														
PHORATE						41 U	39 U							
SULFOTEPP														
THIONAZIN														
Herbicides (ug/kg)														
2,4,5-T						25 U	24 U							
2,4,5-TP (SILVEX)						25 U	24 U							
2,4-D						100 U	95 U							
DINOSEB						15 U	14 U							
Explosives (ug/kg)														
1,3,5-TRINITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
1,3-DINITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4,6-TRINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2-AMINO-4,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
3-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-AMINO-2,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB15	17SB15	17SB15	17SB16	17SB16	17SB16	17SB17	17SB17	17SB17	17SB18	17SB18	17SB18	17SB19	17SB19
Sample Number	17-B-15-01	17-B-15-03	17-B-15-05	17-B-16-01	17-B-16-03	17-B-16-05	17-B-17-01	17-B-17-03	17-B-17-05	17-B-18-01	17-B-18-03	17-B-18-05	17-B-19-01	17-B-19-03
Depth Range (below ground surface)	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5	5 - 7	1 - 3	3 - 5
Sample Date	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01	06/05/01
HMX	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
NITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
RDX	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
TETRYL	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U
Inorganics (mg/kg)														
ALUMINUM	18100	14900	32400	12400	26900	19500	20500	22100	10300	30500	21200	52500	30200	26600
ANTIMONY	0.38 U	0.31 U	0.44 U	0.33 U	0.32 U	0.58 U	0.44 U	0.48 U	0.32 U	0.37 U	0.62 U	0.76 U	0.37 U	0.67 U
ARSENIC	3.5	2	4.9	1.2 U	3.9	1.3 U	2.4 U	2.9	0.22 U	4.6	7	5.7	5.3	13.2
BARIUM	45.8	24.9	278	36.6	20.2	64.4	38.6	87.5	27.9	46.8	25	359	41.4	25.6
BERYLLIUM	0.67	0.25 U	0.86	0.36 U	0.52	0.41 U	0.36 U	0.44 U	0.29 U	0.58	0.5	1.1	0.59	0.54
CADMIUM	0.18 U	0.06 U	0.08 U	0.14 U	0.29 U	0.05 U	0.05 U	0.3 U	0.12 U	0.39 U	0.04 U	0.05 U	0.46 U	0.04 U
CALCIUM	448	458	2840	223	266	269	913	1860	836	524	457	995	360	172
CHROMIUM	20.2	22.4	46.8	11	44.4	23.9	27.6	34.6	19.5	45.4	35	62.7	45.9	49.8
COBALT	2.1	1.7	5.5	1.8	2.7	2.2	2.4	4.7	1.5	2.8	2.6	5.4	2.7	2.6
COPPER	1.6	1.4	1.8 U	0.74 U	1.7 U	0.91 U	0.71 U	1.4 U	1.2	2.5	2.3	3.3	3.1	3.2
IRON	13200	13400	25900	5620	66500	6540	14300	19000	9460	23400	28900	28400	25000	38300
LEAD	7.4	7.8	27.6	6.7	8.1	9.6	10.4	13	4.1	12.7	8.1	18.9	11.6	11.7
MAGNESIUM	959	1090	2780	431	1420	938	1520	1820	884	2600	1830	3900	1740	2210
MANGANESE	36.5	16.3	38.7	36	15	22.2	19.1	30.1	23.1	32.5	24.1	40.5	31.4	25.6
MERCURY	0.02 U	0.02 U	0.01 U	0.03 U	0.03 U	0.02 U	0.01 U	0.01 U	0.01 U	0.03 U	0.02 U	0.02 U	0.05 U	0.01 U
NICKEL	5.1	3.6	12.4	4.9	5.3	4.8	5	7.7	3.7	8.5	5.6	16	7.9	6.7
POTASSIUM	426	435	574	270	431	472	446	454	460	846	650	1160	723	731
SELENIUM	0.87 U	0.44 U	0.37 U	0.27 U	0.98 U	0.33 U	0.37 U	0.65 U	0.27 U	0.86 U	0.64 U	0.63 U	1.3 U	1.5 U
SILVER	0.11 U	0.09 U	0.12 U	0.09 U	0.09 U	0.11 U	0.12 U	0.13 U	0.09 U	0.11 U	0.09 U	0.11 U	0.11 U	0.11 U
SODIUM	22.6	116	284	100 U	101 U	97.6 U	207 U	351	111 U	224	192	344	246	315
THALLIUM	0.5 U	0.4 U	0.57 U	0.43 U	0.67 U	0.51 U	0.57 U	0.62 U	0.42 U	0.59 U	0.8 U	0.99 U	0.49 U	0.86 U
VANADIUM	27.6	21.8	47.3	12.7	36.8	24.2	26.7	33.5	18.4	51.9	47.6	68.9	50.8	55.3
ZINC	15.4 U	12.2 U	37.2	7.1	18.9	11.8 J	17.3 J	24.6 U	12.1 U	22.5	18.4	40.3	21.3	21.2
Miscellaneous Parameters (mg/kg)														
CYANIDE	1.2 U	1.2 U	1.3 U	1.1 U	1.4 U	1.2 U	1.2 U	1.3 U	5	1.2 U	1.2 U	1.3 U	1.2 U	2
TOTAL ORGANIC CARBON														
TOTAL SOLIDS														

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB19	17SB20	17SB20	17SB21	17SB21	17SB22	17SB22	17SB22	17SB22	17SB23	17SB23	17SB24	17SB24
Sample Number	17-B-19-05	17-B-20-01	17-B-20-03	17-B-21-01	17-B-21-03	17-B-22-01	17-B-22-01-AVG	17-B-22-01-D	17-B-22-03	17-B-23-01	17-B-23-03	17-B-24-01	17-B-24-03
Depth Range (below ground surface)	5 - 7	1 - 3	3 - 5	1 - 3	3 - 5	1 - 3	1 - 3	1 - 3	3 - 5	1 - 3	3 - 5	1 - 3	3 - 5
Sample Date	06/05/01	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03
Volatile Organics (ug/kg)													
1,1,1,2-TETRACHLOROETHANE													
1,1,1-TRICHLOROETHANE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
1,1,2,2-TETRACHLOROETHANE	5 U	6 U	6 U	7 UR	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
1,1,2-TRICHLOROETHANE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	2 J	2 J	50	6 U	6 U
1,1,2-TRICHLOROTRIFLUOROETHANE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
1,1-DICHLOROETHANE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
1,1-DICHLOROETHENE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
1,2,3-TRICHLOROPROPANE													
1,2,4-TRICHLOROBENZENE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
1,2,4-TRIMETHYLBENZENE		6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
1,2-DIBROMO-3-CHLOROPROPANE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
1,2-DIBROMOETHANE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROBENZENE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROPROPANE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
1,3,5-TRIMETHYLBENZENE		6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
1,3-DICHLOROBENZENE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
1,4-DICHLOROBENZENE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
1,4-DIOXANE													
2-BUTANONE	5 U	24 U	23 U	27 U	23 U	22 U	21.5 U	21 U	25 U	24 U	22 U	24 U	23 U
2-HEXANONE	5 U	24 U	23 U	27 U	23 U	22 U	21.5 U	21 U	25 U	24 U	22 U	24 U	23 U
3-CHLOROPROPENE													
4-METHYL-2-PENTANONE	5 U	24 U	23 U	27 U	23 U	22 U	21.5 U	21 U	25 U	24 U	22 U	24 U	23 U
ACETONE	100	24 U	23 U	27 U	23 U	22 U	21.5 U	21 U	25 U	24 U	22 U	24 U	23 U
ACETONITRILE													
ACROLEIN													
ACRYLONITRILE													
BENZENE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
BROMODICHLOROMETHANE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
BROMOFORM	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
BROMOMETHANE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
CARBON DISULFIDE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
CARBON TETRACHLORIDE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
CHLOROBENZENE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
CHLORODIBROMOMETHANE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
CHLOROETHANE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
CHLOROFORM	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	3 J	6 U	6 U
CHLOROMETHANE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
CHLOROPRENE													
CIS-1,2-DICHLOROETHENE	5 U	6 U	6 U	5 J	23	6 U	5.5 U	5 U	6 J	19	86	6 U	6 U
CIS-1,3-DICHLOROPROPENE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
CYCLOHEXANE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
DIBROMOMETHANE													
DICHLORODIFLUOROMETHANE	2 J	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
ETHYL METHACRYLATE													
ETHYLBENZENE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
ISOBUTANOL													
ISOPROPYLBENZENE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
M+P-XYLENES		12 U	11 U	14 U	11 U	11 U	10.5 U	10 U	12 U	12 U	11 U	12 U	12 U

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB19	17SB20	17SB20	17SB21	17SB21	17SB22	17SB22	17SB22	17SB22	17SB23	17SB23	17SB24	17SB24
Sample Number	17-B-19-05	17-B-20-01	17-B-20-03	17-B-21-01	17-B-21-03	17-B-22-01	17-B-22-01-AVG	17-B-22-01-D	17-B-22-03	17-B-23-01	17-B-23-03	17-B-24-01	17-B-24-03
Depth Range (below ground surface)	5 - 7	1 - 3	3 - 5	1 - 3	3 - 5	1 - 3	1 - 3	1 - 3	3 - 5	1 - 3	3 - 5	1 - 3	3 - 5
Sample Date	06/05/01	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03
METHACRYLONITRILE													
METHYL ACETATE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
METHYL CYCLOHEXANE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6. U	6 U	6 U	6 U	6 U
METHYL IODIDE													
METHYL METHACRYLATE													
METHYL TERT-BUTYL ETHER	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
METHYLENE CHLORIDE	5 U	6 U	6 U	15 U	6 U	8 U	8 U	8 U	10 U	10	7 U	6 U	6 U
O-XYLENE		6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
PENTACHLOROETHANE													
PROPIONITRILE													
STYRENE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
TETRACHLOROETHENE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
TOLUENE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
TOTAL 1,2-DICHLOROETHENE		12 U	11 U	12 J	53	11 U	10.5 U	10 U	6 J	19	86	12 U	12 U
TOTAL XYLENES	5 U	18 U	17 U	20 U	17 U	17 U	16.5 U	16 U	19 U	18 U	17 U	18 U	17 U
TRANS-1,2-DICHLOROETHENE	5 U	6 U	6 U	7	30	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
TRANS-1,3-DICHLOROPROPENE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
TRANS-1,4-DICHLORO-2-BUTENE													
TRICHLOROETHENE	5 U	6 U	6 U	9	34	11 J	26.5 J	42 J	99	160	1000	6 U	6 U
TRICHLOROFLUOROMETHANE	5 U	16	34	6 J	11	7	6.5	6	12	6 J	7	10	42
VINYL ACETATE													
VINYL CHLORIDE	5 U	6 U	6 U	7 U	6 U	6 U	5.5 U	5 U	6 U	6 U	6 U	6 U	6 U
Semivolatile Organics (ug/kg)													
1,1-BIPHENYL	400 U												
1,2,4,5-TETRACHLOROBENZENE													
1,3,5-TRINITROBENZENE													
1,3-DINITROBENZENE													
1,4-NAPHTHOQUINONE													
1,4-PHENYLENEDIAMINE													
1-NAPHTHYLAMINE													
2,2'-OXYBIS(1-CHLOROPROPANE)	400 U												
2,3,4,6-TETRACHLOROPHENOL													
2,4,5-TRICHLOROPHENOL	1000 U												
2,4,6-TRICHLOROPHENOL	400 U												
2,4-DICHLOROPHENOL	400 U												
2,4-DIMETHYLPHENOL	400 U												
2,4-DINITROPHENOL	1000 U												
2,4-DINITROTOLUENE	400 U												
2,6-DICHLOROPHENOL													
2,6-DINITROTOLUENE	400 U												
2-ACETYLAMINOFLUORENE													
2-CHLORONAPHTHALENE	400 U												
2-CHLOROPHENOL	400 U												
2-METHYLNAPHTHALENE	400 U												
2-METHYLPHENOL	400 U												
2-NAPHTHYLAMINE													
2-NITROANILINE	1000 U												
2-NITROPHENOL	400 U												
2-PICOLINE													
3&4-METHYLPHENOL													

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB19	17SB20	17SB20	17SB21	17SB21	17SB22	17SB22	17SB22	17SB22	17SB23	17SB23	17SB24	17SB24
Sample Number	17-B-19-05	17-B-20-01	17-B-20-03	17-B-21-01	17-B-21-03	17-B-22-01	17-B-22-01-AVG	17-B-22-01-D	17-B-22-03	17-B-23-01	17-B-23-03	17-B-24-01	17-B-24-03
Depth Range (below ground surface)	5 - 7	1 - 3	3 - 5	1 - 3	3 - 5	1 - 3	1 - 3	1 - 3	3 - 5	1 - 3	3 - 5	1 - 3	3 - 5
Sample Date	06/05/01	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03
3,3'-DICHLOROBENZIDINE	400 UR												
3,3'-DIMETHYLBENZIDINE													
3-METHYLCHOLANTHRENE													
3-NITROANILINE	1000 U												
4,6-DINITRO-2-METHYLPHENOL	1000 U												
4-AMINOBIPHENYL													
4-BROMOPHENYL PHENYL ETHER	400 U												
4-CHLORO-3-METHYLPHENOL	400 U												
4-CHLOROANILINE	400 U												
4-CHLOROPHENYL PHENYL ETHER	400 U												
4-METHYLPHENOL	400 U												
4-NITROANILINE	1000 U												
4-NITROPHENOL	1000 U												
4-NITROQUINOLINE-1-OXIDE													
5-NITRO-O-TOLUIDINE													
7,12-DIMETHYLBENZ(A)ANTHRACENE													
A,A-DIMETHYLPHENETHYLAMINE													
ACENAPHTHENE	400 U												
ACENAPHTHYLENE	400 U												
ACETOPHENONE	400 U												
ANILINE													
ANTHRACENE	400 U												
ARAMITE													
ATRAZINE	400 U												
BENZALDEHYDE	400 U												
BENZO(A)ANTHRACENE	400 U												
BENZO(A)PYRENE	400 U												
BENZO(B)FLUORANTHENE	400 U												
BENZO(G,H,I)PERYLENE	400 U												
BENZO(K)FLUORANTHENE	400 U												
BENZYL ALCOHOL													
BIS(2-CHLOROETHOXY)METHANE	400 U												
BIS(2-CHLOROETHYL)ETHER	400 U												
BIS(2-CHLOROISOPROPYL)ETHER													
BIS(2-ETHYLHEXYL)PHTHALATE	400 U												
BUTYL BENZYL PHTHALATE	400 U												
CAPROLACTAM	400 U												
CARBAZOLE	400 U												
CHLOROBENZILATE													
CHRYSENE	400 U												
DI-N-BUTYL PHTHALATE	400 U												
DI-N-OCTYL PHTHALATE	400 U												
DIALLATE													
DIBENZO(A,H)ANTHRACENE	400 U												
DIBENZOFURAN	400 U												
DIETHYL PHTHALATE	400 U												
DIMETHOATE													
DIMETHYL PHTHALATE	400 U												
DINOSEB													
ETHYL METHANE SULFONATE													

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB19	17SB20	17SB20	17SB21	17SB21	17SB22	17SB22	17SB22	17SB22	17SB23	17SB23	17SB24	17SB24
Sample Number	17-B-19-05	17-B-20-01	17-B-20-03	17-B-21-01	17-B-21-03	17-B-22-01	17-B-22-01-AVG	17-B-22-01-D	17-B-22-03	17-B-23-01	17-B-23-03	17-B-24-01	17-B-24-03
Depth Range (below ground surface)	5 - 7	1 - 3	3 - 5	1 - 3	3 - 5	1 - 3	1 - 3	1 - 3	3 - 5	1 - 3	3 - 5	1 - 3	3 - 5
Sample Date	06/05/01	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03
ETHYL PARATHION													
FLUORANTHENE	400 U												
FLUORENE	400 U												
HEXACHLOROBENZENE	400 U												
HEXACHLOROBUTADIENE	400 U												
HEXACHLOROCYCLOPENTADIENE	400 U												
HEXACHLOROETHANE	400 U												
HEXACHLOROPHENE													
HEXACHLOROPROPENE													
INDENO(1,2,3-CD)PYRENE	400 U												
ISODRIN													
ISOPHORONE	400 U												
ISOSAFROLE													
KEPONE													
METHAPYRILENE													
METHYL METHANE SULFONATE													
N-NITROSO-DI-N-BUTYLAMINE													
N-NITROSO-DI-N-PROPYLAMINE	400 U												
N-NITROSODIETHYLAMINE													
N-NITROSODIMETHYLAMINE													
N-NITROSODIPHENYLAMINE	400 U												
N-NITROSOMETHYLETHYLAMINE													
N-NITROSOMORPHOLINE													
N-NITROSOPIPERIDINE													
N-NITROSOPYRROLIDINE													
NAPHTHALENE	400 U												
NITROBENZENE	400 U												
O,O,O-TRIETHYL PHOSPHOROTHIOATE													
O-TOLUIDINE													
P-(DIMETHYLAMINO)AZOBENZENE													
PENTACHLOROBENZENE													
PENTACHLORONITROBENZENE													
PENTACHLOROPHENOL	1000 U												
PHENACETIN													
PHENANTHRENE	400 U												
PHENOL	400 U												
PRONAMIDE													
PYRENE	400 U												
PYRIDINE													
SAFROLE													
SULFOTEPP													
THIONAZIN													
Pesiticides/PCBs (ug/kg)													
4,4'-DDD	4 U												
4,4'-DDE	4 U												
4,4'-DDT	4 U												
ALDRIN	2.1 U												
ALPHA-BHC	2.1 U												
ALPHA-CHLORDANE	2.1 U												
AROCLOR-1016	21 U												

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB19	17SB20	17SB20	17SB21	17SB21	17SB22	17SB22	17SB22	17SB22	17SB23	17SB23	17SB24	17SB24
Sample Number	17-B-19-05	17-B-20-01	17-B-20-03	17-B-21-01	17-B-21-03	17-B-22-01	17-B-22-01-AVG	17-B-22-01-D	17-B-22-03	17-B-23-01	17-B-23-03	17-B-24-01	17-B-24-03
Depth Range (below ground surface)	5 - 7	1 - 3	3 - 5	1 - 3	3 - 5	1 - 3	1 - 3	1 - 3	3 - 5	1 - 3	3 - 5	1 - 3	3 - 5
Sample Date	06/05/01	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03
AROCLOR-1221	21 U												
AROCLOR-1232	21 U												
AROCLOR-1242	21 U												
AROCLOR-1248	21 U												
AROCLOR-1254	21 U												
AROCLOR-1260	21 U												
BETA-BHC	2.1 U												
CHLORDANE													
CHLORDANE (TECHNICAL)													
DELTA-BHC	2.1 U												
DIELDRIN	4 U												
ENDOSULFAN I	2.1 U												
ENDOSULFAN II	4 U												
ENDOSULFAN SULFATE	4 U												
ENDRIN	4 U												
ENDRIN ALDEHYDE	4 U												
ENDRIN KETONE	4 U												
GAMMA-BHC (LINDANE)	2.1 U												
GAMMA-CHLORDANE	2.1 U												
HEPTACHLOR	2.1 U												
HEPTACHLOR EPOXIDE	2.1 U												
KEPONE													
METHOXYCHLOR	21 U												
TOXAPHENE	40 U												
OrganoPhos Pesticides (ug/kg)													
DIMETHOATE													
DISULFOTON													
ETHYL PARATHION													
FAMPHUR													
METHYL PARATHION													
O,O,O-TRIETHYL PHOSPHOROTHIOATE													
PHORATE													
SULFOTEPP													
THIONAZIN													
Herbicides (ug/kg)													
2,4,5-T													
2,4,5-TP (SILVEX)													
2,4-D													
DINOSEB													
Explosives (ug/kg)													
1,3,5-TRINITROBENZENE	250 U												
1,3-DINITROBENZENE	250 U												
2,4,6-TRINITROTOLUENE	250 U												
2,4-DINITROTOLUENE	250 U												
2,6-DINITROTOLUENE	250 U												
2-AMINO-4,6-DINITROTOLUENE	250 U												
2-NITROTOLUENE	250 U												
3-NITROTOLUENE	250 U												
4-AMINO-2,6-DINITROTOLUENE	250 U												
4-NITROTOLUENE	250 U												

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB19	17SB20	17SB20	17SB21	17SB21	17SB22	17SB22	17SB22	17SB22	17SB23	17SB23	17SB24	17SB24
Sample Number	17-B-19-05	17-B-20-01	17-B-20-03	17-B-21-01	17-B-21-03	17-B-22-01	17-B-22-01-AVG	17-B-22-01-D	17-B-22-03	17-B-23-01	17-B-23-03	17-B-24-01	17-B-24-03
Depth Range (below ground surface)	5 - 7	1 - 3	3 - 5	1 - 3	3 - 5	1 - 3	1 - 3	1 - 3	3 - 5	1 - 3	3 - 5	1 - 3	3 - 5
Sample Date	06/05/01	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03
HMX	500 U												
NITROBENZENE	250 U												
RDX	500 U												
TETRYL	650 U												
Inorganics (mg/kg)													
ALUMINUM	19300												
ANTIMONY	0.32 U												
ARSENIC	3												
BARIUM	19.5												
BERYLLIUM	0.25 U												
CADMIUM	0.26 U												
CALCIUM	226												
CHROMIUM	29												
COBALT	2												
COPPER	1.1 U												
IRON	16300												
LEAD	6.3												
MAGNESIUM	1320												
MANGANESE	25.9												
MERCURY	0.01 U												
NICKEL	4.9												
POTASSIUM	512												
SELENIUM	0.61 U												
SILVER	0.09 U												
SODIUM	133												
THALLIUM	0.42 U												
VANADIUM	28.5												
ZINC	16.1 U												
Miscellaneous Parameters (mg/kg)													
CYANIDE	1.2 U												
TOTAL ORGANIC CARBON													
TOTAL SOLIDS		82 %	83 %	72 %	83 %	82 %	82 %	82 %	82 %	80 %	80 %	84 %	83 %

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB25	17SB25	17SB26	17SB26	17SB26	17SB26	17SB27	17SB27	17SB28	17SB28	17SB29	17SB29	17SB30
Sample Number	17-B-25-01	17-B-25-03	17-B-26-01	17-B-26-03	17-B-26-03-AVG	17-B-26-03-D	17-B-27-01	17-B-27-03	17-B-28-01	17-B-28-03	17-B-29-01	17-B-29-03	17-B-30-02
Depth Range (below ground surface)	1 - 3	3 - 5	1 - 3	3 - 5	3 - 5	3 - 5	1 - 3	3 - 5	1 - 3	3 - 5	1 - 3	3 - 5	2 - 3
Sample Date	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	01/18/05
Volatile Organics (ug/kg)													
1,1,1,2-TETRACHLOROETHANE													
1,1,1-TRICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
1,1,2,2-TETRACHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U	8	11	6 U	6 U	6 U	6 U	5 U
1,1,2-TRICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	2 J	6 U	6 U	6 U	6 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
1,1-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
1,1-DICHLOROETHENE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
1,2,3-TRICHLOROPROPANE													
1,2,4-TRICHLOROBENZENE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
1,2,4-TRIMETHYLBENZENE	6 U	5 J	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	
1,2-DIBROMO-3-CHLOROPROPANE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
1,2-DIBROMOETHANE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
1,2-DICHLOROBENZENE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
1,2-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
1,2-DICHLOROPROPANE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
1,3,5-TRIMETHYLBENZENE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	
1,3-DICHLOROBENZENE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
1,4-DICHLOROBENZENE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
1,4-DIOXANE													
2-BUTANONE	22 U	22 U	23 U	24 U	23 U	22 U	23 U	23 U	25 U	23 U	23 U	24 U	27 U
2-HEXANONE	22 U	22 U	23 U	24 U	23 U	22 U	23 U	23 U	25 U	23 U	23 U	24 U	27 U
3-CHLOROPROPENE													
4-METHYL-2-PENTANONE	22 U	22 U	23 U	24 U	23 U	22 U	23 U	23 U	25 U	23 U	23 U	24 U	27 U
ACETONE	12 J	28 J	23 U	24 U	23 U	22 U	23 U	23 U	25 U	23 U	23 U	24 U	16 J
ACETONITRILE													
ACROLEIN													
ACRYLONITRILE													
BENZENE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
BROMODICHLOROMETHANE	6 U	6 U	6 U	6 U	6 U	6 U	4 J	6 U	6 U	6 U	6 U	6 U	5 U
BROMOFORM	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
BROMOMETHANE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	1 J	6 U	5 U
CARBON DISULFIDE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
CARBON TETRACHLORIDE	6 U	6 U	6 U	6 U	6 U	6 U	18	6 U	6 U	6 U	6 U	6 U	5 U
CHLOROBENZENE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
CHLORODIBROMOMETHANE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
CHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
CHLOROFORM	6 U	6 U	6 U	6 U	6 U	6 U	140	87	6 U	6 U	6 U	6 U	5 U
CHLOROMETHANE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
CHLOROPRENE													
CIS-1,2-DICHLOROETHENE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	3 J	6 U	6 U	6 U	6 U	210
CIS-1,3-DICHLOROPROPENE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
CYCLOHEXANE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
DIBROMOMETHANE													
DICHLORODIFLUOROMETHANE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
ETHYL METHACRYLATE													
ETHYLBENZENE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
ISOBUTANOL													
ISOPROPYLBENZENE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
M+P-XYLENES	6 U	6 U	6 U	6 U	6 U	6 U	12 U	12 U	6 U	6 U	6 U	6 U	11 U

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB25	17SB25	17SB26	17SB26	17SB26	17SB26	17SB27	17SB27	17SB28	17SB28	17SB29	17SB29	17SB30
Sample Number	17-B-25-01	17-B-25-03	17-B-26-01	17-B-26-03	17-B-26-03-AVG	17-B-26-03-D	17-B-27-01	17-B-27-03	17-B-28-01	17-B-28-03	17-B-29-01	17-B-29-03	17-B-30-02
Depth Range (below ground surface)	1 - 3	3 - 5	1 - 3	3 - 5	3 - 5	3 - 5	1 - 3	3 - 5	1 - 3	3 - 5	1 - 3	3 - 5	2 - 3
Sample Date	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	01/18/05
METHACRYLONITRILE													
METHYL ACETATE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
METHYL CYCLOHEXANE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
METHYL IODIDE													
METHYL METHACRYLATE													
METHYL TERT-BUTYL ETHER	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	11 U
METHYLENE CHLORIDE	13 J	11 J	11 J	14 J	11.5 J	9 J	11 U	6 U	14 J	9 J	8 J	10 J	9 U
O-XYLENE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
PENTACHLOROETHANE													
PROPIONITRILE													
STYRENE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
TETRACHLOROETHENE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
TOLUENE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
TOTAL 1,2-DICHLOROETHENE	6 U	6 U	6 U	6 U	6 U	6 U	12 U	12 U	6 U	6 U	6 U	6 U	210
TOTAL XYLENES	6 U	6 U	6 U	6 U	6 U	6 U	18 U	17 U	6 U	6 U	6 U	6 U	16 U
TRANS-1,2-DICHLOROETHENE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	1 J
TRANS-1,3-DICHLOROPROPENE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
TRANS-1,4-DICHLORO-2-BUTENE													
TRICHLOROETHENE	6 U	6 U	6 U	6 U	6 U	6 U	20	1900	6 U	6 U	6 U	6 U	440
TRICHLOROFLUOROMETHANE	11	18 J	9	18 J	31 J	44 J	14	46	4 J	10	3 J	7	5 U
VINYL ACETATE													
VINYL CHLORIDE	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	5 U
Semivolatile Organics (ug/kg)													
1,1-BIPHENYL													400 U
1,2,4,5-TETRACHLOROBENZENE													
1,3,5-TRINITROBENZENE													
1,3-DINITROBENZENE													
1,4-NAPHTHOQUINONE													
1,4-PHENYLENEDIAMINE													
1-NAPHTHYLAMINE													
2,2'-OXYBIS(1-CHLOROPROPANE)													400 U
2,3,4,6-TETRACHLOROPHENOL													
2,4,5-TRICHLOROPHENOL													400 U
2,4,6-TRICHLOROPHENOL													400 U
2,4-DICHLOROPHENOL													400 U
2,4-DIMETHYLPHENOL													400 U
2,4-DINITROPHENOL													970 U
2,4-DINITROTOLUENE													400 U
2,6-DICHLOROPHENOL													
2,6-DINITROTOLUENE													400 U
2-ACETYLAMINOFLUORENE													
2-CHLORONAPHTHALENE													400 U
2-CHLOROPHENOL													400 U
2-METHYLNAPHTHALENE													400 U
2-METHYLPHENOL													400 U
2-NAPHTHYLAMINE													
2-NITROANILINE													970 U
2-NITROPHENOL													400 U
2-PICOLINE													
3&4-METHYLPHENOL													

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB25	17SB25	17SB26	17SB26	17SB26	17SB26	17SB27	17SB27	17SB28	17SB28	17SB29	17SB29	17SB30
Sample Number	17-B-25-01	17-B-25-03	17-B-26-01	17-B-26-03	17-B-26-03-AVG	17-B-26-03-D	17-B-27-01	17-B-27-03	17-B-28-01	17-B-28-03	17-B-29-01	17-B-29-03	17-B-30-02
Depth Range (below ground surface)	1 - 3	3 - 5	1 - 3	3 - 5	3 - 5	3 - 5	1 - 3	3 - 5	1 - 3	3 - 5	1 - 3	3 - 5	2 - 3
Sample Date	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	01/18/05
3,3'-DICHLOROBENZIDINE													400 U
3,3'-DIMETHYLBENZIDINE													
3-METHYLCHOLANTHRENE													
3-NITROANILINE													970 U
4,6-DINITRO-2-METHYLPHENOL													970 U
4-AMINOBIPHENYL													
4-BROMOPHENYL PHENYL ETHER													400 U
4-CHLORO-3-METHYLPHENOL													400 U
4-CHLOROANILINE													400 U
4-CHLOROPHENYL PHENYL ETHER													400 U
4-METHYLPHENOL													400 U
4-NITROANILINE													970 U
4-NITROPHENOL													970 U
4-NITROQUINOLINE-1-OXIDE													
5-NITRO-O-TOLUIDINE													
7,12-DIMETHYLBENZ(A)ANTHRACENE													
A,A-DIMETHYLPHENETHYLAMINE													
ACENAPHTHENE													400 U
ACENAPHTHYLENE													400 U
ACETOPHENONE													400 U
ANILINE													
ANTHRACENE													400 U
ARAMITE													
ATRAZINE													400 U
BENZALDEHYDE													400 U
BENZO(A)ANTHRACENE													400 U
BENZO(A)PYRENE													400 U
BENZO(B)FLUORANTHENE													400 U
BENZO(G,H,I)PERYLENE													400 U
BENZO(K)FLUORANTHENE													400 U
BENZYL ALCOHOL													
BIS(2-CHLOROETHOXY)METHANE													400 U
BIS(2-CHLOROETHYL)ETHER													400 U
BIS(2-CHLOROISOPROPYL)ETHER													
BIS(2-ETHYLHEXYL)PHTHALATE													230 J
BUTYL BENZYL PHTHALATE													400 U
CAPROLACTAM													400 U
CARBAZOLE													400 U
CHLOROBENZILATE													
CHRYSENE													400 U
DI-N-BUTYL PHTHALATE													400 U
DI-N-OCTYL PHTHALATE													400 U
DIALLATE													
DIBENZO(A,H)ANTHRACENE													400 U
DIBENZOFURAN													400 U
DIETHYL PHTHALATE													400 U
DIMETHOATE													
DIMETHYL PHTHALATE													400 U
DINOSEB													
ETHYL METHANE SULFONATE													

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB25	17SB25	17SB26	17SB26	17SB26	17SB26	17SB27	17SB27	17SB28	17SB28	17SB29	17SB29	17SB30
Sample Number	17-B-25-01	17-B-25-03	17-B-26-01	17-B-26-03	17-B-26-03-AVG	17-B-26-03-D	17-B-27-01	17-B-27-03	17-B-28-01	17-B-28-03	17-B-29-01	17-B-29-03	17-B-30-02
Depth Range (below ground surface)	1 - 3	3 - 5	1 - 3	3 - 5	3 - 5	3 - 5	1 - 3	3 - 5	1 - 3	3 - 5	1 - 3	3 - 5	2 - 3
Sample Date	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	01/18/05
ETHYL PARATHION													
FLUORANTHENE													400 U
FLUORENE													400 U
HEXACHLOROBENZENE													400 U
HEXACHLOROBUTADIENE													400 U
HEXACHLOROCYCLOPENTADIENE													400 U
HEXACHLOROETHANE													400 U
HEXACHLOROPHENE													
HEXACHLOROPROPENE													
INDENO(1,2,3-CD)PYRENE													400 U
ISODRIN													
ISOPHORONE													400 U
ISOSAFROLE													
KEPONE													
METHAPYRILENE													
METHYL METHANE SULFONATE													
N-NITROSO-DI-N-BUTYLAMINE													
N-NITROSO-DI-N-PROPYLAMINE													400 U
N-NITROSODIETHYLAMINE													
N-NITROSODIMETHYLAMINE													
N-NITROSODIPHENYLAMINE													400 U
N-NITROSOMETHYLETHYLAMINE													
N-NITROSOMORPHOLINE													
N-NITROSOPIPERIDINE													
N-NITROSOPYRROLIDINE													
NAPHTHALENE													400 U
NITROBENZENE													400 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE													
O-TOLUIDINE													
P-(DIMETHYLAMINO)AZOBENZENE													
PENTACHLOROBENZENE													
PENTACHLORONITROBENZENE													
PENTACHLOROPHENOL													970 U
PHENACETIN													
PHENANTHRENE													400 U
PHENOL													400 U
PRONAMIDE													
PYRENE													400 U
PYRIDINE													
SAFROLE													
SULFOTEPP													
THIONAZIN													
Pesiticides/PCBs (ug/kg)													
4,4'-DDD													4 U
4,4'-DDE													0.8 J
4,4'-DDT													4 U
ALDRIN													2.1 U
ALPHA-BHC													2.1 U
ALPHA-CHLORDANE													2.1 U
AROCLOR-1016													21 U

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB25	17SB25	17SB26	17SB26	17SB26	17SB26	17SB27	17SB27	17SB28	17SB28	17SB29	17SB29	17SB30
Sample Number	17-B-25-01	17-B-25-03	17-B-26-01	17-B-26-03	17-B-26-03-AVG	17-B-26-03-D	17-B-27-01	17-B-27-03	17-B-28-01	17-B-28-03	17-B-29-01	17-B-29-03	17-B-30-02
Depth Range (below ground surface)	1 - 3	3 - 5	1 - 3	3 - 5	3 - 5	3 - 5	1 - 3	3 - 5	1 - 3	3 - 5	1 - 3	3 - 5	2 - 3
Sample Date	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	01/18/05
AROCLOR-1221													21 U
AROCLOR-1232													21 U
AROCLOR-1242													21 U
AROCLOR-1248													21 U
AROCLOR-1254													21 U
AROCLOR-1260													21 U
BETA-BHC													2.1 U
CHLORDANE													
CHLORDANE (TECHNICAL)													
DELTA-BHC													2.1 U
DIELDRIN													4 U
ENDOSULFAN I													2.1 U
ENDOSULFAN II													4 U
ENDOSULFAN SULFATE													4 U
ENDRIN													4 U
ENDRIN ALDEHYDE													4 U
ENDRIN KETONE													4 U
GAMMA-BHC (LINDANE)													2.1 U
GAMMA-CHLORDANE													2.1 U
HEPTACHLOR													2.1 U
HEPTACHLOR EPOXIDE													2.1 U
KEPONE													
METHOXYCHLOR													21 U
TOXAPHENE													40 U
OrganoPhos Pesticides (ug/kg)													
DIMETHOATE													
DISULFOTON													
ETHYL PARATHION													
FAMPHUR													
METHYL PARATHION													
O,O,O-TRIETHYL PHOSPHOROTHIOATE													
PHORATE													
SULFOTEPP													
THIONAZIN													
Herbicides (ug/kg)													
2,4,5-T													
2,4,5-TP (SILVEX)													
2,4-D													
DINOSEB													
Explosives (ug/kg)													
1,3,5-TRINITROBENZENE													100 U
1,3-DINITROBENZENE													100 U
2,4,6-TRINITROTOLUENE													100 U
2,4-DINITROTOLUENE													100 U
2,6-DINITROTOLUENE													200 U
2-AMINO-4,6-DINITROTOLUENE													200 U
2-NITROTOLUENE													200 U
3-NITROTOLUENE													200 U
4-AMINO-2,6-DINITROTOLUENE													200 U
4-NITROTOLUENE													200 U

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17SB25	17SB25	17SB26	17SB26	17SB26	17SB26	17SB27	17SB27	17SB28	17SB28	17SB29	17SB29	17SB30
Sample Number	17-B-25-01	17-B-25-03	17-B-26-01	17-B-26-03	17-B-26-03-AVG	17-B-26-03-D	17-B-27-01	17-B-27-03	17-B-28-01	17-B-28-03	17-B-29-01	17-B-29-03	17-B-30-02
Depth Range (below ground surface)	1 - 3	3 - 5	1 - 3	3 - 5	3 - 5	3 - 5	1 - 3	3 - 5	1 - 3	3 - 5	1 - 3	3 - 5	2 - 3
Sample Date	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	04/28/03	01/18/05
HMX													200 U
NITROBENZENE													100 U
RDX													200 U
TETRYL													250 U
Inorganics (mg/kg)													
ALUMINUM													15100
ANTIMONY													0.16 U
ARSENIC													4.9
BARIUM													29.6
BERYLLIUM													0.27
CADMIUM													0.24
CALCIUM													533
CHROMIUM													24.1
COBALT													1.6
COPPER													2.4
IRON													13100
LEAD													9.8
MAGNESIUM													1200
MANGANESE													17.8 J
MERCURY													0.05
NICKEL													4.4
POTASSIUM													416
SELENIUM													0.25 U
SILVER													0.05 U
SODIUM													96.1
THALLIUM													0.6 U
VANADIUM													30.3
ZINC													15.3
Miscellaneous Parameters (mg/kg)													
CYANIDE													0.21 J
TOTAL ORGANIC CARBON													2200
TOTAL SOLIDS	82 %	84 %	87 %	82 %	81 %	80 %	79 %	81 %	82 %	86 %	80 %	84 %	82 %

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017
Sample Location	17SB31	17SB31	17SB31	17SB32
Sample Number	17-B-31-02	17-B-31-02-AVG	17-B-31-02-D	17-B-32-03
Depth Range (below ground surface)	2 - 3	2 - 3	2 - 3	3 - 4
Sample Date	01/18/05	01/18/05	01/18/05	01/18/05
Volatile Organics (ug/kg)				
1,1,1,2-TETRACHLOROETHANE				6 U
1,1,1-TRICHLOROETHANE	7 U	7 U	7 U	6 U
1,1,2,2-TETRACHLOROETHANE	7 U	7 U	7 U	6 U
1,1,2-TRICHLOROETHANE	7 U	7 U	7 U	1 J
1,1,2-TRICHLOROTRIFLUOROETHANE	7 U	7 U	7 U	
1,1-DICHLOROETHANE	7 U	7 U	7 U	6 U
1,1-DICHLOROETHENE	7 U	7 U	7 U	6 U
1,2,3-TRICHLOROPROPANE				6 U
1,2,4-TRICHLOROBENZENE	7 U	7 U	7 U	6 U
1,2,4-TRIMETHYLBENZENE				
1,2-DIBROMO-3-CHLOROPROPANE	7 U	7 U	7 U	6 U
1,2-DIBROMOETHANE	7 U	7 U	7 U	6 U
1,2-DICHLOROBENZENE	7 U	7 U	7 U	6 U
1,2-DICHLOROETHANE	7 U	7 U	7 U	6 U
1,2-DICHLOROPROPANE	7 U	7 U	7 U	6 U
1,3,5-TRIMETHYLBENZENE				
1,3-DICHLOROBENZENE	7 U	7 U	7 U	6 U
1,4-DICHLOROBENZENE	7 U	7 U	7 U	6 U
1,4-DIOXANE				120 UR
2-BUTANONE	36 U	35 U	34 U	30 U
2-HEXANONE	36 U	35 U	34 U	30 U
3-CHLOROPROPENE				6 U
4-METHYL-2-PENTANONE	36 U	35 U	34 U	30 U
ACETONE	36 UR	19 J	19 J	23 J
ACETONITRILE				60 U
ACROLEIN				30 UR
ACRYLONITRILE				30 UR
BENZENE	7 U	7 U	7 U	6 U
BROMODICHLOROMETHANE	7 U	7 U	7 U	6 U
BROMOFORM	7 U	7 U	7 U	6 U
BROMOMETHANE	7 U	7 U	7 U	6 U
CARBON DISULFIDE	7 U	7 U	7 U	6 U
CARBON TETRACHLORIDE	7 U	7 U	7 U	6 U
CHLOROBENZENE	7 U	7 U	7 U	6 U
CHLORODIBROMOMETHANE	7 U	7 U	7 U	6 U
CHLOROETHANE	7 U	7 U	7 U	6 U
CHLOROFORM	7 U	7 U	7 U	6 U
CHLOROMETHANE	7 U	4.5 U	2 U	6 U
CHLOROPRENE				6 U
CIS-1,2-DICHLOROETHENE	5 J	5 J	5 J	200
CIS-1,3-DICHLOROPROPENE	7 U	7 U	7 U	6 U
CYCLOHEXANE	7 U	7 U	7 U	
DIBROMOMETHANE				6 U
DICHLORODIFLUOROMETHANE	7 U	7 U	7 U	6 U
ETHYL METHACRYLATE				6 U
ETHYLBENZENE	7 U	7 U	7 U	6 U
ISOBUTANOL				120 UR
ISOPROPYLBENZENE	7 U	7 U	7 U	
M+P-XYLENES	14 U	14 U	14 U	12 U

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017
Sample Location	17SB31	17SB31	17SB31	17SB32
Sample Number	17-B-31-02	17-B-31-02-AVG	17-B-31-02-D	17-B-32-03
Depth Range (below ground surface)	2 - 3	2 - 3	2 - 3	3 - 4
Sample Date	01/18/05	01/18/05	01/18/05	01/18/05
METHACRYLONITRILE				60 U
METHYL ACETATE	7 U	7 U	7 U	
METHYL CYCLOHEXANE	7 U	7 U	7 U	
METHYL IODIDE				6 U
METHYL METHACRYLATE				6 U
METHYL TERT-BUTYL ETHER	14 U	14 U	14 U	
METHYLENE CHLORIDE	12 U	12.5 U	13 U	6 U
O-XYLENE	7 U	7 U	7 U	6 U
PENTACHLOROETHANE				6 U
PROPIONITRILE				60 U
STYRENE	7 U	7 U	7 U	6 U
TETRACHLOROETHENE	7 U	7 U	7 U	6 U
TOLUENE	7 U	7 U	7 U	6 U
TOTAL 1,2-DICHLOROETHENE	5 J	5 J	5 J	
TOTAL XYLENES	22 U	21 U	20 U	18 U
TRANS-1,2-DICHLOROETHENE	7 U	7 U	7 U	6 U
TRANS-1,3-DICHLOROPROPENE	7 U	7 U	7 U	6 U
TRANS-1,4-DICHLORO-2-BUTENE				12 U
TRICHLOROETHENE	250 J	190 J	130 J	430
TRICHLOROFLUOROMETHANE	7 U	7 U	7 U	6 U
VINYL ACETATE				6 U
VINYL CHLORIDE	7 U	7 U	7 U	6 U
Semivolatile Organics (ug/kg)				
1,1-BIPHENYL	410 U	410 U	410 U	
1,2,4,5-TETRACHLOROBENZENE				400 U
1,3,5-TRINITROBENZENE				400 U
1,3-DINITROBENZENE				400 U
1,4-NAPHTHOQUINONE				400 U
1,4-PHENYLENEDIAMINE				400 U
1-NAPHTHYLAMINE				400 U
2,2'-OXYBIS(1-CHLOROPROPANE)	410 U	410 U	410 U	
2,3,4,6-TETRACHLOROPHENOL				400 U
2,4,5-TRICHLOROPHENOL	410 U	410 U	410 U	990 U
2,4,6-TRICHLOROPHENOL	410 U	410 U	410 U	400 U
2,4-DICHLOROPHENOL	410 U	410 U	410 U	400 U
2,4-DIMETHYLPHENOL	410 U	410 U	410 U	400 U
2,4-DINITROPHENOL	990 U	990 U	990 U	990 U
2,4-DINITROTOLUENE	410 U	410 U	410 U	400 U
2,6-DICHLOROPHENOL				400 U
2,6-DINITROTOLUENE	410 U	410 U	410 U	400 U
2-ACETYLAMINOFLUORENE				400 U
2-CHLORONAPHTHALENE	410 U	410 U	410 U	400 U
2-CHLOROPHENOL	410 U	410 U	410 U	400 U
2-METHYLNAPHTHALENE	410 U	410 U	410 U	400 U
2-METHYLPHENOL	410 U	410 U	410 U	400 U
2-NAPHTHYLAMINE				400 U
2-NITROANILINE	990 U	990 U	990 U	990 U
2-NITROPHENOL	410 U	410 U	410 U	400 U
2-PICOLINE				400 U
3&4-METHYLPHENOL				400 U

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017
Sample Location	17SB31	17SB31	17SB31	17SB32
Sample Number	17-B-31-02	17-B-31-02-AVG	17-B-31-02-D	17-B-32-03
Depth Range (below ground surface)	2 - 3	2 - 3	2 - 3	3 - 4
Sample Date	01/18/05	01/18/05	01/18/05	01/18/05
3,3'-DICHLOROBENZIDINE	410 U	410 U	410 U	400 U
3,3'-DIMETHYLBENZIDINE				790 U
3-METHYLCHOLANTHRENE				400 U
3-NITROANILINE	990 U	990 U	990 U	990 U
4,6-DINITRO-2-METHYLPHENOL	990 U	990 U	990 U	990 U
4-AMINOBIPHENYL				400 U
4-BROMOPHENYL PHENYL ETHER	410 U	410 U	410 U	400 U
4-CHLORO-3-METHYLPHENOL	410 U	410 U	410 U	400 U
4-CHLOROANILINE	410 U	410 U	410 U	400 U
4-CHLOROPHENYL PHENYL ETHER	410 U	410 U	410 U	400 U
4-METHYLPHENOL	410 U	410 U	410 U	
4-NITROANILINE	990 U	990 U	990 U	990 U
4-NITROPHENOL	990 U	990 U	990 U	990 U
4-NITROQUINOLINE-1-OXIDE				790 U
5-NITRO-O-TOLUIDINE				790 U
7,12-DIMETHYLBENZ(A)ANTHRACENE				400 U
A,A-DIMETHYLPHENETHYLAMINE				400 U
ACENAPHTHENE	410 U	410 U	410 U	400 U
ACENAPHTHYLENE	410 U	410 U	410 U	400 U
ACETOPHENONE	410 U	410 U	410 U	400 U
ANILINE				400 U
ANTHRACENE	410 U	410 U	410 U	400 U
ARAMITE				790 U
ATRAZINE	410 U	410 U	410 U	
BENZALDEHYDE	410 U	410 U	410 U	
BENZO(A)ANTHRACENE	410 U	410 U	410 U	400 U
BENZO(A)PYRENE	410 U	410 U	410 U	400 U
BENZO(B)FLUORANTHENE	410 U	410 U	410 U	400 U
BENZO(G,H,I)PERYLENE	410 U	410 U	410 U	400 U
BENZO(K)FLUORANTHENE	410 U	410 U	410 U	400 U
BENZYL ALCOHOL				790 U
BIS(2-CHLOROETHOXY)METHANE	410 U	410 U	410 U	400 U
BIS(2-CHLOROETHYL)ETHER	410 U	410 U	410 U	400 U
BIS(2-CHLOROISOPROPYL)ETHER				400 U
BIS(2-ETHYLHEXYL)PHTHALATE	250 J	245 J	240 J	400 U
BUTYL BENZYL PHTHALATE	410 U	410 U	410 U	400 U
CAPROLACTAM	410 U	410 U	410 U	
CARBAZOLE	410 U	410 U	410 U	
CHLOROBENZILATE				790 U
CHRYSENE	410 U	410 U	410 U	400 U
DI-N-BUTYL PHTHALATE	410 U	410 U	410 U	400 U
DI-N-OCTYL PHTHALATE	410 U	410 U	410 U	400 U
DIALLATE				790 U
DIBENZO(A,H)ANTHRACENE	410 U	410 U	410 U	400 U
DIBENZOFURAN	410 U	410 U	410 U	400 U
DIETHYL PHTHALATE	410 U	410 U	410 U	400 U
DIMETHOATE				400 U
DIMETHYL PHTHALATE	410 U	410 U	410 U	400 U
DINOSEB				200 U
ETHYL METHANE SULFONATE				400 U

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017
Sample Location	17SB31	17SB31	17SB31	17SB32
Sample Number	17-B-31-02	17-B-31-02-AVG	17-B-31-02-D	17-B-32-03
Depth Range (below ground surface)	2 - 3	2 - 3	2 - 3	3 - 4
Sample Date	01/18/05	01/18/05	01/18/05	01/18/05
ETHYL PARATHION				400 U
FLUORANTHENE	410 U	410 U	410 U	400 U
FLUORENE	410 U	410 U	410 U	400 U
HEXACHLOROBENZENE	410 U	410 U	410 U	400 U
HEXACHLOROBUTADIENE	410 U	410 U	410 U	400 U
HEXACHLOROCYCLOPENTADIENE	410 U	410 U	410 U	400 U
HEXACHLOROETHANE	410 U	410 U	410 U	400 U
HEXACHLOROPHENE				400 UR
HEXACHLOROPROPENE				400 U
INDENO(1,2,3-CD)PYRENE	410 U	410 U	410 U	400 U
ISODRIN				790 U
ISOPHORONE	410 U	410 U	410 U	400 U
ISOSAFROLE				790 U
KEPONE				400 UR
METHAPYRILENE				400 U
METHYL METHANE SULFONATE				790 U
N-NITROSO-DI-N-BUTYLAMINE				400 U
N-NITROSO-DI-N-PROPYLAMINE	410 U	410 U	410 U	400 U
N-NITROSODIETHYLAMINE				790 U
N-NITROSODIMETHYLAMINE				790 U
N-NITROSODIPHENYLAMINE	410 U	410 U	410 U	400 U
N-NITROSOMETHYLETHYLAMINE				400 U
N-NITROSOMORPHOLINE				400 U
N-NITROSOPIPERIDINE				400 U
N-NITROSOPYRROLIDINE				400 U
NAPHTHALENE	410 U	410 U	410 U	400 U
NITROBENZENE	410 U	410 U	410 U	400 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE				790 U
O-TOLUIDINE				400 U
P-(DIMETHYLAMINO)AZOBENZENE				790 U
PENTACHLOROBENZENE				400 U
PENTACHLORONITROBENZENE				400 U
PENTACHLOROPHENOL	990 U	990 U	990 U	990 U
PHENACETIN				400 U
PHENANTHRENE	410 U	410 U	410 U	400 U
PHENOL	410 U	410 U	410 U	400 U
PRONAMIDE				400 U
PYRENE	410 U	410 U	410 U	400 U
PYRIDINE				1900 U
SAFROLE				400 U
SULFOTEPP				400 U
THIONAZIN				790 U
Pesiticides/PCBs (ug/kg)				
4,4'-DDD	4.1 U	4.1 U	4.1 U	4 U
4,4'-DDE	4.1 U	4.1 U	4.1 U	4 U
4,4'-DDT	4.1 U	4.1 U	4.1 U	4 U
ALDRIN	2.1 U	2.1 U	2.1 U	2 U
ALPHA-BHC	2.1 U	2.1 U	2.1 U	2 U
ALPHA-CHLORDANE	2.1 U	2.1 U	2.1 U	2 U
AROCLOR-1016	21 U	21 U	21 U	20 U

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017
Sample Location	17SB31	17SB31	17SB31	17SB32
Sample Number	17-B-31-02	17-B-31-02-AVG	17-B-31-02-D	17-B-32-03
Depth Range (below ground surface)	2 - 3	2 - 3	2 - 3	3 - 4
Sample Date	01/18/05	01/18/05	01/18/05	01/18/05
AROCLOR-1221	21 U	21 U	21 U	20 U
AROCLOR-1232	21 U	21 U	21 U	20 U
AROCLOR-1242	21 U	21 U	21 U	20 U
AROCLOR-1248	21 U	21 U	21 U	20 U
AROCLOR-1254	21 U	21 U	21 U	20 U
AROCLOR-1260	21 U	21 U	21 U	20 U
BETA-BHC	2.1 U	2.1 U	2.1 U	2 U
CHLORDANE				20 U
CHLORDANE (TECHNICAL)				
DELTA-BHC	2.1 U	2.1 U	2.1 U	2 U
DIELDRIN	4.1 U	4.1 U	4.1 U	4 U
ENDOSULFAN I	2.1 U	2.1 U	2.1 U	2 U
ENDOSULFAN II	4.1 U	4.1 U	4.1 U	4 U
ENDOSULFAN SULFATE	4.1 U	4.1 U	4.1 U	4 U
ENDRIN	4.1 U	4.1 U	4.1 U	4 U
ENDRIN ALDEHYDE	4.1 U	4.1 U	4.1 U	4 U
ENDRIN KETONE	4.1 U	4.1 U	4.1 U	4 U
GAMMA-BHC (LINDANE)	2.1 U	2.1 U	2.1 U	2 U
GAMMA-CHLORDANE	2.1 U	2.1 U	2.1 U	2 U
HEPTACHLOR	2.1 U	2.1 U	2.1 U	2 U
HEPTACHLOR EPOXIDE	2.1 U	2.1 U	2.1 U	2 U
KEPONE				
METHOXYCHLOR	21 U	21 U	21 U	20 U
TOXAPHENE	41 U	41 U	41 U	40 U
OrganoPhos Pesticides (ug/kg)				
DIMETHOATE				74 U
DISULFOTON				74 U
ETHYL PARATHION				74 U
FAMPHUR				74 U
METHYL PARATHION				74 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE				74 U
PHORATE				74 U
SULFOTEPP				74 U
THIONAZIN				74 U
Herbicides (ug/kg)				
2,4,5-T				40 U
2,4,5-TP (SILVEX)				40 U
2,4-D				100 U
DINOSEB				
Explosives (ug/kg)				
1,3,5-TRINITROBENZENE	100 U	100 U	100 U	100 U
1,3-DINITROBENZENE	100 U	100 U	100 U	100 U
2,4,6-TRINITROTOLUENE	100 U	100 U	100 U	100 U
2,4-DINITROTOLUENE	100 U	100 U	100 U	100 U
2,6-DINITROTOLUENE	200 U	200 U	200 U	200 U
2-AMINO-4,6-DINITROTOLUENE	200 U	200 U	200 U	200 U
2-NITROTOLUENE	200 U	200 U	200 U	200 U
3-NITROTOLUENE	200 U	200 U	200 U	200 U
4-AMINO-2,6-DINITROTOLUENE	200 U	200 U	200 U	200 U
4-NITROTOLUENE	200 U	200 U	200 U	200 U

SUBSURFACE SOIL DATA (> 1')
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017
Sample Location	17SB31	17SB31	17SB31	17SB32
Sample Number	17-B-31-02	17-B-31-02-AVG	17-B-31-02-D	17-B-32-03
Depth Range (below ground surface)	2 - 3	2 - 3	2 - 3	3 - 4
Sample Date	01/18/05	01/18/05	01/18/05	01/18/05
HMX	200 U	200 U	200 U	200 U
NITROBENZENE	100 U	100 U	100 U	100 U
RDX	200 U	200 U	200 U	200 U
TETRYL	250 U	250 U	250 U	250 U
Inorganics (mg/kg)				
ALUMINUM	21900	19850	17800	12800
ANTIMONY	0.75 U	0.59 U	0.43 U	0.3 U
ARSENIC	8.3	7.5	6.7	5.6
BARIUM	28.3	27.6	26.9	32
BERYLLIUM	0.34	0.34	0.34	0.33
CADMIUM	0.06 U	0.055 U	0.05 U	0.04 U
CALCIUM	406	409	412	875
CHROMIUM	39.6	37.45	35.3	24.3
COBALT	2.4	2.4	2.4	1.8
COPPER	2.6	2.75	2.9	0.99
IRON	24800	24950	25100	17300
LEAD	14.8	15.4	16	10.7
MAGNESIUM	1810	1710	1610	1150
MANGANESE	32 J	51.75 J	71.5 J	14.2 J
MERCURY	0.09	0.08	0.07	0.01 U
NICKEL	7.2	6.55	5.9	3.6
POTASSIUM	613	582.5	552	360
SELENIUM	0.74 U	0.705 U	0.67 U	0.47 U
SILVER	0.07 U	0.065 U	0.06 U	0.04 U
SODIUM	77.5	79.3	81.1	237
THALLIUM	0.81 U	1.055 U	1.3 U	0.98 U
VANADIUM	58.1	51.45	44.8	30.8
ZINC	27.4	26.7	26	12.3
Miscellaneous Parameters (mg/kg)				
CYANIDE	0.31 J	0.265 J	0.22 J	0.3 J
TOTAL ORGANIC CARBON	3600	3250	2900	960
TOTAL SOLIDS	80 %	80.5 %	81 %	83 %

APPENDIX E-3
GROUNDWATER ANALYTICAL RESULTS (TtNUS)

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	016
Sample Location	16MW01S	16MW01S	16MW02S	16MW02S	16MW03S	16MW03S	16MW04S	16MW04S	16MW04S	16MW04S
Sample Number	16-G-01S-1001	16-G-01S-0305	16-G-02S-1001	16-G-02S-0205	16-G-03S-1001	16-G-03S-0205	16-G-04S-1001	16-G-04S-1001-AVG	16-G-04S-1001-D	16-G-04S-0205
Sample Date	10/16/01	03/10/05	10/16/01	02/25/05	10/20/01	02/23/05	10/19/01	10/19/01	10/19/01	02/25/05
Volatile Organics (ug/L)										
1,1,1,2-TETRACHLOROETHANE										
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-TRICHLOROPROPANE										
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRIMETHYLBENZENE										
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-TRIMETHYLBENZENE										
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DIOXANE										
2-BUTANONE	5 U	5 U	5 U	5 U	5 U	5 UR	5 U	5 U	5 U	5 U
2-CHLOROETHYL VINYL ETHER										
2-HEXANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-CHLOROPROPENE										
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	5 U	5 UR	5 U	5 U	5 U	5 UR	5 U	5 U	5 U	5 U
ACETONITRILE										
ACROLEIN										
ACRYLONITRILE										
BENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOETHANE										
BROMOFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U	0.7 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLORODIBROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	1 J	1 J	5 U
CHLOROPRENE										
CIS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIBROMOMETHANE										
DICHLORODIFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ETHYL METHACRYLATE										
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOBUTANOL										
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	016
Sample Location	16MW01S	16MW01S	16MW02S	16MW02S	16MW03S	16MW03S	16MW04S	16MW04S	16MW04S	16MW04S
Sample Number	16-G-01S-1001	16-G-01S-0305	16-G-02S-1001	16-G-02S-0205	16-G-03S-1001	16-G-03S-0205	16-G-04S-1001	16-G-04S-1001-AVG	16-G-04S-1001-D	16-G-04S-0205
Sample Date	10/16/01	03/10/05	10/16/01	02/25/05	10/20/01	02/23/05	10/19/01	10/19/01	10/19/01	02/25/05
M+P-XYLENES		10 U		10 U		10 U				10 U
METHACRYLONITRILE										
METHYL ACETATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL IODIDE										
METHYL METHACRYLATE										
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYLENE CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
O-XYLENE		5 U		5 U		5 U				5 U
PENTACHLOROETHANE										
PROPIONITRILE										
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOLUENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOTAL 1,2-DICHLOROETHENE		10 U		10 U		10 U				10 U
TOTAL XYLENES	5 U	15 U	5 U	15 U	5 U	15 U	5 U	5 U	5 U	15 U
TRANS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,4-DICHLORO-2-BUTENE										
TRICHLOROETHENE	5 U	5 U	5 U	32	5 U	0.4 U	0.7 J	0.7 J	5 U	5 U
TRICHLOROFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
VINYL ACETATE										
VINYL CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Semivolatile Organics (ug/L)										
1,1-BIPHENYL	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
1,2,4,5-TETRACHLOROBENZENE										
1,3,5-TRINITROBENZENE										
1,3-DINITROBENZENE										
1,4-NAPHTHOQUINONE										
1,4-PHENYLENEDIAMINE										
1-NAPHTHYLAMINE										
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
2,3,4,6-TETRACHLOROPHENOL										
2,4,5-TRICHLOROPHENOL	25 U	25 U	25 U	25 U	25 U	25 UJ	25 U	25 U	25 U	25 U
2,4,6-TRICHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
2,4-DICHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
2,4-DIMETHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
2,4-DINITROPHENOL	25 U	25 U	25 U	25 U	25 U	25 UJ	25 U	25 U	25 U	25 U
2,4-DINITROTOLUENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
2,6-DICHLOROPHENOL										
2,6-DINITROTOLUENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
2-ACETYLAMINOFLUORENE										
2-CHLORONAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
2-CHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
2-METHYLNAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
2-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
2-NAPHTHYLAMINE										
2-NITROANILINE	25 U	25 U	25 U	25 U	25 U	25 UJ	25 U	25 U	25 U	25 U
2-NITROPHENOL	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
2-PICOLINE										
3&4-METHYLPHENOL										

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	016
Sample Location	16MW01S	16MW01S	16MW02S	16MW02S	16MW03S	16MW03S	16MW04S	16MW04S	16MW04S	16MW04S
Sample Number	16-G-01S-1001	16-G-01S-0305	16-G-02S-1001	16-G-02S-0205	16-G-03S-1001	16-G-03S-0205	16-G-04S-1001	16-G-04S-1001-AVG	16-G-04S-1001-D	16-G-04S-0205
Sample Date	10/16/01	03/10/05	10/16/01	02/25/05	10/20/01	02/23/05	10/19/01	10/19/01	10/19/01	02/25/05
3,3'-DICHLOROBENZIDINE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
3,3'-DIMETHYLBENZIDINE										
3-METHYLCHOLANTHRENE										
3-NITROANILINE	25 U	25 U	25 U	25 U	25 U	25 UJ	25 U	25 U	25 U	25 U
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U	25 U	25 U	25 U	25 UJ	25 U	25 U	25 U	25 U
4-AMINOBIPHENYL										
4-BROMOPHENYL PHENYL ETHER	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
4-CHLORO-3-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
4-CHLOROANILINE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
4-CHLOROPHENYL PHENYL ETHER	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
4-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
4-NITROANILINE	25 U	25 U	25 U	25 U	25 U	25 UJ	25 U	25 U	25 U	25 U
4-NITROPHENOL	25 U	25 UR	25 U	25 U	25 U	25 UJ	25 U	25 U	25 U	25 U
4-NITROQUINOLINE-1-OXIDE										
5-NITRO-O-TOLUIDINE										
7,12-DIMETHYLBENZ(A)ANTHRACENE										
A,A-DIMETHYLPHENETHYLAMINE										
ACENAPHTHENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
ACENAPHTHYLENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
ACETOPHENONE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
ANILINE										
ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
ARAMITE										
ATRAZINE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
BENZALDEHYDE	10 U	10 UR	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U	10 UR
BENZO(A)ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
BENZO(A)PYRENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
BENZO(B)FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
BENZO(G,H,I)PERYLENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
BENZO(K)FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
BENZYL ALCOHOL										
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
BIS(2-CHLOROISOPROPYL)ETHER										
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	11
BUTYL BENZYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
CAPROLACTAM	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
CARBAZOLE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
CHLOROBENZILATE										
CHRYSENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
DI-N-BUTYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
DI-N-OCTYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
DIALLATE										
DIBENZO(A,H)ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
DIBENZOFURAN	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
DIETHYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
DIMETHOATE										
DIMETHYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
DINOSEB										
ETHYL METHANE SULFONATE										
ETHYL PARATHION										

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	016
Sample Location	16MW01S	16MW01S	16MW02S	16MW02S	16MW03S	16MW03S	16MW04S	16MW04S	16MW04S	16MW04S
Sample Number	16-G-01S-1001	16-G-01S-0305	16-G-02S-1001	16-G-02S-0205	16-G-03S-1001	16-G-03S-0205	16-G-04S-1001	16-G-04S-1001-AVG	16-G-04S-1001-D	16-G-04S-0205
Sample Date	10/16/01	03/10/05	10/16/01	02/25/05	10/20/01	02/23/05	10/19/01	10/19/01	10/19/01	02/25/05
FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
FLUORENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
HEXACHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
HEXACHLOROBUTADIENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
HEXACHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
HEXACHLOROPHENE										
HEXACHLOROPROPENE										
INDENO(1,2,3-CD)PYRENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
ISODRIN										
ISOPHORONE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
ISOSAFROLE										
KEPONE										
METHAPYRILENE										
METHYL METHANE SULFONATE										
N-NITROSO-DI-N-BUTYLAMINE										
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
N-NITROSODIETHYLAMINE										
N-NITROSODIMETHYLAMINE										
N-NITROSODIPHENYLAMINE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
N-NITROSOMETHYLETHYLAMINE										
N-NITROSOMORPHOLINE										
N-NITROSOPIPERIDINE										
N-NITROSOPYRROLIDINE										
NAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
NITROBENZENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE										
O-TOLUIDINE										
P-(DIMETHYLAMINO)AZOBENZENE										
PENTACHLOROBENZENE										
PENTACHLORONITROBENZENE										
PENTACHLOROPHENOL	25 U	25 U	25 U	25 UR	25 U	25 UR	25 U	25 U	25 U	25 UR
PHENACETIN										
PHENANTHRENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
PHENOL	10 U	10 U	2 J	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
PRONAMIDE										
PYRENE	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U
PYRIDINE										
SAFROLE										
SULFOTEPP										
THIONAZIN										
Pesticides/PCBs (ug/L)										
4,4'-DDD	0.1 U	0.1 U	0.1 U	0.1 U	9.7 U	0.1 U	9.8 U	9.8 U	9.8 U	0.1 U
4,4'-DDE	0.1 U	0.1 U	0.1 U	0.1 U	9.7 U	0.1 U	9.8 U	9.8 U	9.8 U	0.1 U
4,4'-DDT	0.1 U	0.1 U	0.1 U	0.1 U	9.7 U	0.1 U	9.8 U	9.8 U	9.8 U	0.1 U
ALDRIN	0.05 U	0.05 U	0.05 U	0.05 U	4.8 U	0.05 U	4.9 U	4.9 U	4.9 U	0.05 U
ALPHA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	4.8 U	0.05 U	4.9 U	4.9 U	4.9 U	0.05 U
ALPHA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U	4.8 U	0.05 U	4.9 U	4.9 U	4.9 U	0.05 U
AROCLOR-1016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1221	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1232	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	016
Sample Location	16MW01S	16MW01S	16MW02S	16MW02S	16MW03S	16MW03S	16MW04S	16MW04S	16MW04S	16MW04S
Sample Number	16-G-01S-1001	16-G-01S-0305	16-G-02S-1001	16-G-02S-0205	16-G-03S-1001	16-G-03S-0205	16-G-04S-1001	16-G-04S-1001-AVG	16-G-04S-1001-D	16-G-04S-0205
Sample Date	10/16/01	03/10/05	10/16/01	02/25/05	10/20/01	02/23/05	10/19/01	10/19/01	10/19/01	02/25/05
AROCLOR-1242	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1248	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1254	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1260	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BETA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	4.8 U	0.05 U	4.9 U	4.9 U	4.9 U	0.05 U
CHLORDANE										
DELTA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	4.8 U	0.05 U	4.9 U	4.9 U	4.9 U	0.05 U
DIELDRIN	0.1 U	0.1 U	0.1 U	0.1 U	9.7 U	0.1 U	9.8 U	9.8 U	9.8 U	0.1 U
ENDOSULFAN I	0.05 U	0.05 U	0.05 U	0.05 U	4.8 U	0.05 U	4.9 U	4.9 U	4.9 U	0.05 U
ENDOSULFAN II	0.1 U	0.1 U	0.1 U	0.1 U	9.7 U	0.1 U	9.8 U	9.8 U	9.8 U	0.1 U
ENDOSULFAN SULFATE	0.1 UJ	0.1 U	0.1 U	0.1 U	9.7 U	0.1 U	9.8 U	9.8 U	9.8 U	0.1 U
ENDRIN	0.1 U	0.1 U	0.1 U	0.1 U	9.7 U	0.1 U	9.8 U	9.8 U	9.8 U	0.1 U
ENDRIN ALDEHYDE	0.1 U	0.1 U	0.1 U	0.1 U	9.7 U	0.1 U	9.8 U	9.8 U	9.8 U	0.1 U
ENDRIN KETONE	0.1 UJ	0.1 U	0.1 U	0.1 U	9.7 U	0.1 U	9.8 U	9.8 U	9.8 U	0.1 U
GAMMA-BHC (LINDANE)	0.05 U	0.05 U	0.05 U	0.05 U	4.8 U	0.05 U	4.9 U	4.9 U	4.9 U	0.05 U
GAMMA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U	4.8 U	0.05 U	4.9 U	4.9 U	4.9 U	0.05 U
HEPTACHLOR	0.05 U	0.05 U	0.05 U	0.05 U	4.8 U	0.05 U	4.9 U	4.9 U	4.9 U	0.05 U
HEPTACHLOR EPOXIDE	0.05 U	0.05 U	0.05 U	0.05 U	4.8 U	0.05 U	4.9 U	4.9 U	4.9 U	0.05 U
KEPONE										
METHOXYCHLOR	0.5 U	0.5 U	0.5 U	0.5 U	48 U	0.5 U	49 U	49 U	49 U	0.5 U
TOXAPHENE	1 U	1 U	1 U	1 U	97 U	1 U	98 U	98 U	98 U	1 U
OrganoPhos Pesticides (ug/L)										
DIMETHOATE										
DISULFOTON										
ETHYL PARATHION										
FAMPHUR										
METHYL PARATHION										
O,O,O-TRIETHYL PHOSPHOROTHIOATE										
PHORATE										
SULFOTEPP										
THIONAZIN										
Herbicides (ug/L)										
2,4,5-T										
2,4,5-TP (SILVEX)										
2,4-D										
DINOSEB										
Explosives (ug/L)										
1,3,5-TRINITROBENZENE	0.2 U	0.16 U	0.2 U	0.26 U	0.2 U	0.33 U	0.2 UR	0.2 U	0.2 U	0.25 U
1,3-DINITROBENZENE	0.2 U	0.16 U	0.2 U	0.26 U	0.2 U	0.33 U	0.2 U	0.2 U	0.2 U	0.25 U
2,4,6-TRINITROTOLUENE	0.2 U	0.16 U	0.2 U	0.26 U	0.2 U	0.33 U	0.2 UR	0.2 U	0.2 U	0.25 U
2,4-DINITROTOLUENE	0.2 U	0.31 U	0.2 U	0.5 U	0.2 U	0.64 U	0.2 U	0.2 U	0.2 U	0.48 U
2,6-DINITROTOLUENE	0.2 U	0.31 U	0.2 U	0.5 U	0.2 U	0.64 U	0.2 U	0.2 U	0.2 U	0.48 U
2-AMINO-4,6-DINITROTOLUENE	0.2 U	0.31 U	0.2 U	0.5 U	0.2 U	0.64 U	0.2 U	0.2 U	0.2 U	0.48 U
2-NITROTOLUENE	0.2 U	0.31 U	0.2 U	0.5 U	0.2 U	0.64 U	0.2 U	0.2 U	0.2 U	0.48 U
3-NITROTOLUENE	0.2 U	0.31 U	0.2 U	0.5 U	0.2 U	0.64 U	0.2 U	0.2 U	0.2 U	0.48 U
4-AMINO-2,6-DINITROTOLUENE	0.2 U	0.31 U	0.2 U	0.5 U	0.2 U	0.64 U	0.2 U	0.2 U	0.2 U	0.48 U
4-NITROTOLUENE	0.2 U	0.31 U	0.2 U	0.5 U	0.2 U	0.64 U	0.2 U	0.2 U	0.2 U	0.48 U
HMX	0.5 U	0.31 U	0.5 U	0.5 U	0.5 U	0.64 U	0.5 U	0.5 U	0.5 U	0.48 U
NITROBENZENE	0.2 U	0.16 U	0.2 U	0.26 U	0.2 U	0.33 U	0.2 U	0.2 U	0.2 U	0.25 U
RDX	0.5 U	0.16 U	0.5 U	0.26 U	0.5 U	0.33 U	0.5 U	0.5 U	0.5 U	0.25 U
TETRYL	0.2 U	0.39 U	0.2 U	0.63 U	0.2 U	0.81 U	0.2 UR	0.2 U	0.2 U	0.6 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	016
Sample Location	16MW01S	16MW01S	16MW02S	16MW02S	16MW03S	16MW03S	16MW04S	16MW04S	16MW04S	16MW04S
Sample Number	16-G-01S-1001	16-G-01S-0305	16-G-02S-1001	16-G-02S-0205	16-G-03S-1001	16-G-03S-0205	16-G-04S-1001	16-G-04S-1001-AVG	16-G-04S-1001-D	16-G-04S-0205
Sample Date	10/16/01	03/10/05	10/16/01	02/25/05	10/20/01	02/23/05	10/19/01	10/19/01	10/19/01	02/25/05
Inorganics (ug/L)										
ALUMINUM	950	657	461 U	77.4 U	241 U	43.0 U	56.4 U	60.5 U	64.6 U	36.6 U
ANTIMONY	3.65 U	3.54 U	3.65 U	3.54 U	3.65 U	3.54 U	3.65 U	3.65 U	3.65 U	3.54 U
ARSENIC	2.53 U	2.81 U	2.53 U	2.81 U	3.0 U	2.81 U	4.3 U	3.85 U	3.4 U	6.4 U
BARIUM	524	294	101	93	35.9	40.4	82.9	81.55	80.2	86.2
BERYLLIUM	5.1 U	1.8 U	0.54 U	0.45	0.26 U	0.47	0.74 U	0.775 U	0.81 U	0.40 U
CADMIUM	0.24 U	2.29 U	0.24 U	3.8 U	0.24 U	0.41 U	0.24 U	0.24 U	0.24 U	3.6 U
CALCIUM	43600	23600	202000	228000	179000	215000	178000	180000	182000	170000
CHROMIUM	0.57 U	1.9 U	8.8 U	1.0 U	4.4 U	2.0 U	3.2 U	2.9 U	2.6 U	1.3 U
COBALT	24.7	17.9	0.92 U	4.3 U	0.92 U	4.3 U	0.92 U	0.92 U	0.92 U	4.3 U
COPPER	0.84 U	2.8	0.84 U	2.52 U	0.84 U	2.52 U	0.84 U	0.84 U	0.84 U	2.52 U
IRON	2160	376	285	21.5 U	97.9 U	7.73 U	16.46 U	20.33 U	24.2 U	7.73 U
LEAD	2	2.07 U	1.48 U	2.07 U	1.48 U	4.4 U	1.48 U	1.48 U	1.48 U	2.07 U
MAGNESIUM	27500	15800	472000	571000	504000	588000	445000	453000	461000	475000
MANGANESE	171	130	285	249	552	722	315	319.5	324	251
MERCURY	0.09 U	0.17 U	0.05 U	0.02 U	0.05	0.02 U	0.03 U	0.0275	0.04	0.02 U
NICKEL	36.4 U	24.9 U	4.6 U	11.6 U	4.5 U	11.6 U	1.5 U	2.15 U	2.8 U	11.6 U
POTASSIUM	8460	4820	140000	178000	154000	165000	134000	135500	137000	134000
SELENIUM	3.04 U	4.08 U	3.04 U	4.08 U	3.04 U	4.4 U	3.04 U	2.81	4.1	4.08 U
SILVER	1.03 U	3.93 U	1.03 U	3.93 U	1.03 U	3.93 U	1.03 U	1.03 U	1.03 U	3.93 U
SODIUM	63800	56000	4120000	4720000	3820000	4580000	3930000	3880000	3830000	3660000
THALLIUM	4.74 U	4.26 U	4.74 U	4.26 U	4.74 U	4.26 U	4.74 U	4.74 U	4.74 U	8.7 U
VANADIUM	0.52 U	5.07 U	2.4	5.07 U	3.1	5.07 U	2.8	2.95	3.1	5.07 U
ZINC	37.2	22	2.4 U	3.1 U	9	1.42 U	7.7	6.4	5.1	2.2 U
Miscellaneous Parameters (ug/L)										
CYANIDE	10 U	10 U	10 UR	10 U	10	3.8 J	10 U	10 U	10 U	10 U
Petroleum Hydrocarbons (mg/L)										
TOTAL PETROLEUM HYDROCARBONS										

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	017	017	017	017	017
Sample Location	16MW05S	16MW05S	17MIP01-TW31	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S
Sample Number	16-G-05S-1001	16-G-05S-0205	17-Q-31-0403	17-Q-30-0403	17-Q-30-0403-AVG	17-Q-30-0403-D	17-G-22S-0205
Sample Date	10/20/01	02/23/05	04/27/03	04/27/03	04/27/03	04/27/03	02/23/05
Volatile Organics (ug/L)							
1,1,1,2-TETRACHLOROETHANE							
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	5 U	5 U	12	390	395	400	160
1,1-DICHLOROETHANE	5 U	5 U	5 U	0.7 J	0.75 J	0.8 J	5 U
1,1-DICHLOROETHENE	5 U	5 U	1 J	5 UJ	6.75 J	11 J	9
1,2,3-TRICHLOROPROPANE							
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRIMETHYLBENZENE			5 U	5 U	5 U	5 U	
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-TRIMETHYLBENZENE			5 U	5 U	5 U	5 U	
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DIOXANE							
2-BUTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-CHLOROETHYL VINYL ETHER							
2-HEXANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-CHLOROPROPENE							
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	5 U	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR
ACETONITRILE							
ACROLEIN							
ACRYLONITRILE							
BENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOETHANE							
BROMOFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLORODIBROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROPRENE							
CIS-1,2-DICHLOROETHENE	5 U	5 U	1 J	5 J	4.5 J	4 J	2 J
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIBROMOMETHANE							
DICHLORODIFLUOROMETHANE	5 U	5 U	5 U	14	14.5	15	3 J
ETHYL METHACRYLATE							
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOBUTANOL							
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	017	017	017	017	017
Sample Location	16MW05S	16MW05S	17MIP01-TW31	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S
Sample Number	16-G-05S-1001	16-G-05S-0205	17-Q-31-0403	17-Q-30-0403	17-Q-30-0403-AVG	17-Q-30-0403-D	17-G-22S-0205
Sample Date	10/20/01	02/23/05	04/27/03	04/27/03	04/27/03	04/27/03	02/23/05
M+P-XYLENES		10 U	10 U	10 U	10 U	10 U	10 U
METHACRYLONITRILE							
METHYL ACETATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL IODIDE							
METHYL METHACRYLATE							
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYLENE CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
O-XYLENE		5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLOROETHANE							
PROPIONITRILE							
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	5 U	5 U	92	380	385	390	330
TOLUENE	6	5 U	5 U	5 U	5 U	5 U	5 U
TOTAL 1,2-DICHLOROETHENE		10 U	1 J	5 J	4.5 J	4 J	2 J
TOTAL XYLENES	5 U	15 U	15 U	15 U	15 U	15 U	15 U
TRANS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,4-DICHLORO-2-BUTENE							
TRICHLOROETHENE	5 U	5 U	7 U	45	44.5	44	12
TRICHLOROFLUOROMETHANE	5 U	5 U	5 U	4 J	4 J	4 J	1 J
VINYL ACETATE							
VINYL CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Semivolatile Organics (ug/L)							
1,1-BIPHENYL	10 U	10 U					10 U
1,2,4,5-TETRACHLOROBENZENE							
1,3,5-TRINITROBENZENE							
1,3-DINITROBENZENE							
1,4-NAPHTHOQUINONE							
1,4-PHENYLENEDIAMINE							
1-NAPHTHYLAMINE							
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U					10 U
2,3,4,6-TETRACHLOROPHENOL							
2,4,5-TRICHLOROPHENOL	25 U	25 U					25 U
2,4,6-TRICHLOROPHENOL	10 U	10 U					10 U
2,4-DICHLOROPHENOL	10 U	10 U					10 U
2,4-DIMETHYLPHENOL	10 U	10 U					10 U
2,4-DINITROPHENOL	25 U	25 U					25 U
2,4-DINITROTOLUENE	10 U	10 U					10 U
2,6-DICHLOROPHENOL							
2,6-DINITROTOLUENE	10 U	10 U					10 U
2-ACETYLAMINOFLUORENE							
2-CHLORONAPHTHALENE	10 U	10 U					10 U
2-CHLOROPHENOL	10 U	10 U					10 U
2-METHYLNAPHTHALENE	10 U	10 U					10 U
2-METHYLPHENOL	10 U	10 U					10 U
2-NAPHTHYLAMINE							
2-NITROANILINE	25 U	25 U					25 U
2-NITROPHENOL	10 U	10 U					10 U
2-PICOLINE							
3&4-METHYLPHENOL							

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	017	017	017	017	017
Sample Location	16MW05S	16MW05S	17MIP01-TW31	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S
Sample Number	16-G-05S-1001	16-G-05S-0205	17-Q-31-0403	17-Q-30-0403	17-Q-30-0403-AVG	17-Q-30-0403-D	17-G-22S-0205
Sample Date	10/20/01	02/23/05	04/27/03	04/27/03	04/27/03	04/27/03	02/23/05
3,3'-DICHLOROBENZIDINE	10 U	10 U					10 U
3,3'-DIMETHYLBENZIDINE							
3-METHYLCHOLANTHRENE							
3-NITROANILINE	25 U	25 U					25 U
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U					25 U
4-AMINOBIPHENYL							
4-BROMOPHENYL PHENYL ETHER	10 U	10 U					10 U
4-CHLORO-3-METHYLPHENOL	10 U	10 U					10 U
4-CHLOROANILINE	10 U	10 U					10 U
4-CHLOROPHENYL PHENYL ETHER	10 U	10 U					10 U
4-METHYLPHENOL	10 U	10 U					10 U
4-NITROANILINE	25 U	25 U					25 U
4-NITROPHENOL	25 U	25 U					25 U
4-NITROQUINOLINE-1-OXIDE							
5-NITRO-O-TOLUIDINE							
7,12-DIMETHYLBENZ(A)ANTHRACENE							
A,A-DIMETHYLPHENETHYLAMINE							
ACENAPHTHENE	10 U	10 U					10 U
ACENAPHTHYLENE	10 U	10 U					10 U
ACETOPHENONE	10 U	10 U					10 U
ANILINE							
ANTHRACENE	10 U	10 U					10 U
ARAMITE							
ATRAZINE	10 U	10 U					10 U
BENZALDEHYDE	10 U	10 UR					10 UR
BENZO(A)ANTHRACENE	10 U	10 U					10 U
BENZO(A)PYRENE	10 U	10 U					10 U
BENZO(B)FLUORANTHENE	10 U	10 U					10 U
BENZO(G,H,I)PERYLENE	10 U	10 U					10 U
BENZO(K)FLUORANTHENE	10 U	10 U					10 U
BENZYL ALCOHOL							
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U					10 U
BIS(2-CHLOROETHYL)ETHER	10 U	10 U					10 U
BIS(2-CHLOROISOPROPYL)ETHER							
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	10 U					10 U
BUTYL BENZYL PHTHALATE	10 U	10 U					10 U
CAPROLACTAM	10 U	10 U					10 U
CARBAZOLE	10 U	10 U					10 U
CHLOROBENZILATE							
CHRYSENE	10 U	10 U					10 U
DI-N-BUTYL PHTHALATE	10 U	3 J					3 J
DI-N-OCTYL PHTHALATE	10 U	10 U					10 U
DIALLATE							
DIBENZO(A,H)ANTHRACENE	10 U	10 U					10 U
DIBENZOFURAN	10 U	10 U					10 U
DIETHYL PHTHALATE	10 U	10 U					10 U
DIMETHOATE							
DIMETHYL PHTHALATE	10 U	10 U					10 U
DINOSEB							
ETHYL METHANE SULFONATE							
ETHYL PARATHION							

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	017	017	017	017	017
Sample Location	16MW05S	16MW05S	17MIP01-TW31	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S
Sample Number	16-G-05S-1001	16-G-05S-0205	17-Q-31-0403	17-Q-30-0403	17-Q-30-0403-AVG	17-Q-30-0403-D	17-G-22S-0205
Sample Date	10/20/01	02/23/05	04/27/03	04/27/03	04/27/03	04/27/03	02/23/05
FLUORANTHENE	10 U	10 U					10 U
FLUORENE	10 U	10 U					10 U
HEXACHLOROBENZENE	10 U	10 U					10 U
HEXACHLOROBUTADIENE	10 U	10 U					10 U
HEXACHLOROCYCLOPENTADIENE	10 U	10 U					10 U
HEXACHLOROETHANE	10 U	10 U					10 U
HEXACHLOROPHENE							
HEXACHLOROPROPENE							
INDENO(1,2,3-CD)PYRENE	10 U	10 U					10 U
ISODRIN							
ISOPHORONE	10 U	10 U					10 U
ISOSAFROLE							
KEPONE							
METHAPYRILENE							
METHYL METHANE SULFONATE							
N-NITROSO-DI-N-BUTYLAMINE							
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U					10 U
N-NITROSODIETHYLAMINE							
N-NITROSODIMETHYLAMINE							
N-NITROSODIPHENYLAMINE	10 U	10 U					10 U
N-NITROSOMETHYLETHYLAMINE							
N-NITROSOMORPHOLINE							
N-NITROSOPIPERIDINE							
N-NITROSOPYRROLIDINE							
NAPHTHALENE	10 U	10 U					10 U
NITROBENZENE	10 U	10 U					10 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE							
O-TOLUIDINE							
P-(DIMETHYLAMINO)AZOBENZENE							
PENTACHLOROBENZENE							
PENTACHLORONITROBENZENE							
PENTACHLOROPHENOL	25 U	25 UR					25 UR
PHENACETIN							
PHENANTHRENE	10 U	10 U					10 U
PHENOL	10 U	10 U					10 U
PRONAMIDE							
PYRENE	10 U	10 U					10 U
PYRIDINE							
SAFROLE							
SULFOTEPP							
THIONAZIN							
Pesticides/PCBs (ug/L)							
4,4'-DDD	9.9 U	0.1 U					0.1 U
4,4'-DDE	9.9 U	0.1 U					0.1 U
4,4'-DDT	9.9 U	0.1 U					0.1 U
ALDRIN	5 U	0.05 U					0.05 U
ALPHA-BHC	5 U	0.05 U					0.05 U
ALPHA-CHLORDANE	5 U	0.05 U					0.05 U
AROCLOR-1016	0.5 U	0.5 U					0.5 U
AROCLOR-1221	0.5 U	0.5 U					0.5 U
AROCLOR-1232	0.5 U	0.5 U					0.5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	017	017	017	017	017
Sample Location	16MW05S	16MW05S	17MIP01-TW31	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S
Sample Number	16-G-05S-1001	16-G-05S-0205	17-Q-31-0403	17-Q-30-0403	17-Q-30-0403-AVG	17-Q-30-0403-D	17-G-22S-0205
Sample Date	10/20/01	02/23/05	04/27/03	04/27/03	04/27/03	04/27/03	02/23/05
AROCLOR-1242	0.5 U	0.5 U					0.5 U
AROCLOR-1248	0.5 U	0.5 U					0.5 U
AROCLOR-1254	0.5 U	0.5 U					0.5 U
AROCLOR-1260	0.5 U	0.5 U					0.5 U
BETA-BHC	5 U	0.05 U					0.05 U
CHLORDANE							
DELTA-BHC	5 U	0.05 U					0.05 U
DIELDRIN	9.9 U	0.1 U					0.1 U
ENDOSULFAN I	5 U	0.05 U					0.05 U
ENDOSULFAN II	9.9 U	0.1 U					0.1 U
ENDOSULFAN SULFATE	9.9 U	0.1 U					0.1 U
ENDRIN	9.9 U	0.1 U					0.1 U
ENDRIN ALDEHYDE	9.9 U	0.1 U					0.1 U
ENDRIN KETONE	9.9 U	0.1 U					0.1 U
GAMMA-BHC (LINDANE)	5 U	0.05 U					0.05 U
GAMMA-CHLORDANE	5 U	0.05 U					0.05 U
HEPTACHLOR	5 U	0.05 U					0.05 U
HEPTACHLOR EPOXIDE	5 U	0.05 U					0.05 U
KEPONE							
METHOXYCHLOR	50 U	0.5 U					0.5 U
TOXAPHENE	99 U	1 U					1 U
OrganoPhos Pesticides (ug/L)							
DIMETHOATE							
DISULFOTON							
ETHYL PARATHION							
FAMPHUR							
METHYL PARATHION							
O,O,O-TRIETHYL PHOSPHOROTHIOATE							
PHORATE							
SULFOTEPP							
THIONAZIN							
Herbicides (ug/L)							
2,4,5-T							
2,4,5-TP (SILVEX)							
2,4-D							
DINOSEB							
Explosives (ug/L)							
1,3,5-TRINITROBENZENE	0.2 U	0.25 U					0.2 U
1,3-DINITROBENZENE	0.2 U	0.25 U					0.2 U
2,4,6-TRINITROTOLUENE	0.2 U	0.25 U					0.2 U
2,4-DINITROTOLUENE	0.2 U	0.49 U					0.39 U
2,6-DINITROTOLUENE	0.2 U	0.49 U					0.39 U
2-AMINO-4,6-DINITROTOLUENE	0.2 U	0.49 U					0.39 U
2-NITROTOLUENE	0.2 U	0.49 U					0.39 U
3-NITROTOLUENE	0.2 U	0.49 U					0.39 U
4-AMINO-2,6-DINITROTOLUENE	0.2 U	0.49 U					0.39 U
4-NITROTOLUENE	0.2 U	0.49 U					0.39 U
HMX	0.5 U	0.49 U					0.39 U
NITROBENZENE	0.2 U	0.25 U					0.2 U
RDX	0.5 U	0.25 U					0.2 U
TETRYL	0.2 U	0.62 U					0.49 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	017	017	017	017	017
Sample Location	16MW05S	16MW05S	17MIP01-TW31	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S
Sample Number	16-G-05S-1001	16-G-05S-0205	17-Q-31-0403	17-Q-30-0403	17-Q-30-0403-AVG	17-Q-30-0403-D	17-G-22S-0205
Sample Date	10/20/01	02/23/05	04/27/03	04/27/03	04/27/03	04/27/03	02/23/05
Inorganics (ug/L)							
ALUMINUM	167 U	127 U					59.2 U
ANTIMONY	3.65 U	3.54 U					3.54 U
ARSENIC	5.1 U	4.3 U					3.6 U
BARIUM	35.4	30.9					42.7
BERYLLIUM	0.19 U	0.40 U					0.40 U
CADMIUM	0.24 U	0.41 U					0.41 U
CALCIUM	166000	186000					35800
CHROMIUM	3.4 U	1.6 U					1.0 U
COBALT	0.92 U	4.3 U					4.3 U
COPPER	0.84 U	2.52 U					2.52 U
IRON	53.4 U	36.2 U					123 U
LEAD	1.48 U	2.07 U					2.07 U
MAGNESIUM	472000	509000					4380
MANGANESE	340	335					98.6
MERCURY	0.03 U	0.02 U					0.02 U
NICKEL	3.8 U	11.6 U					11.6 U
POTASSIUM	154000	158000					3820
SELENIUM	3.04 U	4.08 U					4.08 U
SILVER	1.03 U	3.93 U					3.93 U
SODIUM	3590000	4120000					21800
THALLIUM	4.74 U	4.26 U					4.26 U
VANADIUM	2.2	5.07 U					5.07 U
ZINC	6.2	1.8 U					12.9
Miscellaneous Parameters (ug/L)							
CYANIDE	10 U	10 U					10 U
Petroleum Hydrocarbons (mg/L)							
TOTAL PETROLEUM HYDROCARBONS							

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017
Sample Location	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S	17MIP03-TW29-MW11S	17MIP03-TW29-MW11S	17MIP04-TW28	17MIP05-TW27	17MIP06-TW26
Sample Number	17-G-22S-0205-AVG	17-G-22S-0205-D	17-Q-29-0403	17-G-11S-0205	17-Q-28-0403	17-Q-27-0403	17-Q-26-0403
Sample Date	02/23/05	02/23/05	04/27/03	02/23/05	04/27/03	04/27/03	04/27/03
Volatile Organics (ug/L)							
1,1,1,2-TETRACHLOROETHANE				5 U			
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROETHANE	5 U	5 U	6	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	160	160	930		2500 J	320	6
1,1-DICHLOROETHANE	5 U	5 U	2 J	2 J	1 J	5 U	0.2 J
1,1-DICHLOROETHENE	8	7	5 U	6	5 U	5 U	0.4 J
1,2,3-TRICHLOROPROPANE				5 U			
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRIMETHYLBENZENE			5 U		5 U	5 U	5 U
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U	1 J	0.7 J	0.6 J	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-TRIMETHYLBENZENE			5 U		5 U	5 U	5 U
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DIOXANE				100 UR			
2-BUTANONE	5 U	5 UR	5 U	10 U	5 U	5 U	5 U
2-CHLOROETHYL VINYL ETHER							
2-HEXANONE	5 U	5 U	5 U	10 U	5 U	5 U	5 U
3-CHLOROPROPENE				10 U			
4-METHYL-2-PENTANONE	5 U	5 U	5 U	10 U	5 U	5 U	5 U
ACETONE	5 UR	5 UR	5 UR	10 UR	5 U	5 U	5 UR
ACETONITRILE				50 UR			
ACROLEIN				50 UR			
ACRYLONITRILE				10 UR			
BENZENE	5 U	5 U	0.6 J	5 U	0.7 J	5 U	5 U
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOETHANE							
BROMOFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U	5 U	0.3 J
CARBON TETRACHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLORODIBROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROPRENE				10 U			
CIS-1,2-DICHLOROETHENE	2 J	2 J	8	6	9	1 J	2 J
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CYCLOHEXANE	5 U	5 U	5 U		5 U	5 U	5 U
DIBROMOMETHANE				5 U			
DICHLORODIFLUOROMETHANE	3 J	3 J	51	2 J	40	5 J	5 U
ETHYL METHACRYLATE				10 U			
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOBUTANOL				100 UR			
ISOPROPYLBENZENE	5 U	5 U	5 U		5 U	5 U	5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017
Sample Location	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S	17MIP03-TW29-MW11S	17MIP03-TW29-MW11S	17MIP04-TW28	17MIP05-TW27	17MIP06-TW26
Sample Number	17-G-22S-0205-AVG	17-G-22S-0205-D	17-Q-29-0403	17-G-11S-0205	17-Q-28-0403	17-Q-27-0403	17-Q-26-0403
Sample Date	02/23/05	02/23/05	04/27/03	02/23/05	04/27/03	04/27/03	04/27/03
M+P-XYLENES	10 U	10 U	10 U	10 U	10 U	10 U	0.3 J
METHACRYLONITRILE				50 U			
METHYL ACETATE	5 U	5 U	5 U		5 U	5 U	5 U
METHYL CYCLOHEXANE	5 U	5 U	5 U		5 U	5 U	5 U
METHYL IODIDE				10 U			
METHYL METHACRYLATE				10 U			
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U		5 U	5 U	5 U
METHYLENE CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
O-XYLENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLOROETHANE				10 U			
PROPIONITRILE				50 U			
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	325	320	210	180	290	12	28
TOLUENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOTAL 1,2-DICHLOROETHENE	2 J	2 J	8 J		9 J	1 J	2 J
TOTAL XYLENES	15 U	15 U	15 U	15 U	15 U	15 U	0.3 J
TRANS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,4-DICHLORO-2-BUTENE				10 U			
TRICHLOROETHENE	12	12	120	50	180	36	5 U
TRICHLOROFLUOROMETHANE	1 J	1 J	9	3 J	14	2 J	5 U
VINYL ACETATE				5 U			
VINYL CHLORIDE	5 U	5 U	0.8 J	2 U	5 U	5 U	5 U
Semivolatile Organics (ug/L)							
1,1-BIPHENYL	10 U	10 U					
1,2,4,5-TETRACHLOROBENZENE				10 U			
1,3,5-TRINITROBENZENE				10 U			
1,3-DINITROBENZENE				10 U			
1,4-NAPHTHOQUINONE				10 U			
1,4-PHENYLENEDIAMINE				10 U			
1-NAPHTHYLAMINE				10 U			
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U		10 U			
2,3,4,6-TETRACHLOROPHENOL				10 U			
2,4,5-TRICHLOROPHENOL	25 U	25 U		25 U			
2,4,6-TRICHLOROPHENOL	10 U	10 U		10 U			
2,4-DICHLOROPHENOL	10 U	10 U		10 U			
2,4-DIMETHYLPHENOL	10 U	10 U		10 U			
2,4-DINITROPHENOL	25 U	25 U		25 U			
2,4-DINITROTOLUENE	10 U	10 U		10 U			
2,6-DICHLOROPHENOL				10 U			
2,6-DINITROTOLUENE	10 U	10 U		10 U			
2-ACETYLAMINOFLUORENE				10 U			
2-CHLORONAPHTHALENE	10 U	10 U		10 U			
2-CHLOROPHENOL	10 U	10 U		10 U			
2-METHYLNAPHTHALENE	10 U	10 U		10 U			
2-METHYLPHENOL	10 U	10 U		10 U			
2-NAPHTHYLAMINE				10 U			
2-NITROANILINE	25 U	25 U		25 U			
2-NITROPHENOL	10 U	10 U		10 U			
2-PICOLINE				10 U			
3&4-METHYLPHENOL				10 U			

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017
Sample Location	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S	17MIP03-TW29-MW11S	17MIP03-TW29-MW11S	17MIP04-TW28	17MIP05-TW27	17MIP06-TW26
Sample Number	17-G-22S-0205-AVG	17-G-22S-0205-D	17-Q-29-0403	17-G-11S-0205	17-Q-26-0403	17-Q-27-0403	17-Q-26-0403
Sample Date	02/23/05	02/23/05	04/27/03	02/23/05	04/27/03	04/27/03	04/27/03
3,3'-DICHLOROBENZIDINE	10 U	10 U		10 U			
3,3'-DIMETHYLBENZIDINE				20 U			
3-METHYLCHOLANTHRENE				10 U			
3-NITROANILINE	25 U	25 U		25 U			
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U		25 U			
4-AMINOBIPHENYL				10 U			
4-BROMOPHENYL PHENYL ETHER	10 U	10 U		10 U			
4-CHLORO-3-METHYLPHENOL	10 U	10 U		10 U			
4-CHLOROANILINE	10 U	10 U		10 U			
4-CHLOROPHENYL PHENYL ETHER	10 U	10 U		10 U			
4-METHYLPHENOL	10 U	10 U					
4-NITROANILINE	25 U	25 U		25 U			
4-NITROPHENOL	25 U	25 U		25 U			
4-NITROQUINOLINE-1-OXIDE				20 U			
5-NITRO-O-TOLUIDINE				20 U			
7,12-DIMETHYLBENZ(A)ANTHRACENE				10 U			
A,A-DIMETHYLPHENETHYLAMINE				10 U			
ACENAPHTHENE	10 U	10 U		10 U			
ACENAPHTHYLENE	10 U	10 U		10 U			
ACETOPHENONE	10 U	10 U		10 U			
ANILINE				10 U			
ANTHRACENE	10 U	10 U		10 U			
ARAMITE				20 U			
ATRAZINE	10 U	10 U					
BENZALDEHYDE	10 UR	10 UR					
BENZO(A)ANTHRACENE	10 U	10 U		10 U			
BENZO(A)PYRENE	10 U	10 U		10 U			
BENZO(B)FLUORANTHENE	10 U	10 U		10 U			
BENZO(G,H,I)PERYLENE	10 U	10 U		10 U			
BENZO(K)FLUORANTHENE	10 U	10 U		10 U			
BENZYL ALCOHOL				20 U			
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U		10 U			
BIS(2-CHLOROETHYL)ETHER	10 U	10 U		10 U			
BIS(2-CHLOROISOPROPYL)ETHER							
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	10 U		10 U			
BUTYL BENZYL PHTHALATE	10 U	10 U		10 U			
CAPROLACTAM	10 U	10 U					
CARBAZOLE	10 U	10 U					
CHLOROBENZILATE				20 U			
CHRYSENE	10 U	10 U		10 U			
DI-N-BUTYL PHTHALATE	4.5 J	6 J		10 U			
DI-N-OCTYL PHTHALATE	10 U	10 U		10 U			
DIALLATE				20 U			
DIBENZO(A,H)ANTHRACENE	10 U	10 U		10 U			
DIBENZOFURAN	10 U	10 U		10 U			
DIETHYL PHTHALATE	10 U	10 U		10 U			
DIMETHOATE							
DIMETHYL PHTHALATE	10 U	10 U		10 U			
DINOSEB				5 U			
ETHYL METHANE SULFONATE				10 U			
ETHYL PARATHION							

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017
Sample Location	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S	17MIP03-TW29-MW11S	17MIP03-TW29-MW11S	17MIP04-TW28	17MIP05-TW27	17MIP06-TW26
Sample Number	17-G-22S-0205-AVG	17-G-22S-0205-D	17-Q-29-0403	17-G-11S-0205	17-Q-28-0403	17-Q-27-0403	17-Q-26-0403
Sample Date	02/23/05	02/23/05	04/27/03	02/23/05	04/27/03	04/27/03	04/27/03
FLUORANTHENE	10 U	10 U		10 U			
FLUORENE	10 U	10 U		10 U			
HEXACHLOROBENZENE	10 U	10 U		10 U			
HEXACHLOROBUTADIENE	10 U	10 U		10 U			
HEXACHLOROCYCLOPENTADIENE	10 U	10 U		10 U			
HEXACHLOROETHANE	10 U	10 U		10 U			
HEXACHLOROPHENE				10 UR			
HEXACHLOROPROPENE				10 U			
INDENO(1,2,3-CD)PYRENE	10 U	10 U		10 U			
ISODRIN				20 U			
ISOPHORONE	10 U	10 U		10 U			
ISOSAFROLE				20 U			
KEPONE				10 UR			
METHAPYRILENE				10 U			
METHYL METHANE SULFONATE				20 U			
N-NITROSO-DI-N-BUTYLAMINE				10 U			
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U		10 U			
N-NITROSODIETHYLAMINE				20 U			
N-NITROSODIMETHYLAMINE				20 U			
N-NITROSODIPHENYLAMINE	10 U	10 U		10 U			
N-NITROSOMETHYLETHYLAMINE				10 U			
N-NITROSOMORPHOLINE				10 U			
N-NITROSOPIPERIDINE				10 U			
N-NITROSOPYRROLIDINE				10 U			
NAPHTHALENE	10 U	10 U		10 U			
NITROBENZENE	10 U	10 U		10 U			
O,O,O-TRIETHYL PHOSPHOROTHIOATE							
O-TOLUIDINE				10 U			
P-(DIMETHYLAMINO)AZOBENZENE				20 U			
PENTACHLOROBENZENE				10 U			
PENTACHLORONITROBENZENE				10 U			
PENTACHLOROPHENOL	25 UR	25 UR		25 U			
PHENACETIN				10 U			
PHENANTHRENE	10 U	10 U		10 U			
PHENOL	10 U	10 U		10 U			
PRONAMIDE				10 U			
PYRENE	10 U	10 U		10 U			
PYRIDINE				50 U			
SAFROLE				10 U			
SULFOTEPP							
THIONAZIN							
Pesticides/PCBs (ug/L)							
4,4'-DDD	0.1 U	0.1 U		0.1 U			
4,4'-DDE	0.1 U	0.1 U		0.1 U			
4,4'-DDT	0.1 U	0.1 U		0.1 U			
ALDRIN	0.05 U	0.05 U		0.05 U			
ALPHA-BHC	0.05 U	0.05 U		0.05 U			
ALPHA-CHLORDANE	0.05 U	0.05 U		0.05 U			
AROCLOR-1016	0.5 U	0.5 U		0.5 U			
AROCLOR-1221	0.5 U	0.5 U		0.5 U			
AROCLOR-1232	0.5 U	0.5 U		0.5 U			

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017
Sample Location	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S	17MIP03-TW29-MW11S	17MIP03-TW29-MW11S	17MIP04-TW28	17MIP05-TW27	17MIP06-TW26
Sample Number	17-G-22S-0205-AVG	17-G-22S-0205-D	17-Q-29-0403	17-G-11S-0205	17-Q-28-0403	17-Q-27-0403	17-Q-26-0403
Sample Date	02/23/05	02/23/05	04/27/03	02/23/05	04/27/03	04/27/03	04/27/03
AROCLOR-1242	0.5 U	0.5 U		0.5 U			
AROCLOR-1248	0.5 U	0.5 U		0.5 U			
AROCLOR-1254	0.5 U	0.5 U		0.5 U			
AROCLOR-1260	0.5 U	0.5 U		0.5 U			
BETA-BHC	0.05 U	0.05 U		0.05 U			
CHLORDANE				0.5 U			
DELTA-BHC	0.05 U	0.05 U		0.05 U			
DIELDRIN	0.1 U	0.1 U		0.1 U			
ENDOSULFAN I	0.05 U	0.05 U		0.05 U			
ENDOSULFAN II	0.1 U	0.1 U		0.1 U			
ENDOSULFAN SULFATE	0.1 U	0.1 U		0.1 U			
ENDRIN	0.1 U	0.1 U		0.1 U			
ENDRIN ALDEHYDE	0.1 U	0.1 U		0.1 U			
ENDRIN KETONE	0.1 U	0.1 U		0.1 U			
GAMMA-BHC (LINDANE)	0.05 U	0.05 U		0.05 U			
GAMMA-CHLORDANE	0.05 U	0.05 U		0.05 U			
HEPTACHLOR	0.05 U	0.05 U		0.05 U			
HEPTACHLOR EPOXIDE	0.05 U	0.05 U		0.05 U			
KEPONE							
METHOXYCHLOR	0.5 U	0.5 U		0.5 U			
TOXAPHENE	1 U	1 U		1 U			
OrganoPhos Pesticides (ug/L)							
DIMETHOATE				2 U			
DISULFOTON				2 U			
ETHYL PARATHION				2 U			
FAMPHUR				2 U			
METHYL PARATHION				2 U			
O,O,O-TRIETHYL PHOSPHOROTHIOATE				2 U			
PHORATE				2 U			
SULFOTEPP				2 U			
THIONAZIN				2 U			
Herbicides (ug/L)							
2,4,5-T				1.5 U			
2,4,5-TP (SILVEX)				1 U			
2,4-D				2.5 U			
DINOSEB							
Explosives (ug/L)							
1,3,5-TRINITROBENZENE	0.19 U	0.18 U		0.16 U			
1,3-DINITROBENZENE	0.19 U	0.18 U		0.16 U			
2,4,6-TRINITROTOLUENE	0.19 U	0.18 U		0.16 U			
2,4-DINITROTOLUENE	0.37 U	0.35 U		0.31 U			
2,6-DINITROTOLUENE	0.37 U	0.35 U		0.31 U			
2-AMINO-4,6-DINITROTOLUENE	0.37 U	0.35 U		0.31 U			
2-NITROTOLUENE	0.37 U	0.35 U		0.31 U			
3-NITROTOLUENE	0.37 U	0.35 U		0.31 U			
4-AMINO-2,6-DINITROTOLUENE	0.37 U	0.35 U		0.31 U			
4-NITROTOLUENE	0.37 U	0.35 U		0.31 U			
HMX	0.37 U	0.35 U		0.31 U			
NITROBENZENE	0.19 U	0.18 U		0.16 U			
RDX	0.19 U	0.18 U		0.16 U			
TETRYL	0.465 U	0.44 U		0.39 U			

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017
Sample Location	17MIP02-TW30-MW22S	17MIP02-TW30-MW22S	17MIP03-TW29-MW11S	17MIP03-TW29-MW11S	17MIP04-TW28	17MIP05-TW27	17MIP06-TW26
Sample Number	17-G-22S-0205-AVG	17-G-22S-0205-D	17-Q-29-0403	17-G-11S-0205	17-Q-28-0403	17-Q-27-0403	17-Q-26-0403
Sample Date	02/23/05	02/23/05	04/27/03	02/23/05	04/27/03	04/27/03	04/27/03
Inorganics (ug/L)							
ALUMINUM	55.3 U	51.4 U		197 U			
ANTIMONY	3.54 U	3.54 U		3.54 U			
ARSENIC	3.205 U	2.81 U		2.81 U			
BARIUM	42.35	42		49.7			
BERYLLIUM	0.4 U	0.40 U		0.40 U			
CADMIUM	0.41 U	0.41 U		0.41 U			
CALCIUM	35400	35000		12800			
CHROMIUM	1 U	1.0 U		1.0 U			
COBALT	4.3 U	4.3 U		4.3 U			
COPPER	2.52 U	2.52 U		2.52 U			
IRON	121.5 U	120 U		526			
LEAD	2.07 U	2.07 U		2.07 U			
MAGNESIUM	4340	4300		3120			
MANGANESE	90	81.4		46.4			
MERCURY	0.02 U	0.02 U		0.02 U			
NICKEL	11.6 U	11.6 U		11.6 U			
POTASSIUM	3780	3740		2430			
SELENIUM	4.09 U	4.1 U		4.08 U			
SILVER	3.93 U	3.93 U		3.93 U			
SODIUM	21700	21600		23200			
THALLIUM	4.26 U	4.26 U		4.4 U			
VANADIUM	5.07 U	5.07 U		5.07 U			
ZINC	13.15	13.4		16			
Miscellaneous Parameters (ug/L)							
CYANIDE	10 U	10 U		10 U			
Petroleum Hydrocarbons (mg/L)							
TOTAL PETROLEUM HYDROCARBONS							

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MIP06-TW26	17MIP06-TW26	17MIP07-TW24	17MIP08-TW23	17MIP09-TW21	17MIP10-TW25SD	17MIP10-TW25SD	17MIP11-TW11	17MIP12-TW12
Sample Number	17-Q-26-0403-AVG	17-Q-26-0403-D	17-Q-24-0403	17-Q-23-0403	17-Q-21-0403	17-Q-25D-0403	17-Q-25S-0403	17-Q-11-0403	17-Q-12-0403
Sample Date	04/27/03	04/27/03	04/27/03	04/27/03	04/27/03	04/27/03	04/27/03	04/26/03	04/26/03
Volatile Organics (ug/L)									
1,1,1,2-TETRACHLOROETHANE									
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	8 J	10 J	5 U	31 J	5 U	9 J	5 U	5 U	230 J
1,1-DICHLOROETHANE	0.2 J	5 U	5 U	5 U	5 U	0.3 J	5 U	5 U	5 U
1,1-DICHLOROETHENE	0.4 J	5 U	0.5 J	5 U	5 U	0.4 J	5 U	5 U	5 U
1,2,3-TRICHLOROPROPANE									
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRIMETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	2 J	5 U	5 U	5 U
1,3,5-TRIMETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DIOXANE									
2-BUTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-CHLOROETHYL VINYL ETHER									
2-HEXANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-CHLOROPROPENE									
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONITRILE									
ACROLEIN									
ACRYLONITRILE									
BENZENE	5 U	5 U	0.3 J	0.2 J	5 U	5 U	5 U	5 U	5 U
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOETHANE									
BROMOFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	0.3 J	5 U	5 U	5 U	5 U	0.3 J	5 U	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLORODIBROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROPRENE									
CIS-1,2-DICHLOROETHENE	2 J	2 J	6	5 U	5 U	1 J	5 U	5 U	0.9 J
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIBROMOMETHANE									
DICHLORODIFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	2 J
ETHYL METHACRYLATE									
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOBUTANOL									
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MIP06-TW26	17MIP06-TW26	17MIP07-TW24	17MIP08-TW23	17MIP09-TW21	17MIP10-TW25SD	17MIP10-TW25SD	17MIP11-TW11	17MIP12-TW12
Sample Number	17-Q-26-0403-AVG	17-Q-26-0403-D	17-Q-24-0403	17-Q-23-0403	17-Q-21-0403	17-Q-25D-0403	17-Q-25S-0403	17-Q-11-0403	17-Q-12-0403
Sample Date	04/27/03	04/27/03	04/27/03	04/27/03	04/27/03	04/27/03	04/27/03	04/26/03	04/26/03
M+P-XYLENES	0.3 J	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHACRYLONITRILE									
METHYL ACETATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL IODIDE									
METHYL METHACRYLATE									
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYLENE CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
O-XYLENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLOROETHANE									
PROPIONITRILE									
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	32.5	37	120	5	5 U	29	5 U	5 U	6
TOLUENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOTAL 1,2-DICHLOROETHENE	2 J	2 J	6	5 U	5 U	1 J	5 U	5 U	0.9 J
TOTAL XYLENES	0.3 J	15 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,4-DICHLORO-2-BUTENE									
TRICHLOROETHENE	23.25 J	44 J	23 J	8 U	35 J	8 U	5 U	5 U	5 U
TRICHLOROFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
VINYL ACETATE									
VINYL CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Semivolatile Organics (ug/L)									
1,1-BIPHENYL									
1,2,4,5-TETRACHLOROBENZENE									
1,3,5-TRINITROBENZENE									
1,3-DINITROBENZENE									
1,4-NAPHTHOQUINONE									
1,4-PHENYLENEDIAMINE									
1-NAPHTHYLAMINE									
2,2'-OXYBIS(1-CHLOROPROPANE)									
2,3,4,6-TETRACHLOROPHENOL									
2,4,5-TRICHLOROPHENOL									
2,4,6-TRICHLOROPHENOL									
2,4-DICHLOROPHENOL									
2,4-DIMETHYLPHENOL									
2,4-DINITROPHENOL									
2,4-DINITROTOLUENE									
2,6-DICHLOROPHENOL									
2,6-DINITROTOLUENE									
2-ACETYLAMINOFLUORENE									
2-CHLORONAPHTHALENE									
2-CHLOROPHENOL									
2-METHYLNAPHTHALENE									
2-METHYLPHENOL									
2-NAPHTHYLAMINE									
2-NITROANILINE									
2-NITROPHENOL									
2-PICOLINE									
3&4-METHYLPHENOL									

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MIP06-TW26	17MIP06-TW26	17MIP07-TW24	17MIP08-TW23	17MIP09-TW21	17MIP10-TW25SD	17MIP10-TW25SD	17MIP11-TW11	17MIP12-TW12
Sample Number	17-Q-26-0403-AVG	17-Q-26-0403-D	17-Q-24-0403	17-Q-23-0403	17-Q-21-0403	17-Q-25D-0403	17-Q-25S-0403	17-Q-11-0403	17-Q-12-0403
Sample Date	04/27/03	04/27/03	04/27/03	04/27/03	04/27/03	04/27/03	04/27/03	04/26/03	04/26/03
3,3'-DICHLOROBENZIDINE									
3,3'-DIMETHYLBENZIDINE									
3-METHYLCHOLANTHRENE									
3-NITROANILINE									
4,6-DINITRO-2-METHYLPHENOL									
4-AMINOBIPHENYL									
4-BROMOPHENYL PHENYL ETHER									
4-CHLORO-3-METHYLPHENOL									
4-CHLOROANILINE									
4-CHLOROPHENYL PHENYL ETHER									
4-METHYLPHENOL									
4-NITROANILINE									
4-NITROPHENOL									
4-NITROQUINOLINE-1-OXIDE									
5-NITRO-O-TOLUIDINE									
7,12-DIMETHYLBENZ(A)ANTHRACENE									
A,A-DIMETHYLPHENETHYLAMINE									
ACENAPHTHENE									
ACENAPHTHYLENE									
ACETOPHENONE									
ANILINE									
ANTHRACENE									
ARAMITE									
ATRAZINE									
BENZALDEHYDE									
BENZO(A)ANTHRACENE									
BENZO(A)PYRENE									
BENZO(B)FLUORANTHENE									
BENZO(G,H,I)PERYLENE									
BENZO(K)FLUORANTHENE									
BENZYL ALCOHOL									
BIS(2-CHLOROETHOXY)METHANE									
BIS(2-CHLOROETHYL)ETHER									
BIS(2-CHLOROISOPROPYL)ETHER									
BIS(2-ETHYLHEXYL)PHTHALATE									
BUTYL BENZYL PHTHALATE									
CAPROLACTAM									
CARBAZOLE									
CHLOROBENZILATE									
CHRYSENE									
DI-N-BUTYL PHTHALATE									
DI-N-OCTYL PHTHALATE									
DIALLATE									
DIBENZO(A,H)ANTHRACENE									
DIBENZOFURAN									
DIETHYL PHTHALATE									
DIMETHOATE									
DIMETHYL PHTHALATE									
DINOSEB									
ETHYL METHANE SULFONATE									
ETHYL PARATHION									

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MIP06-TW26	17MIP06-TW26	17MIP07-TW24	17MIP08-TW23	17MIP09-TW21	17MIP10-TW25SD	17MIP10-TW25SD	17MIP11-TW11	17MIP12-TW12
Sample Number	17-Q-26-0403-AVG	17-Q-26-0403-D	17-Q-24-0403	17-Q-23-0403	17-Q-21-0403	17-Q-25D-0403	17-Q-25S-0403	17-Q-11-0403	17-Q-12-0403
Sample Date	04/27/03	04/27/03	04/27/03	04/27/03	04/27/03	04/27/03	04/27/03	04/26/03	04/26/03
FLUORANTHENE									
FLUORENE									
HEXACHLOROBENZENE									
HEXACHLOROBUTADIENE									
HEXACHLOROCYCLOPENTADIENE									
HEXACHLOROETHANE									
HEXACHLOROPHENE									
HEXACHLOROPROPENE									
INDENO(1,2,3-CD)PYRENE									
ISODRIN									
ISOPHORONE									
ISOSAFROLE									
KEPONE									
METHAPYRILENE									
METHYL METHANE SULFONATE									
N-NITROSO-DI-N-BUTYLAMINE									
N-NITROSO-DI-N-PROPYLAMINE									
N-NITROSODIETHYLAMINE									
N-NITROSODIMETHYLAMINE									
N-NITROSODIPHENYLAMINE									
N-NITROSOMETHYLETHYLAMINE									
N-NITROSOMORPHOLINE									
N-NITROSOPIPERIDINE									
N-NITROSOPYRROLIDINE									
NAPHTHALENE									
NITROBENZENE									
O,O,O-TRIETHYL PHOSPHOROTHIOATE									
O-TOLUIDINE									
P-(DIMETHYLAMINO)AZOBENZENE									
PENTACHLOROBENZENE									
PENTACHLORONITROBENZENE									
PENTACHLOROPHENOL									
PHENACETIN									
PHENANTHRENE									
PHENOL									
PRONAMIDE									
PYRENE									
PYRIDINE									
SAFROLE									
SULFOTEPP									
THIONAZIN									
Pesticides/PCBs (ug/L)									
4,4'-DDD									
4,4'-DDE									
4,4'-DDT									
ALDRIN									
ALPHA-BHC									
ALPHA-CHLORDANE									
AROCLOR-1016									
AROCLOR-1221									
AROCLOR-1232									

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MIP06-TW26	17MIP06-TW26	17MIP07-TW24	17MIP08-TW23	17MIP09-TW21	17MIP10-TW25SD	17MIP10-TW25SD	17MIP11-TW11	17MIP12-TW12
Sample Number	17-Q-26-0403-AVG	17-Q-26-0403-D	17-Q-24-0403	17-Q-23-0403	17-Q-21-0403	17-Q-25D-0403	17-Q-25S-0403	17-Q-11-0403	17-Q-12-0403
Sample Date	04/27/03	04/27/03	04/27/03	04/27/03	04/27/03	04/27/03	04/27/03	04/26/03	04/26/03
AROCLOR-1242									
AROCLOR-1248									
AROCLOR-1254									
AROCLOR-1260									
BETA-BHC									
CHLORDANE									
DELTA-BHC									
DIELDRIN									
ENDOSULFAN I									
ENDOSULFAN II									
ENDOSULFAN SULFATE									
ENDRIN									
ENDRIN ALDEHYDE									
ENDRIN KETONE									
GAMMA-BHC (LINDANE)									
GAMMA-CHLORDANE									
HEPTACHLOR									
HEPTACHLOR EPOXIDE									
KEPONE									
METHOXYCHLOR									
TOXAPHENE									
OrganoPhos Pesticides (ug/L)									
DIMETHOATE									
DISULFOTON									
ETHYL PARATHION									
FAMPHUR									
METHYL PARATHION									
O,O,O-TRIETHYL PHOSPHOROTHIOATE									
PHORATE									
SULFOTEPP									
THIONAZIN									
Herbicides (ug/L)									
2,4,5-T									
2,4,5-TP (SILVEX)									
2,4-D									
DINOSEB									
Explosives (ug/L)									
1,3,5-TRINITROBENZENE									
1,3-DINITROBENZENE									
2,4,6-TRINITROTOLUENE									
2,4-DINITROTOLUENE									
2,6-DINITROTOLUENE									
2-AMINO-4,6-DINITROTOLUENE									
2-NITROTOLUENE									
3-NITROTOLUENE									
4-AMINO-2,6-DINITROTOLUENE									
4-NITROTOLUENE									
HMX									
NITROBENZENE									
RDX									
TETRYL									

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MIP06-TW26	17MIP06-TW26	17MIP07-TW24	17MIP08-TW23	17MIP09-TW21	17MIP10-TW25SD	17MIP10-TW25SD	17MIP11-TW11	17MIP12-TW12
Sample Number	17-Q-26-0403-AVG	17-Q-26-0403-D	17-Q-24-0403	17-Q-23-0403	17-Q-21-0403	17-Q-25D-0403	17-Q-25S-0403	17-Q-11-0403	17-Q-12-0403
Sample Date	04/27/03	04/27/03	04/27/03	04/27/03	04/27/03	04/27/03	04/27/03	04/26/03	04/26/03
Inorganics (ug/L)									
ALUMINUM									
ANTIMONY									
ARSENIC									
BARIUM									
BERYLLIUM									
CADMIUM									
CALCIUM									
CHROMIUM									
COBALT									
COPPER									
IRON									
LEAD									
MAGNESIUM									
MANGANESE									
MERCURY									
NICKEL									
POTASSIUM									
SELENIUM									
SILVER									
SODIUM									
THALLIUM									
VANADIUM									
ZINC									
Miscellaneous Parameters (ug/L)									
CYANIDE									
Petroleum Hydrocarbons (mg/L)									
TOTAL PETROLEUM HYDROCARBONS									

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	17MIP13-TW16	17MIP14-TW22	17MIP15-TW15	17MIP15-TW15	17MIP15-TW15	17MIP16-TW14	17MIP17-TW20	17MIP18-TW17	17MIP19-TW18	17MIP20-TW19
Sample Number	17-Q-16-0403	17-Q-22-0403	17-Q-15-0403	17-Q-15-0403-AVG	17-Q-15-0403-D	17-Q-14-0403	17-Q-20-0403	17-Q-17-0403	17-Q-18-0403	17-Q-19-0403
Sample Date	04/26/03	04/27/03	04/26/03	04/26/03	04/26/03	04/26/03	04/27/03	04/26/03	04/26/03	04/27/03
Volatile Organics (ug/L)										
1,1,1,2-TETRACHLOROETHANE										
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5 U	5 U	0.7 J	0.65 J	0.6 J	13	5 U	2 J	4 J	2 J
1,1,2-TRICHLOROETHANE	5 U	5 U	3 J	3 J	3 J	40	3 J	37	40	42
1,1,2-TRICHLOROTRIFLUOROETHANE	22	5 U	32	31.5	31	18	22 J	5 U	2 J	5 U
1,1-DICHLOROETHANE	5 U	5 U	2 J	2 J	2 J	5 U	5 U	5 U	2 J	2 J
1,1-DICHLOROETHENE	5 U	5 U	3 J	3 J	3 J	5 J	0.8 J	0.4 J	3 J	5
1,2,3-TRICHLOROPROPANE										
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRIMETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	7	5 U	8	11
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-TRIMETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DIOXANE										
2-BUTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-CHLOROETHYL VINYL ETHER										
2-HEXANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-CHLOROPROPENE										
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	8 U	5 U	5 U
ACETONITRILE										
ACROLEIN										
ACRYLONITRILE										
BENZENE	5 U	0.2 J	9	9	9	16	0.5 J	0.5 J	16	9
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOETHANE										
BROMOFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.3 J	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	22
CHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLORODIBROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	5 U	5 U	0.8 J	0.8 J	0.8 J	24	5 J	3 J	140	390 J
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROPRENE										
CIS-1,2-DICHLOROETHENE	5 U	5 U	54	53.5	53	460 J	18	80	280 J	240 J
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIBROMOMETHANE										
DICHLORODIFLUOROMETHANE	5 U	5 U	5 U	3 J	3 J	5 U	140	3 J	170	380 J
ETHYL METHACRYLATE										
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.2 J
ISOBUTANOL										
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	17MIP13-TW16	17MIP14-TW22	17MIP15-TW15	17MIP15-TW15	17MIP15-TW15	17MIP16-TW14	17MIP17-TW20	17MIP18-TW17	17MIP19-TW18	17MIP20-TW19
Sample Number	17-Q-16-0403	17-Q-22-0403	17-Q-15-0403	17-Q-15-0403-AVG	17-Q-15-0403-D	17-Q-14-0403	17-Q-20-0403	17-Q-17-0403	17-Q-18-0403	17-Q-19-0403
Sample Date	04/26/03	04/27/03	04/26/03	04/26/03	04/26/03	04/26/03	04/27/03	04/26/03	04/26/03	04/27/03
M+P-XYLENES	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.4 J
METHACRYLONITRILE										
METHYL ACETATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	95
METHYL IODIDE										
METHYL METHACRYLATE										
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYLENE CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	19
O-XYLENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.4 J	0.8 J
PENTACHLOROETHANE										
PROPIONITRILE										
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	5 U	5 U	5 U	5 U	5 U	0.7 J	0.5 J	5 U	1 J	4 J
TOLUENE	5 U	0.2 J	5 U	5 U	5 U	0.2 J	5 U	5 U	0.3 J	0.6 J
TOTAL 1,2-DICHLOROETHENE	5 U	5 U	54	54	54	460 J	18	80	280 J	240 J
TOTAL XYLENES	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.4 J	1 J
TRANS-1,2-DICHLOROETHENE	5 U	5 U	5 U	0.9 J	0.9 J	5 U	5 U	5 U	2 J	2 J
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,4-DICHLORO-2-BUTENE										
TRICHLOROETHENE	14	32 J	4700 J	4550 J	4400 J	2600 J	9900 J	5300 J	19000 J	95000 J
TRICHLOROFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
VINYL ACETATE										
VINYL CHLORIDE	5 U	5 U	1 J	1.5 J	2 J	7	2 J	0.9 J	13	16
Semivolatile Organics (ug/L)										
1,1-BIPHENYL										
1,2,4,5-TETRACHLOROBENZENE										
1,3,5-TRINITROBENZENE										
1,3-DINITROBENZENE										
1,4-NAPHTHOQUINONE										
1,4-PHENYLENEDIAMINE										
1-NAPHTHYLAMINE										
2,2'-OXYBIS(1-CHLOROPROPANE)										
2,3,4,6-TETRACHLOROPHENOL										
2,4,5-TRICHLOROPHENOL										
2,4,6-TRICHLOROPHENOL										
2,4-DICHLOROPHENOL										
2,4-DIMETHYLPHENOL										
2,4-DINITROPHENOL										
2,4-DINITROTOLUENE										
2,6-DICHLOROPHENOL										
2,6-DINITROTOLUENE										
2-ACETYLAMINOFLUORENE										
2-CHLORONAPHTHALENE										
2-CHLOROPHENOL										
2-METHYLNAPHTHALENE										
2-METHYLPHENOL										
2-NAPHTHYLAMINE										
2-NITROANILINE										
2-NITROPHENOL										
2-PICOLINE										
3&4-METHYLPHENOL										

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	17MIP13-TW16	17MIP14-TW22	17MIP15-TW15	17MIP15-TW15	17MIP15-TW15	17MIP16-TW14	17MIP17-TW20	17MIP18-TW17	17MIP19-TW18	17MIP20-TW19
Sample Number	17-Q-16-0403	17-Q-22-0403	17-Q-15-0403	17-Q-15-0403-AVG	17-Q-15-0403-D	17-Q-14-0403	17-Q-20-0403	17-Q-17-0403	17-Q-18-0403	17-Q-19-0403
Sample Date	04/26/03	04/27/03	04/26/03	04/26/03	04/26/03	04/26/03	04/27/03	04/26/03	04/26/03	04/27/03
3,3'-DICHLOROBENZIDINE										
3,3'-DIMETHYLBENZIDINE										
3-METHYLCHOLANTHRENE										
3-NITROANILINE										
4,6-DINITRO-2-METHYLPHENOL										
4-AMINOBIPHENYL										
4-BROMOPHENYL PHENYL ETHER										
4-CHLORO-3-METHYLPHENOL										
4-CHLOROANILINE										
4-CHLOROPHENYL PHENYL ETHER										
4-METHYLPHENOL										
4-NITROANILINE										
4-NITROPHENOL										
4-NITROQUINOLINE-1-OXIDE										
5-NITRO-O-TOLUIDINE										
7,12-DIMETHYLBENZ(A)ANTHRACENE										
A,A-DIMETHYLPHENETHYLAMINE										
ACENAPHTHENE										
ACENAPHTHYLENE										
ACETOPHENONE										
ANILINE										
ANTHRACENE										
ARAMITE										
ATRAZINE										
BENZALDEHYDE										
BENZO(A)ANTHRACENE										
BENZO(A)PYRENE										
BENZO(B)FLUORANTHENE										
BENZO(G,H,I)PERYLENE										
BENZO(K)FLUORANTHENE										
BENZYL ALCOHOL										
BIS(2-CHLOROETHOXY)METHANE										
BIS(2-CHLOROETHYL)ETHER										
BIS(2-CHLOROISOPROPYL)ETHER										
BIS(2-ETHYLHEXYL)PHTHALATE										
BUTYL BENZYL PHTHALATE										
CAPROLACTAM										
CARBAZOLE										
CHLOROBENZILATE										
CHRYSENE										
DI-N-BUTYL PHTHALATE										
DI-N-OCTYL PHTHALATE										
DIALLATE										
DIBENZO(A,H)ANTHRACENE										
DIBENZOFURAN										
DIETHYL PHTHALATE										
DIMETHOATE										
DIMETHYL PHTHALATE										
DINOSEB										
ETHYL METHANE SULFONATE										
ETHYL PARATHION										

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	17MIP13-TW16	17MIP14-TW22	17MIP15-TW15	17MIP15-TW15	17MIP15-TW15	17MIP16-TW14	17MIP17-TW20	17MIP18-TW17	17MIP19-TW18	17MIP20-TW19
Sample Number	17-Q-16-0403	17-Q-22-0403	17-Q-15-0403	17-Q-15-0403-AVG	17-Q-15-0403-D	17-Q-14-0403	17-Q-20-0403	17-Q-17-0403	17-Q-18-0403	17-Q-19-0403
Sample Date	04/26/03	04/27/03	04/26/03	04/26/03	04/26/03	04/26/03	04/27/03	04/26/03	04/26/03	04/27/03
FLUORANTHENE										
FLUORENE										
HEXACHLOROBENZENE										
HEXACHLOROBUTADIENE										
HEXACHLOROCYCLOPENTADIENE										
HEXACHLOROETHANE										
HEXACHLOROPHENE										
HEXACHLOROPROPENE										
INDENO(1,2,3-CD)PYRENE										
ISODRIN										
ISOPHORONE										
ISOSAFROLE										
KEPONE										
METHAPYRILENE										
METHYL METHANE SULFONATE										
N-NITROSO-DI-N-BUTYLAMINE										
N-NITROSO-DI-N-PROPYLAMINE										
N-NITROSODIETHYLAMINE										
N-NITROSODIMETHYLAMINE										
N-NITROSODIPHENYLAMINE										
N-NITROSOMETHYLETHYLAMINE										
N-NITROSOMORPHOLINE										
N-NITROSOPIPERIDINE										
N-NITROSOPYRROLIDINE										
NAPHTHALENE										
NITROBENZENE										
O,O,O-TRIETHYL PHOSPHOROTHIOATE										
O-TOLUIDINE										
P-(DIMETHYLAMINO)AZOBENZENE										
PENTACHLOROBENZENE										
PENTACHLORONITROBENZENE										
PENTACHLOROPHENOL										
PHENACETIN										
PHENANTHRENE										
PHENOL										
PRONAMIDE										
PYRENE										
PYRIDINE										
SAFROLE										
SULFOTEPP										
THIONAZIN										
Pesticides/PCBs (ug/L)										
4,4'-DDD										
4,4'-DDE										
4,4'-DDT										
ALDRIN										
ALPHA-BHC										
ALPHA-CHLORDANE										
AROCLOR-1016										
AROCLOR-1221										
AROCLOR-1232										

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	17MIP13-TW16	17MIP14-TW22	17MIP15-TW15	17MIP15-TW15	17MIP15-TW15	17MIP16-TW14	17MIP17-TW20	17MIP18-TW17	17MIP19-TW18	17MIP20-TW19
Sample Number	17-Q-16-0403	17-Q-22-0403	17-Q-15-0403	17-Q-15-0403-AVG	17-Q-15-0403-D	17-Q-14-0403	17-Q-20-0403	17-Q-17-0403	17-Q-18-0403	17-Q-19-0403
Sample Date	04/26/03	04/27/03	04/26/03	04/26/03	04/26/03	04/26/03	04/27/03	04/26/03	04/26/03	04/27/03
AROCLOR-1242										
AROCLOR-1248										
AROCLOR-1254										
AROCLOR-1260										
BETA-BHC										
CHLORDANE										
DELTA-BHC										
DIELDRIN										
ENDOSULFAN I										
ENDOSULFAN II										
ENDOSULFAN SULFATE										
ENDRIN										
ENDRIN ALDEHYDE										
ENDRIN KETONE										
GAMMA-BHC (LINDANE)										
GAMMA-CHLORDANE										
HEPTACHLOR										
HEPTACHLOR EPOXIDE										
KEPONE										
METHOXYCHLOR										
TOXAPHENE										
OrganoPhos Pesticides (ug/L)										
DIMETHOATE										
DISULFOTON										
ETHYL PARATHION										
FAMPHUR										
METHYL PARATHION										
O,O,O-TRIETHYL PHOSPHOROTHIOATE										
PHORATE										
SULFOTEPP										
THIONAZIN										
Herbicides (ug/L)										
2,4,5-T										
2,4,5-TP (SILVEX)										
2,4-D										
DINOSEB										
Explosives (ug/L)										
1,3,5-TRINITROBENZENE										
1,3-DINITROBENZENE										
2,4,6-TRINITROTOLUENE										
2,4-DINITROTOLUENE										
2,6-DINITROTOLUENE										
2-AMINO-4,6-DINITROTOLUENE										
2-NITROTOLUENE										
3-NITROTOLUENE										
4-AMINO-2,6-DINITROTOLUENE										
4-NITROTOLUENE										
HMX										
NITROBENZENE										
RDX										
TETRYL										

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	17MIP13-TW16	17MIP14-TW22	17MIP15-TW15	17MIP15-TW15	17MIP15-TW15	17MIP16-TW14	17MIP17-TW20	17MIP18-TW17	17MIP19-TW18	17MIP20-TW19
Sample Number	17-Q-16-0403	17-Q-22-0403	17-Q-15-0403	17-Q-15-0403-AVG	17-Q-15-0403-D	17-Q-14-0403	17-Q-20-0403	17-Q-17-0403	17-Q-18-0403	17-Q-19-0403
Sample Date	04/26/03	04/27/03	04/26/03	04/26/03	04/26/03	04/26/03	04/27/03	04/26/03	04/26/03	04/27/03
Inorganics (ug/L)										
ALUMINUM										
ANTIMONY										
ARSENIC										
BARIUM										
BERYLLIUM										
CADMIUM										
CALCIUM										
CHROMIUM										
COBALT										
COPPER										
IRON										
LEAD										
MAGNESIUM										
MANGANESE										
MERCURY										
NICKEL										
POTASSIUM										
SELENIUM										
SILVER										
SODIUM										
THALLIUM										
VANADIUM										
ZINC										
Miscellaneous Parameters (ug/L)										
CYANIDE										
Petroleum Hydrocarbons (mg/L)										
TOTAL PETROLEUM HYDROCARBONS										

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MIP21-TW13	17MIP23-TW32	17MIP23-TW32	17MIP23-TW32	17MIP24-TW33	17MIP25-TW34	17MIP26-TW35	17MIP27-TW36	17MIP28-TW37
Sample Number	17-Q-13-0403	17-Q-32-0105	17-Q-32-0105-AVG	17-Q-32-0105-D	17-Q-33-0105	17-Q-34-0105	17-Q-35-0105	17-Q-36-0105	17-Q-37-0105
Sample Date	04/26/03	01/15/05	01/15/05	01/15/05	01/17/05	01/15/05	01/17/05	01/17/05	01/16/05
Volatile Organics (ug/L)									
1,1,1,2-TETRACHLOROETHANE									
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	140	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROETHANE	62	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	4 J	22	22	22	12	5 U	5 U	5 U	990
1,1-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	4 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-TRICHLOROPROPANE									
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRIMETHYLBENZENE	5 U								
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-TRIMETHYLBENZENE	5 U								
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DIOXANE									
2-BUTANONE	5 U	5 UR	5 UR	5 UR	5 U	5 UR	5 U	5 U	5 U
2-CHLOROETHYL VINYL ETHER									
2-HEXANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-CHLOROPROPENE									
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	5 U	21 U	22 U	23 U	19 J	5 UR	8 J	19 J	5 UR
ACETONITRILE									
ACROLEIN									
ACRYLONITRILE									
BENZENE	2 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOETHANE									
BROMOFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLORODIBROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	12	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROPRENE									
CIS-1,2-DICHLOROETHENE	200	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIBROMOMETHANE									
DICHLORODIFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ETHYL METHACRYLATE									
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOBUTANOL									
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MIP21-TW13	17MIP23-TW32	17MIP23-TW32	17MIP23-TW32	17MIP24-TW33	17MIP25-TW34	17MIP26-TW35	17MIP27-TW36	17MIP28-TW37
Sample Number	17-Q-13-0403	17-Q-32-0105	17-Q-32-0105-AVG	17-Q-32-0105-D	17-Q-33-0105	17-Q-34-0105	17-Q-35-0105	17-Q-36-0105	17-Q-37-0105
Sample Date	04/26/03	01/15/05	01/15/05	01/15/05	01/17/05	01/15/05	01/17/05	01/17/05	01/16/05
M+P-XYLENES	0.2 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
METHACRYLONITRILE									
METHYL ACETATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.8 J
METHYL IODIDE									
METHYL METHACRYLATE									
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYLENE CHLORIDE	1 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
O-XYLENE	0.2 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLOROETHANE									
PROPIONITRILE									
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	1 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	8
TOLUENE	0.4 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOTAL 1,2-DICHLOROETHENE	210	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TOTAL XYLENES	0.5 J	15 U	15 U	15 U	15 U	15 U	15 U	15 U	15 U
TRANS-1,2-DICHLOROETHENE	8	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,4-DICHLORO-2-BUTENE									
TRICHLOROETHENE	7000 J	0.5 J	0.5 J	0.5 J	5 U	5 U	5 U	5 U	51
TRICHLOROFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	4 J
VINYL ACETATE									
VINYL CHLORIDE	6	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Semivolatile Organics (ug/L)									
1,1-BIPHENYL		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
1,2,4,5-TETRACHLOROBENZENE									
1,3,5-TRINITROBENZENE									
1,3-DINITROBENZENE									
1,4-NAPHTHOQUINONE									
1,4-PHENYLENEDIAMINE									
1-NAPHTHYLAMINE									
2,2'-OXYBIS(1-CHLOROPROPANE)		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
2,3,4,6-TETRACHLOROPHENOL									
2,4,5-TRICHLOROPHENOL		10 U	10 UJ	10 UJ	10 U	10 U	10 UR	10 U	10 U
2,4,6-TRICHLOROPHENOL		10 U	10 UJ	10 UJ	10 U	10 U	10 UR	10 U	10 U
2,4-DICHLOROPHENOL		10 U	10 UJ	10 UJ	10 U	10 U	10 UR	10 U	10 U
2,4-DIMETHYLPHENOL		10 U	10 UJ	10 UJ	10 U	10 U	10 UR	10 U	10 U
2,4-DINITROPHENOL		25 U	25 UJ	25 UJ	25 U	25 U	25 UR	25 U	25 U
2,4-DINITROTOLUENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
2,6-DICHLOROPHENOL									
2,6-DINITROTOLUENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
2-ACETYLAMINOFLUORENE									
2-CHLORONAPHTHALENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
2-CHLOROPHENOL		10 U	10 UJ	10 UJ	10 U	10 U	10 UR	10 U	10 U
2-METHYLNAPHTHALENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
2-METHYLPHENOL		10 U	10 UJ	10 UJ	10 U	10 U	10 UR	10 U	10 U
2-NAPHTHYLAMINE									
2-NITROANILINE		25 U	25 UJ	25 UJ	25 U	25 U	25 U	25 U	25 U
2-NITROPHENOL		10 U	10 UJ	10 UJ	10 U	10 U	10 UR	10 U	10 U
2-PICOLINE									
3&4-METHYLPHENOL									

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MIP21-TW13	17MIP23-TW32	17MIP23-TW32	17MIP23-TW32	17MIP24-TW33	17MIP25-TW34	17MIP26-TW35	17MIP27-TW36	17MIP28-TW37
Sample Number	17-Q-13-0403	17-Q-32-0105	17-Q-32-0105-AVG	17-Q-32-0105-D	17-Q-33-0105	17-Q-34-0105	17-Q-35-0105	17-Q-36-0105	17-Q-37-0105
Sample Date	04/26/03	01/15/05	01/15/05	01/15/05	01/17/05	01/15/05	01/17/05	01/17/05	01/16/05
3,3'-DICHLOROBENZIDINE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
3,3'-DIMETHYLBENZIDINE									
3-METHYLCHOLANTHRENE									
3-NITROANILINE		25 U	25 UJ	25 UJ	25 U	25 U	25 U	25 U	25 U
4,6-DINITRO-2-METHYLPHENOL		25 U	25 UJ	25 UJ	25 U	25 U	25 UR	25 U	25 U
4-AMINOBIPHENYL									
4-BROMOPHENYL PHENYL ETHER		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
4-CHLORO-3-METHYLPHENOL		10 U	10 UJ	10 UJ	10 U	10 U	10 UR	10 U	10 U
4-CHLOROANILINE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
4-CHLOROPHENYL PHENYL ETHER		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
4-METHYLPHENOL		10 U	10 UJ	10 UJ	10 U	10 U	10 UR	10 U	10 U
4-NITROANILINE		25 U	25 UJ	25 UJ	25 U	25 U	25 U	25 U	25 U
4-NITROPHENOL		25 U	25 UJ	25 UJ	25 U	25 U	25 UR	25 U	25 U
4-NITROQUINOLINE-1-OXIDE									
5-NITRO-O-TOLUIDINE									
7,12-DIMETHYLBENZ(A)ANTHRACENE									
A,A-DIMETHYLPHENETHYLAMINE									
ACENAPHTHENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
ACENAPHTHYLENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
ACETOPHENONE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
ANILINE									
ANTHRACENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
ARAMITE									
ATRAZINE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
BENZALDEHYDE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
BENZO(A)ANTHRACENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
BENZO(A)PYRENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
BENZO(B)FLUORANTHENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
BENZO(G,H,I)PERYLENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
BENZO(K)FLUORANTHENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
BENZYL ALCOHOL									
BIS(2-CHLOROETHOXY)METHANE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHYL)ETHER		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROISOPROPYL)ETHER									
BIS(2-ETHYLHEXYL)PHTHALATE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
BUTYL BENZYL PHTHALATE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
CAPROLACTAM		10 U	10 UJ	10 UJ	10 U	10 U	5 J	10 U	10 U
CARBAZOLE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
CHLOROBENZILATE									
CHRYSENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
DI-N-BUTYL PHTHALATE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
DI-N-OCTYL PHTHALATE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
DIALLATE									
DIBENZO(A,H)ANTHRACENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
DIBENZOFURAN		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
DIETHYL PHTHALATE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
DIMETHOATE									
DIMETHYL PHTHALATE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
DINOSEB									
ETHYL METHANE SULFONATE									
ETHYL PARATHION									

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MIP21-TW13	17MIP23-TW32	17MIP23-TW32	17MIP23-TW32	17MIP24-TW33	17MIP25-TW34	17MIP26-TW35	17MIP27-TW36	17MIP28-TW37
Sample Number	17-Q-13-0403	17-Q-32-0105	17-Q-32-0105-AVG	17-Q-32-0105-D	17-Q-33-0105	17-Q-34-0105	17-Q-35-0105	17-Q-36-0105	17-Q-37-0105
Sample Date	04/26/03	01/15/05	01/15/05	01/15/05	01/17/05	01/15/05	01/17/05	01/17/05	01/16/05
FLUORANTHENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
FLUORENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBENZENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBUTADIENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
HEXACHLOROCYCLOPENTADIENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
HEXACHLOROETHANE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
HEXACHLOROPHENE									
HEXACHLOROPROPENE									
INDENO(1,2,3-CD)PYRENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
ISODRIN									
ISOPHORONE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
ISOSAFROLE									
KEPONE									
METHAPYRILENE									
METHYL METHANE SULFONATE									
N-NITROSO-DI-N-BUTYLAMINE									
N-NITROSO-DI-N-PROPYLAMINE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
N-NITROSODIETHYLAMINE									
N-NITROSODIMETHYLAMINE									
N-NITROSODIPHENYLAMINE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
N-NITROSOMETHYLETHYLAMINE									
N-NITROSOMORPHOLINE									
N-NITROSOPIPERIDINE									
N-NITROSOPYRROLIDINE									
NAPHTHALENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
NITROBENZENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE									
O-TOLUIDINE									
P-(DIMETHYLAMINO)AZOBENZENE									
PENTACHLOROBENZENE									
PENTACHLORONITROBENZENE									
PENTACHLOROPHENOL		25 U	25 UJ	25 UJ	25 U	25 U	25 UR	25 U	25 U
PHENACETIN									
PHENANTHRENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
PHENOL		10 U	10 UJ	10 UJ	10 U	10 U	10 UR	10 U	10 U
PRONAMIDE									
PYRENE		10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
PYRIDINE									
SAFROLE									
SULFOTEPP									
THIONAZIN									
Pesticides/PCBs (ug/L)									
4,4'-DDD		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDE		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDT		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ALDRIN		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ALPHA-BHC		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ALPHA-CHLORDANE		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
AROCLOR-1016		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1221		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1232		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MIP21-TW13	17MIP23-TW32	17MIP23-TW32	17MIP23-TW32	17MIP24-TW33	17MIP25-TW34	17MIP26-TW35	17MIP27-TW36	17MIP28-TW37
Sample Number	17-Q-13-0403	17-Q-32-0105	17-Q-32-0105-AVG	17-Q-32-0105-D	17-Q-33-0105	17-Q-34-0105	17-Q-35-0105	17-Q-36-0105	17-Q-37-0105
Sample Date	04/26/03	01/15/05	01/15/05	01/15/05	01/17/05	01/15/05	01/17/05	01/17/05	01/16/05
AROCLOR-1242		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1248		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1254		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1260		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BETA-BHC		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
CHLORDANE									
DELTA-BHC		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
DIELDRIN		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDOSULFAN I		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ENDOSULFAN II		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDOSULFAN SULFATE		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN ALDEHYDE		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN KETONE		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
GAMMA-BHC (LINDANE)		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
GAMMA-CHLORDANE		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR EPOXIDE		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
KEPONE									
METHOXYCHLOR		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TOXAPHENE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
OrganoPhos Pesticides (ug/L)									
DIMETHOATE									
DISULFOTON									
ETHYL PARATHION									
FAMPHUR									
METHYL PARATHION									
O,O,O-TRIETHYL PHOSPHOROTHIOATE									
PHORATE									
SULFOTEPP									
THIONAZIN									
Herbicides (ug/L)									
2,4,5-T									
2,4,5-TP (SILVEX)									
2,4-D									
DINOSEB									
Explosives (ug/L)									
1,3,5-TRINITROBENZENE		0.16 U	0.215 U	0.27 U	0.19 U	0.22 U	0.16 U	0.26 U	0.18 U
1,3-DINITROBENZENE		0.16 U	0.215 U	0.27 U	0.19 U	0.22 U	0.16 U	0.26 U	0.18 U
2,4,6-TRINITROTOLUENE		0.16 U	0.215 U	0.27 U	0.19 U	0.22 U	0.16 U	0.26 U	0.18 U
2,4-DINITROTOLUENE		0.31 U	0.42 U	0.53 U	0.36 U	0.43 U	0.31 U	0.51 U	0.34 U
2,6-DINITROTOLUENE		0.31 U	0.42 U	0.53 U	0.36 U	0.43 U	0.31 U	0.51 U	0.34 U
2-AMINO-4,6-DINITROTOLUENE		0.31 U	0.42 U	0.53 U	0.36 U	0.43 U	0.31 U	0.51 U	0.34 U
2-NITROTOLUENE		0.31 U	0.42 U	0.53 U	0.36 U	0.43 U	0.31 U	0.51 U	0.34 U
3-NITROTOLUENE		0.31 U	0.42 U	0.53 U	0.36 U	0.43 U	0.31 U	0.51 U	0.34 U
4-AMINO-2,6-DINITROTOLUENE		0.31 U	0.42 U	0.53 U	0.36 U	0.43 U	0.31 U	0.51 U	0.34 U
4-NITROTOLUENE		0.31 U	0.42 U	0.53 U	0.36 U	0.43 U	0.31 U	0.51 U	0.34 U
HMX		0.31 U	0.42 U	0.53 U	0.36 U	0.43 U	0.31 U	0.51 U	0.34 U
NITROBENZENE		0.16 U	0.215 U	0.27 U	0.19 U	0.22 U	0.16 U	0.26 U	0.18 U
RDX		0.16 U	0.215 U	0.27 U	0.19 U	0.22 U	0.16 U	0.26 U	0.18 U
TETRYL		0.39 U	0.53 U	0.67 U	0.46 U	0.55 U	0.39 U	0.64 U	0.43 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MIP21-TW13	17MIP23-TW32	17MIP23-TW32	17MIP23-TW32	17MIP24-TW33	17MIP25-TW34	17MIP26-TW35	17MIP27-TW36	17MIP28-TW37
Sample Number	17-Q-13-0403	17-Q-32-0105	17-Q-32-0105-AVG	17-Q-32-0105-D	17-Q-33-0105	17-Q-34-0105	17-Q-35-0105	17-Q-36-0105	17-Q-37-0105
Sample Date	04/26/03	01/15/05	01/15/05	01/15/05	01/17/05	01/15/05	01/17/05	01/17/05	01/16/05
Inorganics (ug/L)									
ALUMINUM		188 U	130.55 U	73.1 U	6180 J	26.2 U	1050 J	250 U	2260 J
ANTIMONY		2.34 U	2.34 U	2.34 U	2.34 U	4.3 U	2.34 U	2.34 U	2.34 U
ARSENIC		3.03 U	3.03 U	3.03 U	3.03 U	3.9	7	10.1	5.3
BARIUM		71.9	71.55	71.2	277	333	54.3	40.4	54.3
BERYLLIUM		0.46 U	0.455 U	0.45 U	1.3 U	0.25 U	0.26 U	0.25 U	1.4 U
CADMIUM		0.3 U	0.3 U	0.3 U	0.30 U	0.3 U	0.30 U	0.30 U	0.30 U
CALCIUM		36200	36300	36400	49200	199000	61800	46100	14800
CHROMIUM		0.8 U	0.8 U	0.8 U	14.3	0.8 U	2.6 U	1.3 U	10.3
COBALT		3	2.85	2.7	8.1	2.7	1.2	2.7	2.4
COPPER		0.86 U	0.86 U	0.86 U	9.5	0.86 U	8.2	0.86 U	7.7
IRON		1860	1795	1730	9020	72900	34700	36600	5180
LEAD		1.7 U	1.7 U	1.7 U	3.1	1.7 U	1.7 U	1.7 U	1.7 U
MAGNESIUM		11500	11500	11500	27500	126000	70200	72600	2540
MANGANESE		66.9	67	67.1	156	619	311	123	47.2
MERCURY		0.02 U	0.02 U	0.02 U	0.02	0.01 U	0.02	0.01	0.02
NICKEL		3.3 U	3.5 U	3.7 U	10.8	3.1 U	3.5 U	2.6 U	5.0 U
POTASSIUM		2210	2365	2520	1740	11000	12700	8710	1090
SELENIUM		3.71 U	3.71 U	3.71 U	3.71 U	3.71 U	3.71 U	3.71 U	3.71 U
SILVER		0.7 U	0.7 U	0.7 U	0.70 U	0.7 U	0.70 U	0.70 U	0.70 U
SODIUM		96900	96700	96500	91500	680000	486000	505000	20400
THALLIUM		4.09 U	4.09 U	4.09 U	4.09 U	4.09 U	4.09 U	4.09 U	4.09 U
VANADIUM		0.75 U	0.75 U	0.75 U	17.4	0.75 U	2.1	0.75 U	9.6
ZINC		34.6	34.8	35	24.5	18.5	8.1	6.8 U	11
Miscellaneous Parameters (ug/L)									
CYANIDE		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Petroleum Hydrocarbons (mg/L)									
TOTAL PETROLEUM HYDROCARBONS									

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP29-TW38-MW12S	17MIP29-TW38-MW12S	17MIP29-TW38-MW12S	17MIP29-TW38-MW12S	17MIP30-TW39	17MIP30-TW39	17MIP30-TW39	17MIP31-TW40
Sample Number	17-Q-38-0105	17-G-12S-0205	17-G-12S-0205-AVG	17-G-12S-0205-D	17-Q-39-0105	17-Q-39-0105-AVG	17-Q-39-0105-D	17-Q-40-0105
Sample Date	01/16/05	02/25/05	02/25/05	02/25/05	01/16/05	01/16/05	01/16/05	01/16/05
Volatile Organics (ug/L)								
1,1,1,2-TETRACHLOROETHANE								
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	5 U	27	25.5	24	5 U	5 U	5 U	1 J
1,1-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-TRICHLOROPROPANE								
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRIMETHYLBENZENE								
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-TRIMETHYLBENZENE								
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DIOXANE								
2-BUTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-CHLOROETHYL VINYL ETHER								
2-HEXANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-CHLOROPROPENE								
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR
ACETONITRILE								
ACROLEIN								
ACRYLONITRILE								
BENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOETHANE								
BROMOFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLORODIBROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROPRENE								
CIS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIBROMOMETHANE								
DICHLORODIFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ETHYL METHACRYLATE								
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOBUTANOL								
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP29-TW38-MW12S	17MIP29-TW38-MW12S	17MIP29-TW38-MW12S	17MIP29-TW38-MW12S	17MIP30-TW39	17MIP30-TW39	17MIP30-TW39	17MIP31-TW40
Sample Number	17-Q-38-0105	17-G-12S-0205	17-G-12S-0205-AVG	17-G-12S-0205-D	17-Q-39-0105	17-Q-39-0105-AVG	17-Q-39-0105-D	17-Q-40-0105
Sample Date	01/16/05	02/25/05	02/25/05	02/25/05	01/16/05	01/16/05	01/16/05	01/16/05
M+P-XYLENES	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
METHACRYLONITRILE								
METHYL ACETATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL IODIDE								
METHYL METHACRYLATE								
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYLENE CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
O-XYLENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLOROETHANE								
PROPIONITRILE								
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOLUENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOTAL 1,2-DICHLOROETHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TOTAL XYLENES	15 U	15 U	15 U	15 U	15 U	15 U	15 U	15 U
TRANS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,4-DICHLORO-2-BUTENE								
TRICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRICHLOROFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
VINYL ACETATE								
VINYL CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Semivolatile Organics (ug/L)								
1,1-BIPHENYL		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
1,2,4,5-TETRACHLOROBENZENE								
1,3,5-TRINITROBENZENE								
1,3-DINITROBENZENE								
1,4-NAPHTHOQUINONE								
1,4-PHENYLENEDIAMINE								
1-NAPHTHYLAMINE								
2,2'-OXYBIS(1-CHLOROPROPANE)		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
2,3,4,6-TETRACHLOROPHENOL								
2,4,5-TRICHLOROPHENOL		25 UJ	25 UJ	25 U	10 UR	10 U	10 U	10 U
2,4,6-TRICHLOROPHENOL		10 UJ	10 UJ	10 U	10 UR	10 U	10 U	10 U
2,4-DICHLOROPHENOL		10 UJ	10 UJ	10 U	10 UR	10 U	10 U	10 U
2,4-DIMETHYLPHENOL		10 UJ	10 UJ	10 U	10 UR	10 U	10 U	10 U
2,4-DINITROPHENOL		25 UJ	25 UJ	25 U	25 UR	25 U	25 U	25 U
2,4-DINITROTOLUENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
2,6-DICHLOROPHENOL								
2,6-DINITROTOLUENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
2-ACETYLAMINOFLUORENE								
2-CHLORONAPHTHALENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
2-CHLOROPHENOL		10 UJ	10 UJ	10 U	10 UR	10 U	10 U	10 U
2-METHYLNAPHTHALENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
2-METHYLPHENOL		10 UJ	10 UJ	10 U	10 UR	10 U	10 U	10 U
2-NAPHTHYLAMINE								
2-NITROANILINE		25 UJ	25 UJ	25 U	25 U	25 U	25 U	25 U
2-NITROPHENOL		10 UJ	10 UJ	10 U	10 UR	10 U	10 U	10 U
2-PICOLINE								
3&4-METHYLPHENOL								

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP29-TW38-MW12S	17MIP29-TW38-MW12S	17MIP29-TW38-MW12S	17MIP29-TW38-MW12S	17MIP30-TW39	17MIP30-TW39	17MIP30-TW39	17MIP31-TW40
Sample Number	17-Q-38-0105	17-G-12S-0205	17-G-12S-0205-AVG	17-G-12S-0205-D	17-Q-39-0105	17-Q-39-0105-AVG	17-Q-39-0105-D	17-Q-40-0105
Sample Date	01/16/05	02/25/05	02/25/05	02/25/05	01/16/05	01/16/05	01/16/05	01/16/05
3,3'-DICHLOROBENZIDINE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
3,3'-DIMETHYLBENZIDINE								
3-METHYLCHOLANTHRENE								
3-NITROANILINE		25 UJ	25 UJ	25 U	25 U	25 U	25 U	25 U
4,6-DINITRO-2-METHYLPHENOL		25 UJ	25 UJ	25 U	25 UR	25 U	25 U	25 U
4-AMINOBIPHENYL								
4-BROMOPHENYL PHENYL ETHER		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
4-CHLORO-3-METHYLPHENOL		10 UJ	10 UJ	10 U	10 UR	10 U	10 U	10 U
4-CHLOROANILINE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
4-CHLOROPHENYL PHENYL ETHER		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
4-METHYLPHENOL		10 UJ	10 UJ	10 U	10 UR	10 U	10 U	10 U
4-NITROANILINE		25 UJ	25 UJ	25 U	25 U	25 U	25 U	25 U
4-NITROPHENOL		25 UJ	25 UJ	25 U	25 UR	25 U	25 U	25 U
4-NITROQUINOLINE-1-OXIDE								
5-NITRO-O-TOLUIDINE								
7,12-DIMETHYLBENZ(A)ANTHRACENE								
A,A-DIMETHYLPHENETHYLAMINE								
ACENAPHTHENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
ACENAPHTHYLENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
ACETOPHENONE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
ANILINE								
ANTHRACENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
ARAMITE								
ATRAZINE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
BENZALDEHYDE		10 UR	10 UR	10 UR	10 U	10 U	10 U	10 U
BENZO(A)ANTHRACENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
BENZO(A)PYRENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
BENZO(B)FLUORANTHENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
BENZO(G,H,I)PERYLENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
BENZO(K)FLUORANTHENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
BENZYL ALCOHOL								
BIS(2-CHLOROETHOXY)METHANE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHYL)ETHER		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROISOPROPYL)ETHER								
BIS(2-ETHYLHEXYL)PHTHALATE		10 UJ	10 UJ	10 U	10 U	8 J	8 J	10 U
BUTYL BENZYL PHTHALATE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
CAPROLACTAM		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
CARBAZOLE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
CHLOROBENZILATE								
CHRYSENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
DI-N-BUTYL PHTHALATE		10 UJ	8 J	8 J	10 U	10 U	10 U	10 U
DI-N-OCTYL PHTHALATE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
DIALLATE								
DIBENZO(A,H)ANTHRACENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
DIBENZOFURAN		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
DIETHYL PHTHALATE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
DIMETHOATE								
DIMETHYL PHTHALATE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
DINOSEB								
ETHYL METHANE SULFONATE								
ETHYL PARATHION								

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP29-TW38-MW12S	17MIP29-TW38-MW12S	17MIP29-TW38-MW12S	17MIP29-TW38-MW12S	17MIP30-TW39	17MIP30-TW39	17MIP30-TW39	17MIP31-TW40
Sample Number	17-Q-38-0105	17-G-12S-0205	17-G-12S-0205-AVG	17-G-12S-0205-D	17-Q-39-0105	17-Q-39-0105-AVG	17-Q-39-0105-D	17-Q-40-0105
Sample Date	01/16/05	02/25/05	02/25/05	02/25/05	01/16/05	01/16/05	01/16/05	01/16/05
FLUORANTHENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
FLUORENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBENZENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBUTADIENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
HEXACHLOROCYCLOPENTADIENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
HEXACHLOROETHANE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
HEXACHLOROPHENE								
HEXACHLOROPROPENE								
INDENO(1,2,3-CD)PYRENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
ISODRIN								
ISOPHORONE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
ISOSAFROLE								
KEPONE								
METHAPYRILENE								
METHYL METHANE SULFONATE								
N-NITROSO-DI-N-BUTYLAMINE								
N-NITROSO-DI-N-PROPYLAMINE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
N-NITROSODIETHYLAMINE								
N-NITROSODIMETHYLAMINE								
N-NITROSODIPHENYLAMINE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
N-NITROSOMETHYLETHYLAMINE								
N-NITROSOMORPHOLINE								
N-NITROSOPIPERIDINE								
N-NITROSOPYRROLIDINE								
NAPHTHALENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
NITROBENZENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE								
O-TOLUIDINE								
P-(DIMETHYLAMINO)AZOBENZENE								
PENTACHLOROBENZENE								
PENTACHLORONITROBENZENE								
PENTACHLOROPHENOL		25 UR	25 UR	25 UR	25 UR	25 U	25 U	25 U
PHENACETIN								
PHENANTHRENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
PHENOL		10 UJ	10 UJ	10 U	10 UR	10 U	10 U	10 U
PRONAMIDE								
PYRENE		10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
PYRIDINE								
SAFROLE								
SULFOTEPP								
THIONAZIN								
Pesticides/PCBs (ug/L)								
4,4'-DDD		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDE		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDT		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ALDRIN		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ALPHA-BHC		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ALPHA-CHLORDANE		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
AROCLOR-1016		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1221		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1232		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP29-TW38-MW12S	17MIP29-TW38-MW12S	17MIP29-TW38-MW12S	17MIP29-TW38-MW12S	17MIP30-TW39	17MIP30-TW39	17MIP30-TW39	17MIP31-TW40
Sample Number	17-Q-38-0105	17-G-12S-0205	17-G-12S-0205-AVG	17-G-12S-0205-D	17-Q-39-0105	17-Q-39-0105-AVG	17-Q-39-0105-D	17-Q-40-0105
Sample Date	01/16/05	02/25/05	02/25/05	02/25/05	01/16/05	01/16/05	01/16/05	01/16/05
AROCLOR-1242		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1248		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1254		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1260		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BETA-BHC		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
CHLORDANE								
DELTA-BHC		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
DIELDRIN		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDOSULFAN I		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ENDOSULFAN II		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDOSULFAN SULFATE		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN ALDEHYDE		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN KETONE		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
GAMMA-BHC (LINDANE)		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
GAMMA-CHLORDANE		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR EPOXIDE		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
KEPONE								
METHOXYCHLOR		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TOXAPHENE		1 U	1 U	1 U	1 U	1 U	1 U	1 U
OrganoPhos Pesticides (ug/L)								
DIMETHOATE								
DISULFOTON								
ETHYL PARATHION								
FAMPHUR								
METHYL PARATHION								
O,O,O-TRIETHYL PHOSPHOROTHIOATE								
PHORATE								
SULFOTEPP								
THIONAZIN								
Herbicides (ug/L)								
2,4,5-T								
2,4,5-TP (SILVEX)								
2,4-D								
DINOSEB								
Explosives (ug/L)								
1,3,5-TRINITROBENZENE		0.19 U	0.225 U	0.26 U	0.22 U	0.215 U	0.21 U	0.16 U
1,3-DINITROBENZENE		0.19 U	0.225 U	0.26 U	0.22 U	0.215 U	0.21 U	0.16 U
2,4,6-TRINITROTOLUENE		0.19 U	0.225 U	0.26 U	0.22 U	0.215 U	0.21 U	0.16 U
2,4-DINITROTOLUENE		0.36 U	0.435 U	0.51 U	0.43 U	0.415 U	0.4 U	0.31 U
2,6-DINITROTOLUENE		0.36 U	0.435 U	0.51 U	0.43 U	0.415 U	0.4 U	0.31 U
2-AMINO-4,6-DINITROTOLUENE		0.36 U	0.435 U	0.51 U	0.43 U	0.415 U	0.4 U	0.31 U
2-NITROTOLUENE		0.36 U	0.435 U	0.51 U	0.43 U	0.415 U	0.4 U	0.31 U
3-NITROTOLUENE		0.36 U	0.435 U	0.51 U	0.43 U	0.415 U	0.4 U	0.31 U
4-AMINO-2,6-DINITROTOLUENE		0.36 U	0.435 U	0.51 U	0.43 U	0.415 U	0.4 U	0.31 U
4-NITROTOLUENE		0.36 U	0.435 U	0.51 U	0.43 U	0.415 U	0.4 U	0.31 U
HMX		0.36 U	0.435 U	0.51 U	0.43 U	0.415 U	0.4 U	0.31 U
NITROBENZENE		0.19 U	0.225 U	0.26 U	0.22 U	0.215 U	0.21 U	0.16 U
RDX		0.19 U	0.225 U	0.26 U	0.22 U	0.215 U	0.21 U	0.16 U
TETRYL		0.46 U	0.55 U	0.64 U	0.54 U	0.525 U	0.51 U	0.39 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP29-TW38-MW12S	17MIP29-TW38-MW12S	17MIP29-TW38-MW12S	17MIP29-TW38-MW12S	17MIP30-TW39	17MIP30-TW39	17MIP30-TW39	17MIP31-TW40
Sample Number	17-Q-38-0105	17-G-12S-0205	17-G-12S-0205-AVG	17-G-12S-0205-D	17-Q-39-0105	17-Q-39-0105-AVG	17-Q-39-0105-D	17-Q-40-0105
Sample Date	01/16/05	02/25/05	02/25/05	02/25/05	01/16/05	01/16/05	01/16/05	01/16/05
Inorganics (ug/L)								
ALUMINUM		88.1 U	108.05 U	128 U	1030 J	599 J	336 U	638 U
ANTIMONY		3.54 U	3.54 U	3.54 U	2.34 U	2.34 U	2.34 U	2.34 U
ARSENIC		2.81 U	3.005 U	3.2 U	3.03 U	3.03 U	3.03 U	3.03 U
BARIUM		18	18	18	21.7	20	18.3	25.6
BERYLLIUM		0.40 U	0.4 U	0.40 U	0.59 U	0.58 U	0.57 U	0.82 U
CADMIUM		0.41 U	0.41 U	0.41 U	0.30 U	0.3 U	0.30 U	0.30 U
CALCIUM		4570	4555	4540	1420	1440	1460	663
CHROMIUM		1.6 U	1.8 U	2.0 U	3.2 U	2.95 U	2.7 U	2.2 U
COBALT		4.3 U	4.3 U	4.3 U	0.99	0.955	0.92	0.78
COPPER		2.52 U	2.52 U	2.52 U	0.86 U	0.86 U	0.86 U	0.86 U
IRON		305	324	343	2120	1865	1610	3180
LEAD		2.07 U	2.07 U	2.07 U	1.7 U	1.7 U	1.7 U	1.7 U
MAGNESIUM		1070	1075	1080	1380	1370	1360	1640
MANGANESE		17	16.9	16.8	16.7	16.5	16.3	9.7
MERCURY		0.05 U	0.04 U	0.03 U	0.01 U	0.0125	0.02	0.01
NICKEL		11.6 U	11.6 U	11.6 U	3.2 U	3.2 U	3.2 U	2.7 U
POTASSIUM		621 U	621 U	621 U	257	188	238 U	238 U
SELENIUM		4.08 U	4.08 U	4.08 U	3.71 U	3.71 U	3.71 U	3.71 U
SILVER		3.93 U	4.165 U	4.4 U	0.70 U	0.7 U	0.70 U	0.70 U
SODIUM		31300	31300	31300	31500	31750	32000	55700
THALLIUM		4.26 U	4.26 U	4.26 U	4.09 U	4.09 U	4.09 U	4.09 U
VANADIUM		5.07 U	5.07 U	5.07 U	1.4	0.8875	0.75 U	1
ZINC		14	15.05	16.1	8.4	8.15	7.9	5.4 U
Miscellaneous Parameters (ug/L)								
CYANIDE		10 U	10 U	10 U	10 U	10 U	10 U	10 U
Petroleum Hydrocarbons (mg/L)								
TOTAL PETROLEUM HYDROCARBONS								

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP32-TW41	17MIP33-TW42	17MIP34-TW43	17MIP35-TW44	17MIP36-TW45	17MIP37-TW46	17MIP38-TW47-MW14S	17MIP38-TW47-MW14S
Sample Number	17-Q-41-0105	17-Q-42-0105	17-Q-43-0105	17-Q-44-0105	17-Q-45-0105	17-Q-46-0105	17-Q-47-0105	17-G-14S-0305
Sample Date	01/17/05	01/17/05	01/16/05	01/17/05	01/17/05	01/16/05	01/13/05	03/09/05
Volatile Organics (ug/L)								
1,1,1,2-TETRACHLOROETHANE					5 U			
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROETHANE	5 U	0.9 J	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	9	34	0.6 J	12		5 U	5 U	5 U
1,1-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	5 U	0.4 J	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-TRICHLOROPROPANE					5 U			
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRIMETHYLBENZENE								
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U	2 J	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-TRIMETHYLBENZENE								
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DIOXANE					100 UR			
2-BUTANONE	5 U	5 UR	5 U	5 U	10 UR	5 U	5 UR	5 U
2-CHLOROETHYL VINYL ETHER								
2-HEXANONE	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U
3-CHLOROPROPENE					10 U			
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U
ACETONE	20 J	5 UR	2 J	5 UR	10 UR	5 UR	18 U	5 UR
ACETONITRILE					50 UR			
ACROLEIN					50 UR			
ACRYLONITRILE					10 UR			
BENZENE	5 U	5 U	0.6 J	5 U	5 U	5 U	5 U	5 U
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOETHANE								
BROMOFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLORODIBROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	5 U	5 U	0.6 J	5 U	5 U	5 U	5 U	5 U
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROPRENE					10 U			
CIS-1,2-DICHLOROETHENE	0.9 J	8	0.5 J	5 U	5 U	5 U	5 U	5 U
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CYCLOHEXANE	5 U	5 U	5 U	5 U		5 U	5 U	5 U
DIBROMOMETHANE					5 U			
DICHLORODIFLUOROMETHANE	5 U	5 U	50	5 U	5 U	5 U	5 U	5 U
ETHYL METHACRYLATE					10 U			
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOBUTANOL					100 UR			
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U		5 U	5 U	5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP32-TW41	17MIP33-TW42	17MIP34-TW43	17MIP35-TW44	17MIP36-TW45	17MIP37-TW46	17MIP38-TW47-MW14S	17MIP38-TW47-MW14S
Sample Number	17-Q-41-0105	17-Q-42-0105	17-Q-43-0105	17-Q-44-0105	17-Q-45-0105	17-Q-46-0105	17-Q-47-0105	17-G-14S-0305
Sample Date	01/17/05	01/17/05	01/16/05	01/17/05	01/17/05	01/16/05	01/13/05	03/09/05
M+P-XYLENES	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
METHACRYLONITRILE					50 U			
METHYL ACETATE	5 U	5 U	5 U	5 U		5 U	5 U	5 U
METHYL CYCLOHEXANE	5 U	5 U	5 U	5 U		5 U	5 U	5 U
METHYL IODIDE					10 U			
METHYL METHACRYLATE					10 U			
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U		5 U	5 U	5 U
METHYLENE CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
O-XYLENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLOROETHANE					10 U			
PROPIONITRILE					50 UR			
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	17	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOLUENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOTAL 1,2-DICHLOROETHENE	0.9 J	8 J	10 U	10 U		10 U	10 U	10 U
TOTAL XYLENES	15 U	15 U	15 U	15 U	15 U	15 U	15 U	15 U
TRANS-1,2-DICHLOROETHENE	5 U	0.7 J	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,4-DICHLORO-2-BUTENE					10 U			
TRICHLOROETHENE	5 U	1400	260	5 U	2 J	49	5 U	5 U
TRICHLOROFLUOROMETHANE	0.8 J	5 U	5 U	2 J	5 U	5 U	5 U	5 U
VINYL ACETATE					5 U			
VINYL CHLORIDE	5 U	5 U	5 U	5 U	2 U	5 U	5 U	5 U
Semivolatile Organics (ug/L)								
1,1-BIPHENYL	10 U	10 U	10 U	10 U		10 U		10 U
1,2,4,5-TETRACHLOROBENZENE					10 U			
1,3,5-TRINITROBENZENE					10 U			
1,3-DINITROBENZENE					10 U			
1,4-NAPHTHOQUINONE					10 U			
1,4-PHENYLENEDIAMINE					10 U			
1-NAPHTHYLAMINE					10 U			
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	10 U	10 U		10 U		10 U
2,3,4,6-TETRACHLOROPHENOL					10 U			
2,4,5-TRICHLOROPHENOL	10 U	10 U	10 U	10 U	25 U	10 U		25 U
2,4,6-TRICHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U		10 U
2,4-DICHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U		10 U
2,4-DIMETHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U		10 U
2,4-DINITROPHENOL	26 U	25 U	26 U	26 U	25 U	26 U		25 U
2,4-DINITROTOLUENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
2,6-DICHLOROPHENOL					10 U			
2,6-DINITROTOLUENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
2-ACETYLAMINOFLUORENE					10 U			
2-CHLORONAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
2-CHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U		10 U
2-METHYLNAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
2-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U		10 U
2-NAPHTHYLAMINE					10 U			
2-NITROANILINE	26 U	25 U	26 U	26 U	25 U	26 U		25 U
2-NITROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U		10 U
2-PICOLINE					10 U			
3&4-METHYLPHENOL					10 U			

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP32-TW41	17MIP33-TW42	17MIP34-TW43	17MIP35-TW44	17MIP36-TW45	17MIP37-TW46	17MIP38-TW47-MW14S	17MIP38-TW47-MW14S
Sample Number	17-Q-41-0105	17-Q-42-0105	17-Q-43-0105	17-Q-44-0105	17-Q-45-0105	17-Q-46-0105	17-Q-47-0105	17-G-14S-0305
Sample Date	01/17/05	01/17/05	01/16/05	01/17/05	01/17/05	01/16/05	01/13/05	03/09/05
3,3'-DICHLOROBENZIDINE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
3,3'-DIMETHYLBENZIDINE					20 U			
3-METHYLCHOLANTHRENE					10 U			
3-NITROANILINE	26 U	25 U	26 U	26 U	25 U	26 U		25 U
4,6-DINITRO-2-METHYLPHENOL	26 U	25 U	26 U	26 U	25 U	26 U		25 U
4-AMINOBIPHENYL					10 U			
4-BROMOPHENYL PHENYL ETHER	10 U	10 U	10 U	10 U	10 U	10 U		10 U
4-CHLORO-3-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U		10 U
4-CHLOROANILINE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
4-CHLOROPHENYL PHENYL ETHER	10 U	10 U	10 U	10 U	10 U	10 U		10 U
4-METHYLPHENOL	10 U	10 U	10 U	10 U		10 U		10 U
4-NITROANILINE	26 U	25 U	26 U	26 U	25 U	26 U		25 U
4-NITROPHENOL	26 U	25 U	26 U	26 U	25 U	26 U		25 UR
4-NITROQUINOLINE-1-OXIDE					20 U			
5-NITRO-O-TOLUIDINE					20 U			
7,12-DIMETHYLBENZ(A)ANTHRACENE					10 U			
A,A-DIMETHYLPHENETHYLAMINE					10 U			
ACENAPHTHENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
ACENAPHTHYLENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
ACETOPHENONE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
ANILINE					10 U			
ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
ARAMITE					20 U			
ATRAZINE	10 U	10 U	10 U	10 U		10 U		10 U
BENZALDEHYDE	10 U	10 U	10 U	10 U		10 U		10 U
BENZO(A)ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
BENZO(A)PYRENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
BENZO(B)FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
BENZO(G,H,I)PERYLENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
BENZO(K)FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
BENZYL ALCOHOL					20 U			
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	10 U	10 U	10 U	10 U		10 U
BIS(2-CHLOROISOPROPYL)ETHER					10 U			
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U		54
BUTYL BENZYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
CAPROLACTAM	10 U	10 U	10 U	10 U		10 U		10 U
CARBAZOLE	10 U	10 U	10 U	10 U		10 U		10 U
CHLOROBENZILATE					20 U			
CHRYSENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
DI-N-BUTYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
DI-N-OCTYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
DIALLATE					20 U			
DIBENZO(A,H)ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
DIBENZOFURAN	10 U	10 U	10 U	10 U	10 U	10 U		10 U
DIETHYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
DIMETHOATE					10 U			
DIMETHYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
DINOSEB					5 U			
ETHYL METHANE SULFONATE					10 U			
ETHYL PARATHION					10 U			

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP32-TW41	17MIP33-TW42	17MIP34-TW43	17MIP35-TW44	17MIP36-TW45	17MIP37-TW46	17MIP38-TW47-MW14S	17MIP38-TW47-MW14S
Sample Number	17-Q-41-0105	17-Q-42-0105	17-Q-43-0105	17-Q-44-0105	17-Q-45-0105	17-Q-46-0105	17-Q-47-0105	17-G-14S-0305
Sample Date	01/17/05	01/17/05	01/16/05	01/17/05	01/17/05	01/16/05	01/13/05	03/09/05
FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
FLUORENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
HEXACHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
HEXACHLOROBUTADIENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
HEXACHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
HEXACHLOROPHENE					10 U			
HEXACHLOROPROPENE					10 U			
INDENO(1,2,3-CD)PYRENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
ISODRIN					20 U			
ISOPHORONE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
ISOSAFROLE					20 U			
KEPONE					10 U			
METHAPYRILENE					10 U			
METHYL METHANE SULFONATE					20 U			
N-NITROSO-DI-N-BUTYLAMINE					10 U			
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
N-NITROSODIETHYLAMINE					20 U			
N-NITROSODIMETHYLAMINE					20 U			
N-NITROSODIPHENYLAMINE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
N-NITROSOMETHYLETHYLAMINE					10 U			
N-NITROSOMORPHOLINE					10 U			
N-NITROSOPIPERIDINE					10 U			
N-NITROSOPYRROLIDINE					10 U			
NAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
NITROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE					20 U			
O-TOLUIDINE					10 U			
P-(DIMETHYLAMINO)AZOBENZENE					20 U			
PENTACHLOROBENZENE					10 U			
PENTACHLORONITROBENZENE					10 U			
PENTACHLOROPHENOL	26 U	25 U	26 U	26 U	25 U	26 U		25 U
PHENACETIN					10 U			
PHENANTHRENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
PHENOL	10 U	10 U	10 U	10 U	10 U	10 U		10 U
PRONAMIDE					10 U			
PYRENE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
PYRIDINE					50 U			
SAFROLE					10 U			
SULFOTEPP					10 U			
THIONAZIN					20 U			
Pesticides/PCBs (ug/L)								
4,4'-DDD	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U
4,4'-DDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U
4,4'-DDT	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U
ALDRIN	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U		0.05 U
ALPHA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U		0.05 U
ALPHA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U		0.05 U
AROCLOR-1016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U
AROCLOR-1221	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U
AROCLOR-1232	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP32-TW41	17MIP33-TW42	17MIP34-TW43	17MIP35-TW44	17MIP36-TW45	17MIP37-TW46	17MIP38-TW47-MW14S	17MIP38-TW47-MW14S
Sample Number	17-Q-41-0105	17-Q-42-0105	17-Q-43-0105	17-Q-44-0105	17-Q-45-0105	17-Q-46-0105	17-Q-47-0105	17-G-14S-0305
Sample Date	01/17/05	01/17/05	01/16/05	01/17/05	01/17/05	01/16/05	01/13/05	03/09/05
AROCLOR-1242	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U
AROCLOR-1248	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U
AROCLOR-1254	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U
AROCLOR-1260	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U
BETA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U		0.05 U
CHLORDANE					0.5 U			
DELTA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U		0.05 U
DIELDRIN	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U
ENDOSULFAN I	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U		0.05 U
ENDOSULFAN II	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U
ENDOSULFAN SULFATE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U
ENDRIN	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U
ENDRIN ALDEHYDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U
ENDRIN KETONE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U
GAMMA-BHC (LINDANE)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U		0.05 U
GAMMA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U		0.05 U
HEPTACHLOR	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U		0.05 U
HEPTACHLOR EPOXIDE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U		0.05 U
KEPONE								
METHOXYCHLOR	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U
TOXAPHENE	1 U	1 U	1 U	1 U	1 U	1 U		1 U
OrganoPhos Pesticides (ug/L)								
DIMETHOATE					2 U			
DISULFOTON					2 U			
ETHYL PARATHION					2 U			
FAMPHUR					2 U			
METHYL PARATHION					2 U			
O,O,O-TRIETHYL PHOSPHOROTHIOATE					2 U			
PHORATE					2 U			
SULFOTEPP					2 U			
THIONAZIN					2 U			
Herbicides (ug/L)								
2,4,5-T					1.5 U			
2,4,5-TP (SILVEX)					1 U			
2,4-D					2.5 U			
DINOSEB								
Explosives (ug/L)								
1,3,5-TRINITROBENZENE	0.21 U	0.31 U	0.16 U	0.17 U	0.27 U	0.18 U		0.8 U
1,3-DINITROBENZENE	0.21 U	0.31 U	0.16 U	0.17 U	0.27 U	0.18 U		0.8 U
2,4,6-TRINITROTOLUENE	0.21 U	0.31 U	0.16 U	0.17 U	0.27 U	0.18 U		0.8 U
2,4-DINITROTOLUENE	0.4 U	0.6 U	0.31 U	0.34 U	0.52 U	0.36 U		1.6 U
2,6-DINITROTOLUENE	0.4 U	0.6 U	0.31 U	0.34 U	0.52 U	0.36 U		1.6 U
2-AMINO-4,6-DINITROTOLUENE	0.4 U	0.6 U	0.31 U	0.34 U	0.52 U	0.36 U		1.6 U
2-NITROTOLUENE	0.4 U	0.6 U	0.31 U	0.34 U	0.52 U	0.36 U		1.6 U
3-NITROTOLUENE	0.4 U	0.6 U	0.31 U	0.34 U	0.52 U	0.36 U		1.6 U
4-AMINO-2,6-DINITROTOLUENE	0.4 U	0.6 U	0.31 U	0.34 U	0.52 U	0.36 U		1.6 U
4-NITROTOLUENE	0.4 U	0.6 U	0.31 U	0.34 U	0.52 U	0.36 U		1.6 U
HMX	0.4 U	0.6 U	0.31 U	0.34 U	0.52 U	0.36 U		1.6 U
NITROBENZENE	0.21 U	0.31 U	0.16 U	0.17 U	0.27 U	0.18 U		0.8 U
RDX	0.21 U	0.31 U	0.16 U	0.17 U	0.27 U	0.18 U		0.8 U
TETRYL	0.51 U	0.76 U	0.39 U	0.42 U	0.65 U	0.45 U		2 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP32-TW41	17MIP33-TW42	17MIP34-TW43	17MIP35-TW44	17MIP36-TW45	17MIP37-TW46	17MIP38-TW47-MW14S	17MIP38-TW47-MW14S
Sample Number	17-Q-41-0105	17-Q-42-0105	17-Q-43-0105	17-Q-44-0105	17-Q-45-0105	17-Q-46-0105	17-Q-47-0105	17-G-14S-0305
Sample Date	01/17/05	01/17/05	01/16/05	01/17/05	01/17/05	01/16/05	01/13/05	03/09/05
Inorganics (ug/L)								
ALUMINUM	3210 J	5150	43.9 U	13600 J	18.2 U	587 U		22900
ANTIMONY	2.34 U	2.34 U	3.6 U	2.34 U	2.34 U	2.34 U		3.9
ARSENIC	3.03 U	17.4	8	3.03 U	3.03 U	3.8		2.81 U
BARIUM	85.2	67.8	81.3	223	7.4	638		1920
BERYLLIUM	1.1 U	1.9	0.46 U	17.4	0.27 U	0.83 U		43.6
CADMIUM	0.30 U	3.97 U	0.30 U	0.30 U	3.97 U	0.30 U		3.2 U
CALCIUM	15500	18500	77000	135000	70200	436000		769000
CHROMIUM	6.8 U	19.7	0.80 U	7.1 U	0.8 U	0.80 U		2.9 U
COBALT	2.8	12.2	3.3	100	0.64 U	135		988
COPPER	8	14.6 U	0.86 U	9.2	2.6 U	0.86 U		2.52 U
IRON	4660	7580	17300	19600	624	124000		187000
LEAD	1.7 U	2.4	1.7 U	2.3	1.7 U	1.7 U		2.4
MAGNESIUM	4460	1980	12600	39700	3870	59200		206000
MANGANESE	24.8	71.4	443	269	174	1500		1730
MERCURY	0.01	0.01 U	0.01	0.02	0.01 U	0.02		0.02 U
NICKEL	5.0 U	22	6.7 U	62.8	10.8 U	38.2		508
POTASSIUM	1190	1150 U	7320	2490	2520 U	4300		6210 U
SELENIUM	3.71 U	3.8	3.71 U	3.71 U	3.71 U	3.71 U		4.08 U
SILVER	0.70 U	2.84 U	0.70 U	0.70 U	2.84 U	0.70 U		3.93 U
SODIUM	18600	31500	58200	310000	30400	675000		1140000
THALLIUM	4.09 U	4.09 U	4.09 U	4.09 U	4.09 U	4.09 U		4.26 U
VANADIUM	6.3	30	0.75 U	5.5	4.14 U	0.75 U		5.07 U
ZINC	17.1	47.4	9.2	172	2.5 U	252		590
Miscellaneous Parameters (ug/L)								
CYANIDE	10 U	10 U	10 U	10 U	10 U	10 U		10 U
Petroleum Hydrocarbons (mg/L)								
TOTAL PETROLEUM HYDROCARBONS								

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017
Sample Location	17MIP39-TW48-MW15S	17MIP39-TW48-MW15S	17MIP40-TW49-MW16I	17MW16S	17MIP41-TW50-MW17I	17MW17S	17MIP42-TW51-MW18S
Sample Number	17-Q-48-0105	17-G-15S-0305	17-Q-49-0105	17-G-16S-0305	17-Q-50-0105	17-G-17S-0205	17-Q-51-0105
Sample Date	01/13/05	03/09/05	01/13/05	03/08/05	01/13/05	02/26/05	01/13/05
Volatile Organics (ug/L)							
1,1,1,2-TETRACHLOROETHANE							
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-TRICHLOROPROPANE							
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRIMETHYLBENZENE							
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-TRIMETHYLBENZENE							
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DIOXANE							
2-BUTANONE	5 UR	5 U	5 UR	5 U	5 UR	5 U	5 UR
2-CHLOROETHYL VINYL ETHER							
2-HEXANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-CHLOROPROPENE							
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	5 UR	5 UR	5 UR	5 UR	17 U	5 UR	20 U
ACETONITRILE							
ACROLEIN							
ACRYLONITRILE							
BENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOETHANE							
BROMOFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLORODIBROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROPRENE							
CIS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIBROMOMETHANE							
DICHLORODIFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ETHYL METHACRYLATE							
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOBUTANOL							
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017
Sample Location	17MIP39-TW48-MW15S	17MIP39-TW48-MW15S	17MIP40-TW49-MW16I	17MW16S	17MIP41-TW50-MW17I	17MW17S	17MIP42-TW51-MW18S
Sample Number	17-Q-48-0105	17-G-15S-0305	17-Q-49-0105	17-G-16S-0305	17-Q-50-0105	17-G-17S-0205	17-Q-51-0105
Sample Date	01/13/05	03/09/05	01/13/05	03/08/05	01/13/05	02/26/05	01/13/05
M+P-XYLENES	10 U	10 U	10 U	10 U	10 U	10 U	10 U
METHACRYLONITRILE							
METHYL ACETATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL IODIDE							
METHYL METHACRYLATE							
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYLENE CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
O-XYLENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLOROETHANE							
PROPIONITRILE							
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOLUENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOTAL 1,2-DICHLOROETHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TOTAL XYLENES	15 U	15 U	15 U	15 U	15 U	15 U	15 U
TRANS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,4-DICHLORO-2-BUTENE							
TRICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	9	5 U
TRICHLOROFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
VINYL ACETATE							
VINYL CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Semivolatile Organics (ug/L)							
1,1-BIPHENYL		10 U		10 U		10 UJ	
1,2,4,5-TETRACHLOROBENZENE							
1,3,5-TRINITROBENZENE							
1,3-DINITROBENZENE							
1,4-NAPHTHOQUINONE							
1,4-PHENYLENEDIAMINE							
1-NAPHTHYLAMINE							
2,2'-OXYBIS(1-CHLOROPROPANE)		10 U		10 U		10 UJ	
2,3,4,6-TETRACHLOROPHENOL							
2,4,5-TRICHLOROPHENOL		25 U		25 UR		25 U	
2,4,6-TRICHLOROPHENOL		10 U		10 UR		10 U	
2,4-DICHLOROPHENOL		10 U		10 UR		10 U	
2,4-DIMETHYLPHENOL		10 U		10 UR		10 U	
2,4-DINITROPHENOL		25 U		25 UR		25 U	
2,4-DINITROTOLUENE		10 U		10 U		10 UJ	
2,6-DICHLOROPHENOL							
2,6-DINITROTOLUENE		10 U		10 U		10 UJ	
2-ACETYLAMINOFLUORENE							
2-CHLORONAPHTHALENE		10 U		10 U		10 UJ	
2-CHLOROPHENOL		10 U		10 UR		10 U	
2-METHYLNAPHTHALENE		10 U		10 U		10 UJ	
2-METHYLPHENOL		10 U		10 UR		10 U	
2-NAPHTHYLAMINE							
2-NITROANILINE		25 U		25 U		25 UJ	
2-NITROPHENOL		10 U		10 UR		10 U	
2-PICOLINE							
3&4-METHYLPHENOL							

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017
Sample Location	17MIP39-TW48-MW15S	17MIP39-TW48-MW15S	17MIP40-TW49-MW16I	17MW16S	17MIP41-TW50-MW17I	17MW17S	17MIP42-TW51-MW18S
Sample Number	17-Q-48-0105	17-G-15S-0305	17-Q-49-0105	17-G-16S-0305	17-Q-50-0105	17-G-17S-0205	17-Q-51-0105
Sample Date	01/13/05	03/09/05	01/13/05	03/08/05	01/13/05	02/26/05	01/13/05
3,3'-DICHLOROBENZIDINE		10 U		10 U		10 UJ	
3,3'-DIMETHYLBENZIDINE							
3-METHYLCHOLANTHRENE							
3-NITROANILINE		25 U		25 U		25 UJ	
4,6-DINITRO-2-METHYLPHENOL		25 U		25 UR		25 U	
4-AMINOBIPHENYL							
4-BROMOPHENYL PHENYL ETHER		10 U		10 U		10 UJ	
4-CHLORO-3-METHYLPHENOL		10 U		10 UR		10 U	
4-CHLOROANILINE		10 U		10 U		10 UJ	
4-CHLOROPHENYL PHENYL ETHER		10 U		10 U		10 UJ	
4-METHYLPHENOL		10 U		10 UR		10 U	
4-NITROANILINE		25 U		25 U		25 UJ	
4-NITROPHENOL		25 UR		25 UR		25 U	
4-NITROQUINOLINE-1-OXIDE							
5-NITRO-O-TOLUIDINE							
7,12-DIMETHYLBENZ(A)ANTHRACENE							
A,A-DIMETHYLPHENETHYLAMINE							
ACENAPHTHENE		10 U		10 U		10 UJ	
ACENAPHTHYLENE		10 U		10 U		10 UJ	
ACETOPHENONE		10 U		10 U		10 UJ	
ANILINE							
ANTHRACENE		10 U		10 U		10 UJ	
ARAMITE							
ATRAZINE		10 U		10 U		10 UJ	
BENZALDEHYDE		10 U		10 U		10 UR	
BENZO(A)ANTHRACENE		10 U		10 U		10 UJ	
BENZO(A)PYRENE		10 U		10 U		10 UJ	
BENZO(B)FLUORANTHENE		10 U		10 U		10 UJ	
BENZO(G,H,I)PERYLENE		10 U		10 U		10 UJ	
BENZO(K)FLUORANTHENE		10 U		10 U		10 UJ	
BENZYL ALCOHOL							
BIS(2-CHLOROETHOXY)METHANE		10 U		10 U		10 UJ	
BIS(2-CHLOROETHYL)ETHER		10 U		10 U		10 UJ	
BIS(2-CHLOROISOPROPYL)ETHER							
BIS(2-ETHYLHEXYL)PHTHALATE		9 J		10 U		10 UJ	
BUTYL BENZYL PHTHALATE		10 U		10 U		10 UJ	
CAPROLACTAM		10 U		10 U		10 UJ	
CARBAZOLE		10 U		10 U		10 UJ	
CHLOROBENZILATE							
CHRYSENE		10 U		10 U		10 UJ	
DI-N-BUTYL PHTHALATE		10 U		10 U		10 UJ	
DI-N-OCTYL PHTHALATE		10 U		10 U		10 UJ	
DIALLATE							
DIBENZO(A,H)ANTHRACENE		10 U		10 U		10 UJ	
DIBENZOFURAN		10 U		10 U		10 UJ	
DIETHYL PHTHALATE		10 U		10 U		10 UJ	
DIMETHOATE							
DIMETHYL PHTHALATE		10 U		10 U		10 UJ	
DINOSEB							
ETHYL METHANE SULFONATE							
ETHYL PARATHION							

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017
Sample Location	17MIP39-TW48-MW15S	17MIP39-TW48-MW15S	17MIP40-TW49-MW16I	17MW16S	17MIP41-TW50-MW17I	17MW17S	17MIP42-TW51-MW18S
Sample Number	17-Q-48-0105	17-G-15S-0305	17-Q-49-0105	17-G-16S-0305	17-Q-50-0105	17-G-17S-0205	17-Q-51-0105
Sample Date	01/13/05	03/09/05	01/13/05	03/08/05	01/13/05	02/26/05	01/13/05
FLUORANTHENE		10 U		10 U		10 UJ	
FLUORENE		10 U		10 U		10 UJ	
HEXACHLOROBENZENE		10 U		10 U		10 UJ	
HEXACHLOROBUTADIENE		10 U		10 U		10 UJ	
HEXACHLOROCYCLOPENTADIENE		10 U		10 U		10 UJ	
HEXACHLOROETHANE		10 U		10 U		10 UJ	
HEXACHLOROPHENE							
HEXACHLOROPROPENE							
INDENO(1,2,3-CD)PYRENE		10 U		10 U		10 UJ	
ISODRIN							
ISOPHORONE		10 U		10 U		10 UJ	
ISOSAFROLE							
KEPONE							
METHAPYRILENE							
METHYL METHANE SULFONATE							
N-NITROSO-DI-N-BUTYLAMINE							
N-NITROSO-DI-N-PROPYLAMINE		10 U		10 U		10 UJ	
N-NITROSODIETHYLAMINE							
N-NITROSODIMETHYLAMINE							
N-NITROSODIPHENYLAMINE		10 U		10 U		10 UJ	
N-NITROSOMETHYLETHYLAMINE							
N-NITROSOMORPHOLINE							
N-NITROSOPIPERIDINE							
N-NITROSOPYRROLIDINE							
NAPHTHALENE		10 U		10 U		10 UJ	
NITROBENZENE		10 U		10 U		10 UR	
O,O,O-TRIETHYL PHOSPHOROTHIOATE							
O-TOLUIDINE							
P-(DIMETHYLAMINO)AZOBENZENE							
PENTACHLOROBENZENE							
PENTACHLORONITROBENZENE							
PENTACHLOROPHENOL		25 U		25 UR		25 UR	
PHENACETIN							
PHENANTHRENE		10 U		10 U		10 UJ	
PHENOL		10 U		10 UR		10 U	
PRONAMIDE							
PYRENE		10 U		10 U		10 UJ	
PYRIDINE							
SAFROLE							
SULFOTEPP							
THIONAZIN							
Pesticides/PCBs (ug/L)							
4,4'-DDD		0.1 U		0.1 U		0.1 U	
4,4'-DDE		0.1 U		0.1 U		0.1 U	
4,4'-DDT		0.1 U		0.1 U		0.1 U	
ALDRIN		0.05 U		0.05 U		0.05 U	
ALPHA-BHC		0.05 U		0.05 U		0.05 U	
ALPHA-CHLORDANE		0.05 U		0.05 U		0.05 U	
AROCLOR-1016		0.5 U		0.5 U		0.5 U	
AROCLOR-1221		0.5 U		0.5 U		0.5 U	
AROCLOR-1232		0.5 U		0.5 U		0.5 U	

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017
Sample Location	17MIP39-TW48-MW15S	17MIP39-TW48-MW15S	17MIP40-TW49-MW16I	17MW16S	17MIP41-TW50-MW17I	17MW17S	17MIP42-TW51-MW18S
Sample Number	17-Q-48-0105	17-G-15S-0305	17-Q-49-0105	17-G-16S-0305	17-Q-50-0105	17-G-17S-0205	17-Q-51-0105
Sample Date	01/13/05	03/09/05	01/13/05	03/08/05	01/13/05	02/26/05	01/13/05
AROCLOR-1242		0.5 U		0.5 U		0.5 U	
AROCLOR-1248		0.5 U		0.5 U		0.5 U	
AROCLOR-1254		0.5 U		0.5 U		0.5 U	
AROCLOR-1260		0.5 U		0.5 U		0.5 U	
BETA-BHC		0.05 U		0.05 U		0.05 U	
CHLORDANE							
DELTA-BHC		0.05 U		0.05 U		0.05 U	
DIELDRIN		0.1 U		0.1 U		0.1 U	
ENDOSULFAN I		0.05 U		0.05 U		0.05 U	
ENDOSULFAN II		0.1 U		0.1 U		0.1 U	
ENDOSULFAN SULFATE		0.1 U		0.1 U		0.1 U	
ENDRIN		0.1 U		0.1 U		0.1 U	
ENDRIN ALDEHYDE		0.1 U		0.1 U		0.1 U	
ENDRIN KETONE		0.1 U		0.1 U		0.1 U	
GAMMA-BHC (LINDANE)		0.05 U		0.05 U		0.05 U	
GAMMA-CHLORDANE		0.05 U		0.05 U		0.05 U	
HEPTACHLOR		0.05 U		0.05 U		0.05 U	
HEPTACHLOR EPOXIDE		0.05 U		0.05 U		0.05 U	
KEPONE							
METHOXYCHLOR		0.5 U		0.5 U		0.5 U	
TOXAPHENE		1 U		1 U		1 U	
OrganoPhos Pesticides (ug/L)							
DIMETHOATE							
DISULFOTON							
ETHYL PARATHION							
FAMPHUR							
METHYL PARATHION							
O,O,O-TRIETHYL PHOSPHOROTHIOATE							
PHORATE							
SULFOTEPP							
THIONAZIN							
Herbicides (ug/L)							
2,4,5-T							
2,4,5-TP (SILVEX)							
2,4-D							
DINOSEB							
Explosives (ug/L)							
1,3,5-TRINITROBENZENE		0.31 U		1.6 U		2.7 U	
1,3-DINITROBENZENE		0.31 U		1.6 U		2.7 U	
2,4,6-TRINITROTOLUENE		0.31 U		1.6 U		2.7 U	
2,4-DINITROTOLUENE		0.6 U		3.1 U		5.3 U	
2,6-DINITROTOLUENE		0.6 U		3.1 U		5.3 U	
2-AMINO-4,6-DINITROTOLUENE		0.6 U		3.1 U		5.3 U	
2-NITROTOLUENE		0.6 U		3.1 U		5.3 U	
3-NITROTOLUENE		0.6 U		3.1 U		5.3 U	
4-AMINO-2,6-DINITROTOLUENE		0.6 U		3.1 U		5.3 U	
4-NITROTOLUENE		0.6 U		3.1 U		5.3 U	
HMX		0.6 U		3.1 U		5.3 U	
NITROBENZENE		0.31 U		1.6 U		2.7 U	
RDX		0.31 U		1.6 U		2.7 U	
TETRYL		0.75 U		3.9 U		6.6 U	

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017
Sample Location	17MIP39-TW48-MW15S	17MIP39-TW48-MW15S	17MIP40-TW49-MW16I	17MW16S	17MIP41-TW50-MW17I	17MW17S	17MIP42-TW51-MW18S
Sample Number	17-Q-48-0105	17-G-15S-0305	17-Q-49-0105	17-G-16S-0305	17-Q-50-0105	17-G-17S-0205	17-Q-51-0105
Sample Date	01/13/05	03/09/05	01/13/05	03/08/05	01/13/05	02/26/05	01/13/05
Inorganics (ug/L)							
ALUMINUM		12200		39000		23800	
ANTIMONY		3.54 U		3.54 U		3.54 U	
ARSENIC		4.4		5.4		8.9 U	
BARIUM		139		79.5		112	
BERYLLIUM		25.4		23.8		26.2	
CADMIUM		3.8 U		2.29 U		2.29 U	
CALCIUM		435000		404000		500000	
CHROMIUM		1.4 U		2.0 U		3.0 U	
COBALT		374		260		585	
COPPER		2.52 U		2.52 U		2.52 U	
IRON		198000		291000		201000	
LEAD		2.7		4.2		3.6 U	
MAGNESIUM		201000		270000		191000	
MANGANESE		914		825		4850	
MERCURY		0.02 U		0.02 U		0.02 U	
NICKEL		219		149		180	
POTASSIUM		6210 U		6210 U		4870	
SELENIUM		4.08 U		4.08 U		4.08 U	
SILVER		3.93 U		3.93 U		3.93 U	
SODIUM		2110000		2800000		2460000	
THALLIUM		4.26 U		4.4 U		5.5 U	
VANADIUM		5.07 U		9.1		9	
ZINC		286		199		318	
Miscellaneous Parameters (ug/L)							
CYANIDE		10 U		10 U		10 U	
Petroleum Hydrocarbons (mg/L)							
TOTAL PETROLEUM HYDROCARBONS							

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP42-TW51-MW18S	17MIP43-TW52-MW19S	17MIP43-TW52-MW19S	17MIP44-TW53	17MIP45-TW54	17MIP45-TW54	17MIP45-TW54	17MIP46-TW55
Sample Number	17-G-18S-0205	17-Q-52-0105	17-G-19S-0205	17-Q-53-0105	17-Q-54-0105	17-Q-54-0105-AVG	17-Q-54-0105-D	17-Q-55-0105
Sample Date	02/26/05	01/15/05	02/24/05	01/15/05	01/15/05	01/15/05	01/15/05	01/17/05
Volatile Organics (ug/L)								
1,1,1,2-TETRACHLOROETHANE	5 U							
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5 U	5 U	5 U	5 U	1 J	1.5 J	2 J	5 U
1,1,2-TRICHLOROETHANE	5 U	5 U	5 U	0.5 J	8	8	8	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE		130	130	0.3 J	5 U	5 U	5 U	5 U
1,1-DICHLOROETHANE	5 U	5 U	5 U	5 U	1 J	1 J	1 J	5 U
1,1-DICHLOROETHENE	5 U	5 U	5 U	2 J	4 J	4.5 J	5 J	5 U
1,2,3-TRICHLOROPROPANE	5 U							
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRIMETHYLBENZENE								
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-TRIMETHYLBENZENE								
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DIOXANE	100 UR							
2-BUTANONE	10 U	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR
2-CHLOROETHYL VINYL ETHER								
2-HEXANONE	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-CHLOROPROPENE	10 U							
4-METHYL-2-PENTANONE	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	10 UR	5 UR	5 UR	22 U	5 UR	19 U	19 U	5 UR
ACETONITRILE	50 UR							
ACROLEIN	50 UR							
ACRYLONITRILE	10 UR							
BENZENE	5 U	5 U	5 U	0.9 J	6	6	6	5 U
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOETHANE								
BROMOFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLORODIBROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	5 U	5 U	5 U	0.6 J	100	100	100	5 U
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROPRENE	10 U							
CIS-1,2-DICHLOROETHENE	5 U	5	4 J	16	84	83	82	1 J
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CYCLOHEXANE		5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIBROMOMETHANE	5 U							
DICHLORODIFLUOROMETHANE	5 U	5 U	5 U	3 J	61	60	59	5 U
ETHYL METHACRYLATE	10 U							
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOBUTANOL	100 UR							
ISOPROPYLBENZENE		5 U	5 U	5 U	5 U	5 U	5 U	5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP42-TW51-MW18S	17MIP43-TW52-MW19S	17MIP43-TW52-MW19S	17MIP44-TW53	17MIP45-TW54	17MIP45-TW54	17MIP45-TW54	17MIP46-TW55
Sample Number	17-G-18S-0205	17-Q-52-0105	17-G-19S-0205	17-Q-53-0105	17-Q-54-0105	17-Q-54-0105-AVG	17-Q-54-0105-D	17-Q-55-0105
Sample Date	02/26/05	01/15/05	02/24/05	01/15/05	01/15/05	01/15/05	01/15/05	01/17/05
M+P-XYLENES	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
METHACRYLONITRILE	50 U							
METHYL ACETATE		5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE		5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL IODIDE	10 U							
METHYL METHACRYLATE	10 U							
METHYL TERT-BUTYL ETHER		5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYLENE CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
O-XYLENE	5 U	5 U	5 U	5 U	0.4 J	0.4 J	0.4 J	5 U
PENTACHLOROETHANE	10 U							
PROPIONITRILE	50 U							
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	5 U	0.8 J	5 U	5 U	2 J	2 J	2 J	5 U
TOLUENE	5 U	5 U	5 U	5 U	0.2 J	0.2 J	5 U	5 U
TOTAL 1,2-DICHLOROETHENE		5 J	4 J	17	87	86	85	2 J
TOTAL XYLENES	15 U	15 U	15 U	15 U	0.4 J	0.4 J	0.4 J	15 U
TRANS-1,2-DICHLOROETHENE	5 U	5 U	5 U	1 J	4 J	4 J	4 J	0.3 J
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,4-DICHLORO-2-BUTENE	10 U							
TRICHLOROETHENE	5 U	310	260	1700	19000	19000	19000	19
TRICHLOROFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
VINYL ACETATE	5 U							
VINYL CHLORIDE	2 U	5 U	5 U	0.8 J	5 J	4.5 J	4 J	5 U
Semivolatile Organics (ug/L)								
1,1-BIPHENYL			10 UJ	11 U				
1,2,4,5-TETRACHLOROBENZENE	10 UJ							
1,3,5-TRINITROBENZENE	10 UJ							
1,3-DINITROBENZENE	10 UJ							
1,4-NAPHTHOQUINONE	10 UJ							
1,4-PHENYLENEDIAMINE	10 UJ							
1-NAPHTHYLAMINE	10 UJ							
2,2'-OXYBIS(1-CHLOROPROPANE)	10 UJ		10 UJ	11 U				
2,3,4,6-TETRACHLOROPHENOL	10 U							
2,4,5-TRICHLOROPHENOL	25 U		25 UJ	11 U				
2,4,6-TRICHLOROPHENOL	10 U		10 UJ	11 U				
2,4-DICHLOROPHENOL	10 U		10 UJ	11 U				
2,4-DIMETHYLPHENOL	10 U		10 UJ	11 U				
2,4-DINITROPHENOL	25 U		25 UJ	26 U				
2,4-DINITROTOLUENE	10 UJ		10 UJ	11 U				
2,6-DICHLOROPHENOL	10 U							
2,6-DINITROTOLUENE	10 UJ		10 UJ	11 U				
2-ACETYLAMINOFLUORENE	10 UJ							
2-CHLORONAPHTHALENE	10 UJ		10 UJ	11 U				
2-CHLOROPHENOL	10 U		10 UJ	11 U				
2-METHYLNAPHTHALENE	10 UJ		10 UJ	11 U				
2-METHYLPHENOL	10 U		10 UJ	11 U				
2-NAPHTHYLAMINE	10 UJ							
2-NITROANILINE	25 UJ		25 UJ	26 U				
2-NITROPHENOL	10 U		10 UJ	11 U				
2-PICOLINE	10 UJ							
3&4-METHYLPHENOL	10 U							

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP42-TW51-MW18S	17MIP43-TW52-MW19S	17MIP43-TW52-MW19S	17MIP44-TW53	17MIP45-TW54	17MIP45-TW54	17MIP45-TW54	17MIP46-TW55
Sample Number	17-G-18S-0205	17-Q-52-0105	17-G-19S-0205	17-Q-53-0105	17-Q-54-0105	17-Q-54-0105-AVG	17-Q-54-0105-D	17-Q-55-0105
Sample Date	02/26/05	01/15/05	02/24/05	01/15/05	01/15/05	01/15/05	01/15/05	01/17/05
3,3'-DICHLOROBENZIDINE	10 UJ		10 UJ	11 U				
3,3'-DIMETHYLBENZIDINE	20 UJ							
3-METHYLCHOLANTHRENE	10 UJ							
3-NITROANILINE	25 UJ		25 UJ	26 U				
4,6-DINITRO-2-METHYLPHENOL	25 U		25 UJ	26 U				
4-AMINOBIPHENYL	10 UJ							
4-BROMOPHENYL PHENYL ETHER	10 UJ		10 UJ	11 U				
4-CHLORO-3-METHYLPHENOL	10 U		10 UJ	11 U				
4-CHLOROANILINE	10 UJ		10 UJ	11 U				
4-CHLOROPHENYL PHENYL ETHER	10 UJ		10 UJ	11 U				
4-METHYLPHENOL			10 UJ	11 U				
4-NITROANILINE	25 UJ		25 UJ	26 U				
4-NITROPHENOL	25 U		25 UJ	26 U				
4-NITROQUINOLINE-1-OXIDE	20 UR							
5-NITRO-O-TOLUIDINE	20 UJ							
7,12-DIMETHYLBENZ(A)ANTHRACENE	10 UJ							
A,A-DIMETHYLPHENETHYLAMINE	10 UJ							
ACENAPHTHENE	10 UJ		10 UJ	11 U				
ACENAPHTHYLENE	10 UJ		10 UJ	11 U				
ACETOPHENONE	10 UJ		10 UJ	11 U				
ANILINE	10 UJ							
ANTHRACENE	10 UJ		10 UJ	11 U				
ARAMITE	20 UJ							
ATRAZINE			10 UJ	11 U				
BENZALDEHYDE			10 UR	11 U				
BENZO(A)ANTHRACENE	10 UJ		10 UJ	11 U				
BENZO(A)PYRENE	10 UJ		10 UJ	11 U				
BENZO(B)FLUORANTHENE	10 UJ		10 UJ	11 U				
BENZO(G,H,I)PERYLENE	10 UJ		10 UJ	11 U				
BENZO(K)FLUORANTHENE	10 UJ		10 UJ	11 U				
BENZYL ALCOHOL	20 UJ							
BIS(2-CHLOROETHOXY)METHANE	10 UJ		10 UJ	11 U				
BIS(2-CHLOROETHYL)ETHER	10 UJ		10 UJ	11 U				
BIS(2-CHLOROISOPROPYL)ETHER								
BIS(2-ETHYLHEXYL)PHTHALATE	10 UJ		10 UJ	11 U				
BUTYL BENZYL PHTHALATE	10 UJ		10 UJ	11 U				
CAPROLACTAM			10 UJ	11 U				
CARBAZOLE			10 UJ	11 U				
CHLOROBENZILATE	20 UJ							
CHRYSENE	10 UJ		10 UJ	11 U				
DI-N-BUTYL PHTHALATE	10 UJ		10 UJ	11 U				
DI-N-OCTYL PHTHALATE	10 UJ		10 UJ	11 U				
DIALLATE	20 UJ							
DIBENZO(A,H)ANTHRACENE	10 UJ		10 UJ	11 U				
DIBENZOFURAN	10 UJ		10 UJ	11 U				
DIETHYL PHTHALATE	10 UJ		10 UJ	11 U				
DIMETHOATE								
DIMETHYL PHTHALATE	10 UJ		10 UJ	11 U				
DINOSEB	5 UJ							
ETHYL METHANE SULFONATE	10 UJ							
ETHYL PARATHION								

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP42-TW51-MW18S	17MIP43-TW52-MW19S	17MIP43-TW52-MW19S	17MIP44-TW53	17MIP45-TW54	17MIP45-TW54	17MIP45-TW54	17MIP46-TW55
Sample Number	17-G-18S-0205	17-Q-52-0105	17-G-19S-0205	17-Q-53-0105	17-Q-54-0105	17-Q-54-0105-AVG	17-Q-54-0105-D	17-Q-55-0105
Sample Date	02/26/05	01/15/05	02/24/05	01/15/05	01/15/05	01/15/05	01/15/05	01/17/05
FLUORANTHENE	10 UJ		10 UJ	11 U				
FLUORENE	10 UJ		10 UJ	11 U				
HEXACHLOROBENZENE	10 UJ		10 UJ	11 U				
HEXACHLOROBUTADIENE	10 UJ		10 UJ	11 U				
HEXACHLOROCYCLOPENTADIENE	10 UJ		10 UJ	11 U				
HEXACHLOROETHANE	10 UJ		10 UJ	11 U				
HEXACHLOROPHENE	10 UR							
HEXACHLOROPROPENE	10 UJ							
INDENO(1,2,3-CD)PYRENE	10 UJ		10 UJ	11 U				
ISODRIN	20 UJ							
ISOPHORONE	10 UJ		10 UJ	11 U				
ISOSAFROLE	20 UJ							
KEPONE	10 UR							
METHAPYRILENE	10 UJ							
METHYL METHANE SULFONATE	20 UJ							
N-NITROSO-DI-N-BUTYLAMINE	10 UJ							
N-NITROSO-DI-N-PROPYLAMINE	10 UJ		10 UJ	11 U				
N-NITROSODIETHYLAMINE	20 UJ							
N-NITROSODIMETHYLAMINE	20 UJ							
N-NITROSODIPHENYLAMINE	10 UJ		10 UJ	11 U				
N-NITROSOMETHYLETHYLAMINE	10 UJ							
N-NITROSOMORPHOLINE	10 UJ							
N-NITROSOPIPERIDINE	10 UJ							
N-NITROSOPYRROLIDINE	10 UJ							
NAPHTHALENE	10 UJ		10 UJ	11 U				
NITROBENZENE	10 UJ		10 UJ	11 U				
O,O,O-TRIETHYL PHOSPHOROTHIOATE								
O-TOLUIDINE	10 UJ							
P-(DIMETHYLAMINO)AZOBENZENE	20 UJ							
PENTACHLOROBENZENE	10 UJ							
PENTACHLORONITROBENZENE	10 UJ							
PENTACHLOROPHENOL	25 U		25 UR	26 U				
PHENACETIN	10 UJ							
PHENANTHRENE	10 UJ		10 UJ	11 U				
PHENOL	10 U		10 UJ	11 U				
PRONAMIDE	10 UJ							
PYRENE	10 UJ		10 UJ	11 U				
PYRIDINE	50 UJ							
SAFROLE	10 UJ							
SULFOTEPP								
THIONAZIN								
Pesticides/PCBs (ug/L)								
4,4'-DDD	0.1 U		0.1 U	0.1 U				
4,4'-DDE	0.1 U		0.1 U	0.1 U				
4,4'-DDT	0.1 U		0.1 U	0.1 U				
ALDRIN	0.05 U		0.05 U	0.05 U				
ALPHA-BHC	0.05 U		0.05 U	0.05 U				
ALPHA-CHLORDANE	0.05 U		0.05 U	0.05 U				
AROCLOR-1016	0.5 U		0.5 U	0.5 U				
AROCLOR-1221	0.5 U		0.5 U	0.5 U				
AROCLOR-1232	0.5 U		0.5 U	0.5 U				

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP42-TW51-MW18S	17MIP43-TW52-MW19S	17MIP43-TW52-MW19S	17MIP44-TW53	17MIP45-TW54	17MIP45-TW54	17MIP45-TW54	17MIP46-TW55
Sample Number	17-G-18S-0205	17-Q-52-0105	17-G-19S-0205	17-Q-53-0105	17-Q-54-0105	17-Q-54-0105-AVG	17-Q-54-0105-D	17-Q-55-0105
Sample Date	02/26/05	01/15/05	02/24/05	01/15/05	01/15/05	01/15/05	01/15/05	01/17/05
AROCLOR-1242	0.5 U		0.5 U	0.5 U				
AROCLOR-1248	0.5 U		0.5 U	0.5 U				
AROCLOR-1254	0.5 U		0.5 U	0.5 U				
AROCLOR-1260	0.5 U		0.5 U	0.5 U				
BETA-BHC	0.05 U		0.05 U	0.05 U				
CHLORDANE	0.5 U							
DELTA-BHC	0.05 U		0.05 U	0.05 U				
DIELDRIN	0.1 U		0.1 U	0.1 U				
ENDOSULFAN I	0.05 U		0.05 U	0.05 U				
ENDOSULFAN II	0.1 U		0.1 U	0.1 U				
ENDOSULFAN SULFATE	0.1 U		0.1 U	0.1 U				
ENDRIN	0.1 U		0.1 U	0.1 U				
ENDRIN ALDEHYDE	0.1 U		0.1 U	0.1 U				
ENDRIN KETONE	0.1 U		0.1 U	0.1 U				
GAMMA-BHC (LINDANE)	0.05 U		0.05 U	0.05 U				
GAMMA-CHLORDANE	0.05 U		0.05 U	0.05 U				
HEPTACHLOR	0.05 U		0.05 U	0.05 U				
HEPTACHLOR EPOXIDE	0.05 U		0.05 U	0.05 U				
KEPONE								
METHOXYCHLOR	0.5 U		0.5 U	0.5 U				
TOXAPHENE	1 U		1 U	1 U				
OrganoPhos Pesticides (ug/L)								
DIMETHOATE	1.9 U							
DISULFOTON	1.9 U							
ETHYL PARATHION	1.9 U							
FAMPHUR	1.9 U							
METHYL PARATHION	1.9 U							
O,O,O-TRIETHYL PHOSPHOROTHIOATE	1.9 U							
PHORATE	1.9 U							
SULFOTEPP	1.9 U							
THIONAZIN	1.9 U							
Herbicides (ug/L)								
2,4,5-T	1.5 U							
2,4,5-TP (SILVEX)	1 U							
2,4-D	2.5 U							
DINOSEB								
Explosives (ug/L)								
1,3,5-TRINITROBENZENE	2.2 U		0.16 U	0.26 U				
1,3-DINITROBENZENE	2.2 U		0.16 U	0.26 U				
2,4,6-TRINITROTOLUENE	2.2 U		0.16 U	0.26 U				
2,4-DINITROTOLUENE	4.3 U		0.31 U	0.5 U				
2,6-DINITROTOLUENE	4.3 U		0.31 U	0.5 U				
2-AMINO-4,6-DINITROTOLUENE	4.3 U		0.31 U	0.5 U				
2-NITROTOLUENE	4.3 U		0.31 U	0.5 U				
3-NITROTOLUENE	4.3 U		0.31 U	0.5 U				
4-AMINO-2,6-DINITROTOLUENE	4.3 U		0.31 U	0.5 U				
4-NITROTOLUENE	4.3 U		0.31 U	0.5 U				
HMX	4.3 U		0.31 U	0.5 U				
NITROBENZENE	2.2 U		0.16 U	0.26 U				
RDX	2.2 U		0.16 U	0.26 U				
TETRYL	5.5 U		0.39 U	0.63 U				

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP42-TW51-MW18S	17MIP43-TW52-MW19S	17MIP43-TW52-MW19S	17MIP44-TW53	17MIP45-TW54	17MIP45-TW54	17MIP45-TW54	17MIP46-TW55
Sample Number	17-G-18S-0205	17-Q-52-0105	17-G-19S-0205	17-Q-53-0105	17-Q-54-0105	17-Q-54-0105-AVG	17-Q-54-0105-D	17-Q-55-0105
Sample Date	02/26/05	01/15/05	02/24/05	01/15/05	01/15/05	01/15/05	01/15/05	01/17/05
Inorganics (ug/L)								
ALUMINUM	4620		26.8 U	3790				
ANTIMONY	5.6		3.54 U	2.34 U				
ARSENIC	6.0 U		14.2 U	7.1				
BARIUM	191		28.6	212				
BERYLLIUM	6.2		0.40 U	2.9				
CADMIUM	2.29 U		0.41 U	0.3 U				
CALCIUM	387000		12400	396000				
CHROMIUM	1.6 U		1.8 U	11.2				
COBALT	287		4.3 U	59.2				
COPPER	2.52 U		2.52 U	6.7				
IRON	360000		2220	115000				
LEAD	3.5 U		2.07 U	1.7 U				
MAGNESIUM	269000		1900	56700				
MANGANESE	1270		44.9	828				
MERCURY	0.02 U		0.02 U	0.02 U				
NICKEL	134		11.6 U	45				
POTASSIUM	7660		1030	4010				
SELENIUM	4.08 U		4.08 U	3.71 U				
SILVER	3.93 U		3.93 U	0.7 U				
SODIUM	2510000		35900	368000				
THALLIUM	4.26 U		4.26 U	5.4 U				
VANADIUM	5.07 U		5.07 U	12.2				
ZINC	215		13.8	168				
Miscellaneous Parameters (ug/L)								
CYANIDE	10 U		10 U	10 U				
Petroleum Hydrocarbons (mg/L)								
TOTAL PETROLEUM HYDROCARBONS								

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP47-TW56	17MIP47-TW56	17MIP47-TW56	17MIP48-TW57-MW20S	17MIP48-TW57-MW20S	17MIP49-TW58	17MIP50-TW59	17MIP51-TW60
Sample Number	17-Q-56-0105	17-Q-56-0105-AVG	17-Q-56-0105-D	17-Q-57-0105	17-G-20S-0205	17-Q-58-0105	17-Q-59-0105	17-Q-60-0105
Sample Date	01/15/05	01/15/05	01/15/05	01/16/05	02/27/05	01/16/05	01/15/05	01/17/05
Volatile Organics (ug/L)								
1,1,1,2-TETRACHLOROETHANE								
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	0.9 J	0.9 J	5 U	5 U	5 U	5 U	5 J	42
1,1,2-TRICHLOROETHANE	28	27	26	5 U	5 U	5 U	2 J	64
1,1,2-TRICHLOROTRIFLUOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	47	13
1,1-DICHLOROETHANE	1 J	1 J	1 J	5 U	5 U	5 U	0.6 J	5 U
1,1-DICHLOROETHENE	4 J	4 J	4 J	5 U	0.8 J	2 J	5 U	3 J
1,2,3-TRICHLOROPROPANE								
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRIMETHYLBENZENE								
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	14	13	12	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-TRIMETHYLBENZENE								
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DIOXANE								
2-BUTANONE	5 UR	5 UR	5 UR	5 U	5 U	5 U	5 UR	5 U
2-CHLOROETHYL VINYL ETHER								
2-HEXANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-CHLOROPROPENE								
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	20 U	5 UR
ACETONITRILE								
ACROLEIN								
ACRYLONITRILE								
BENZENE	16	15.5	15	1 J	3 J	4 J	2 J	4 J
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOETHANE								
BROMOFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	68	66	64	5 U	5 U	5 U	2 J	5 U
CHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLORODIBROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	280	280	280	5 U	0.4 J	0.6 J	18	5 J
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROPRENE								
CIS-1,2-DICHLOROETHENE	87	87.5	88	2 J	3 J	8	18	100
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIBROMOMETHANE								
DICHLORODIFLUOROMETHANE	240	255	270	2 J	3 J	31	5 J	5 U
ETHYL METHACRYLATE								
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOBUTANOL								
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP47-TW56	17MIP47-TW56	17MIP47-TW56	17MIP48-TW57-MW20S	17MIP48-TW57-MW20S	17MIP49-TW58	17MIP50-TW59	17MIP51-TW60
Sample Number	17-Q-56-0105	17-Q-56-0105-AVG	17-Q-56-0105-D	17-Q-57-0105	17-G-20S-0205	17-Q-58-0105	17-Q-59-0105	17-Q-60-0105
Sample Date	01/15/05	01/15/05	01/15/05	01/16/05	02/27/05	01/16/05	01/15/05	01/17/05
M+P-XYLENES	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
METHACRYLONITRILE								
METHYL ACETATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL IODIDE								
METHYL METHACRYLATE								
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYLENE CHLORIDE	7	7	7	5 U	5 U	5 U	5 U	5 U
O-XYLENE	0.5 J	0.45 J	0.4 J	5 U	5 U	5 U	5 U	5 U
PENTACHLOROETHANE								
PROPIONITRILE								
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	2 J	2.5 J	3 J	5 U	0.5 J	2 J	5 U	0.6 J
TOLUENE	0.6 J	0.55 J	0.5 J	5 U	5 U	5 U	5 U	0.4 J
TOTAL 1,2-DICHLOROETHENE	88	88	88	2 J	4 J	8 J	18	110
TOTAL XYLENES	0.5 J	0.45 J	0.4 J	15 U	15 U	15 U	15 U	15 U
TRANS-1,2-DICHLOROETHENE	1 J	0.95 J	0.9 J	5 U	0.6 J	0.5 J	0.4 J	5 J
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,4-DICHLORO-2-BUTENE								
TRICHLOROETHENE	42000	43000	44000	87	120	560	1800	29000
TRICHLOROFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
VINYL ACETATE								
VINYL CHLORIDE	5	5	5	5 U	5 U	0.4 J	0.6 J	4 J
Semivolatile Organics (ug/L)								
1,1-BIPHENYL					10 U			
1,2,4,5-TETRACHLOROBENZENE								
1,3,5-TRINITROBENZENE								
1,3-DINITROBENZENE								
1,4-NAPHTHOQUINONE								
1,4-PHENYLENEDIAMINE								
1-NAPHTHYLAMINE								
2,2'-OXYBIS(1-CHLOROPROPANE)					10 U			
2,3,4,6-TETRACHLOROPHENOL								
2,4,5-TRICHLOROPHENOL					25 U			
2,4,6-TRICHLOROPHENOL					10 U			
2,4-DICHLOROPHENOL					10 U			
2,4-DIMETHYLPHENOL					10 U			
2,4-DINITROPHENOL					25 U			
2,4-DINITROTOLUENE					10 U			
2,6-DICHLOROPHENOL								
2,6-DINITROTOLUENE					10 U			
2-ACETYLAMINOFLUORENE								
2-CHLORONAPHTHALENE					10 U			
2-CHLOROPHENOL					10 U			
2-METHYLNAPHTHALENE					10 U			
2-METHYLPHENOL					10 U			
2-NAPHTHYLAMINE								
2-NITROANILINE					25 U			
2-NITROPHENOL					10 U			
2-PICOLINE								
3&4-METHYLPHENOL								

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP47-TW56	17MIP47-TW56	17MIP47-TW56	17MIP48-TW57-MW20S	17MIP48-TW57-MW20S	17MIP49-TW58	17MIP50-TW59	17MIP51-TW60
Sample Number	17-Q-56-0105	17-Q-56-0105-AVG	17-Q-56-0105-D	17-Q-57-0105	17-G-20S-0205	17-Q-58-0105	17-Q-59-0105	17-Q-60-0105
Sample Date	01/15/05	01/15/05	01/15/05	01/16/05	02/27/05	01/16/05	01/15/05	01/17/05
3,3'-DICHLOROBENZIDINE					10 U			
3,3'-DIMETHYLBENZIDINE								
3-METHYLCHOLANTHRENE								
3-NITROANILINE					25 U			
4,6-DINITRO-2-METHYLPHENOL					25 U			
4-AMINOBIPHENYL								
4-BROMOPHENYL PHENYL ETHER					10 U			
4-CHLORO-3-METHYLPHENOL					10 U			
4-CHLOROANILINE					10 U			
4-CHLOROPHENYL PHENYL ETHER					10 U			
4-METHYLPHENOL					10 U			
4-NITROANILINE					25 U			
4-NITROPHENOL					25 U			
4-NITROQUINOLINE-1-OXIDE								
5-NITRO-O-TOLUIDINE								
7,12-DIMETHYLBENZ(A)ANTHRACENE								
A,A-DIMETHYLPHENETHYLAMINE								
ACENAPHTHENE					10 U			
ACENAPHTHYLENE					10 U			
ACETOPHENONE					10 U			
ANILINE								
ANTHRACENE					10 U			
ARAMITE								
ATRAZINE					10 U			
BENZALDEHYDE					10 UR			
BENZO(A)ANTHRACENE					10 U			
BENZO(A)PYRENE					10 U			
BENZO(B)FLUORANTHENE					10 U			
BENZO(G,H,I)PERYLENE					10 U			
BENZO(K)FLUORANTHENE					10 U			
BENZYL ALCOHOL								
BIS(2-CHLOROETHOXY)METHANE					10 U			
BIS(2-CHLOROETHYL)ETHER					10 U			
BIS(2-CHLOROISOPROPYL)ETHER								
BIS(2-ETHYLHEXYL)PHTHALATE					10 U			
BUTYL BENZYL PHTHALATE					10 U			
CAPROLACTAM					10 U			
CARBAZOLE					10 U			
CHLOROBENZILATE								
CHRYSENE					10 U			
DI-N-BUTYL PHTHALATE					10 U			
DI-N-OCTYL PHTHALATE					10 U			
DIALLATE								
DIBENZO(A,H)ANTHRACENE					10 U			
DIBENZOFURAN					10 U			
DIETHYL PHTHALATE					10 U			
DIMETHOATE								
DIMETHYL PHTHALATE					10 U			
DINOSEB								
ETHYL METHANE SULFONATE								
ETHYL PARATHION								

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP47-TW56	17MIP47-TW56	17MIP47-TW56	17MIP48-TW57-MW20S	17MIP48-TW57-MW20S	17MIP49-TW58	17MIP50-TW59	17MIP51-TW60
Sample Number	17-Q-56-0105	17-Q-56-0105-AVG	17-Q-56-0105-D	17-Q-57-0105	17-G-20S-0205	17-Q-58-0105	17-Q-59-0105	17-Q-60-0105
Sample Date	01/15/05	01/15/05	01/15/05	01/16/05	02/27/05	01/16/05	01/15/05	01/17/05
FLUORANTHENE					10 U			
FLUORENE					10 U			
HEXACHLOROBENZENE					10 U			
HEXACHLOROBUTADIENE					10 U			
HEXACHLOROCYCLOPENTADIENE					10 U			
HEXACHLOROETHANE					10 U			
HEXACHLOROPHENE								
HEXACHLOROPROPENE								
INDENO(1,2,3-CD)PYRENE					10 U			
ISODRIN								
ISOPHORONE					10 U			
ISOSAFROLE								
KEPONE								
METHAPYRILENE								
METHYL METHANE SULFONATE								
N-NITROSO-DI-N-BUTYLAMINE								
N-NITROSO-DI-N-PROPYLAMINE					10 U			
N-NITROSODIETHYLAMINE								
N-NITROSODIMETHYLAMINE								
N-NITROSODIPHENYLAMINE					10 U			
N-NITROSOMETHYLETHYLAMINE								
N-NITROSOMORPHOLINE								
N-NITROSOPIPERIDINE								
N-NITROSOPYRROLIDINE								
NAPHTHALENE					10 U			
NITROBENZENE					10 U			
O,O,O-TRIETHYL PHOSPHOROTHIOATE								
O-TOLUIDINE								
P-(DIMETHYLAMINO)AZOBENZENE								
PENTACHLOROBENZENE								
PENTACHLORONITROBENZENE								
PENTACHLOROPHENOL					25 UR			
PHENACETIN								
PHENANTHRENE					10 U			
PHENOL					10 U			
PRONAMIDE								
PYRENE					10 U			
PYRIDINE								
SAFROLE								
SULFOTEPP								
THIONAZIN								
Pesticides/PCBs (ug/L)								
4,4'-DDD					0.1 U			
4,4'-DDE					0.1 U			
4,4'-DDT					0.1 U			
ALDRIN					0.05 U			
ALPHA-BHC					0.05 U			
ALPHA-CHLORDANE					0.05 U			
AROCLOR-1016					0.5 U			
AROCLOR-1221					0.5 U			
AROCLOR-1232					0.5 U			

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP47-TW56	17MIP47-TW56	17MIP47-TW56	17MIP48-TW57-MW20S	17MIP48-TW57-MW20S	17MIP49-TW58	17MIP50-TW59	17MIP51-TW60
Sample Number	17-Q-56-0105	17-Q-56-0105-AVG	17-Q-56-0105-D	17-Q-57-0105	17-G-20S-0205	17-Q-58-0105	17-Q-59-0105	17-Q-60-0105
Sample Date	01/15/05	01/15/05	01/15/05	01/16/05	02/27/05	01/16/05	01/15/05	01/17/05
AROCLOR-1242					0.5 U			
AROCLOR-1248					0.5 U			
AROCLOR-1254					0.5 U			
AROCLOR-1260					0.5 U			
BETA-BHC					0.05 U			
CHLORDANE								
DELTA-BHC					0.05 U			
DIELDRIN					0.1 U			
ENDOSULFAN I					0.05 U			
ENDOSULFAN II					0.1 U			
ENDOSULFAN SULFATE					0.1 U			
ENDRIN					0.1 U			
ENDRIN ALDEHYDE					0.1 U			
ENDRIN KETONE					0.1 U			
GAMMA-BHC (LINDANE)					0.05 U			
GAMMA-CHLORDANE					0.05 U			
HEPTACHLOR					0.05 U			
HEPTACHLOR EPOXIDE					0.05 U			
KEPONE								
METHOXYCHLOR					0.5 U			
TOXAPHENE					1 U			
OrganoPhos Pesticides (ug/L)								
DIMETHOATE								
DISULFOTON								
ETHYL PARATHION								
FAMPHUR								
METHYL PARATHION								
O,O,O-TRIETHYL PHOSPHOROTHIOATE								
PHORATE								
SULFOTEPP								
THIONAZIN								
Herbicides (ug/L)								
2,4,5-T								
2,4,5-TP (SILVEX)								
2,4-D								
DINOSEB								
Explosives (ug/L)								
1,3,5-TRINITROBENZENE					1.7 U			
1,3-DINITROBENZENE					1.7 U			
2,4,6-TRINITROTOLUENE					1.7 U			
2,4-DINITROTOLUENE					3.3 U			
2,6-DINITROTOLUENE					3.3 U			
2-AMINO-4,6-DINITROTOLUENE					3.3 U			
2-NITROTOLUENE					3.3 U			
3-NITROTOLUENE					3.3 U			
4-AMINO-2,6-DINITROTOLUENE					3.3 U			
4-NITROTOLUENE					3.3 U			
HMX					3.3 U			
NITROBENZENE					1.7 U			
RDX					1.7 U			
TETRYL					4.1 U			

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017
Sample Location	17MIP47-TW56	17MIP47-TW56	17MIP47-TW56	17MIP48-TW57-MW20S	17MIP48-TW57-MW20S	17MIP49-TW58	17MIP50-TW59	17MIP51-TW60
Sample Number	17-Q-56-0105	17-Q-56-0105-AVG	17-Q-56-0105-D	17-Q-57-0105	17-G-20S-0205	17-Q-58-0105	17-Q-59-0105	17-Q-60-0105
Sample Date	01/15/05	01/15/05	01/15/05	01/16/05	02/27/05	01/16/05	01/15/05	01/17/05
Inorganics (ug/L)								
ALUMINUM					2300			
ANTIMONY					3.54 U			
ARSENIC					2.81 U			
BARIUM					665			
BERYLLIUM					2.6			
CADMIUM					2.29 U			
CALCIUM					314000			
CHROMIUM					1.4 U			
COBALT					64			
COPPER					2.52 U			
IRON					40800			
LEAD					2.07 U			
MAGNESIUM					47200			
MANGANESE					544			
MERCURY					0.02 U			
NICKEL					35.4			
POTASSIUM					2750			
SELENIUM					4.08 U			
SILVER					3.93 U			
SODIUM					367000			
THALLIUM					4.26 U			
VANADIUM					5.07 U			
ZINC					97.4			
Miscellaneous Parameters (ug/L)								
CYANIDE					4.2 J			
Petroleum Hydrocarbons (mg/L)								
TOTAL PETROLEUM HYDROCARBONS								

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	17MIP52-TW61	17MIP53-TW62	17MIP54-TW63	17MIP55-TW64	17MW01	17MW01	17MW02S	17MW02S	17MW03S	17MW03S
Sample Number	17-Q-61-0105	17-Q-62-0105	17-Q-63-0105	17-Q-64-0105	17-G-01S-1001	17-G-01S-0205	17-G-02S-1001	17-G-02S-0205	17-G-03S-1001	17-G-03S-0205
Sample Date	01/17/05	01/16/05	01/16/05	01/16/05	10/16/01	02/24/05	10/17/01	02/27/05	10/17/01	02/14/05
Volatile Organics (ug/L)										
1,1,1,2-TETRACHLOROETHANE									5 U	
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	39	92	5 U	10	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROETHANE	31	84	5 U	2 J	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	14	0.7 J	5 U	5 U	5 U	2 J	170	180		2 J
1,1-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	2 J	3 J	0.4 J	1 J	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-TRICHLOROPROPANE									5 U	
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRIMETHYLBENZENE										
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	2 J	1 J	5 U	5 U
1,3,5-TRIMETHYLBENZENE										
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DIOXANE									100 U	
2-BUTANONE	5 U	5 U	5 U	5 U	5 U	5 UR	5 U	5 U	10 U	5 UR
2-CHLOROETHYL VINYL ETHER										
2-HEXANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	10 U	5 U
3-CHLOROPROPENE									10 U	
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	10 U	5 U
ACETONE	5 UR	5 UR	5 UR	5 UR	5 U	5 UR	3 J	5 UR	10 U	5 UR
ACETONITRILE									50 U	
ACROLEIN									50 U	
ACRYLONITRILE									10 U	
BENZENE	2 J	0.6 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOETHANE										
BROMOFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLORODIBROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	2 J	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROPRENE									10 U	
CIS-1,2-DICHLOROETHENE	66	83	1 J	7	5 U	5 U	3 J	2 J	3 J	0.6 J
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.6 J	5 U
CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U		5 U
DIBROMOMETHANE									5 U	
DICHLORODIFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ETHYL METHACRYLATE									10 U	
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOBUTANOL									7 J	
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U		5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	17MIP52-TW61	17MIP53-TW62	17MIP54-TW63	17MIP55-TW64	17MW01	17MW01	17MW02S	17MW02S	17MW03S	17MW03S
Sample Number	17-Q-61-0105	17-Q-62-0105	17-Q-63-0105	17-Q-64-0105	17-G-01S-1001	17-G-01S-0205	17-G-02S-1001	17-G-02S-0205	17-G-03S-1001	17-G-03S-0205
Sample Date	01/17/05	01/16/05	01/16/05	01/16/05	10/16/01	02/24/05	10/17/01	02/27/05	10/17/01	02/14/05
M+P-XYLENES	10 U	10 U	10 U	10 U		10 U		10 U		10 U
METHACRYLONITRILE									50 U	
METHYL ACETATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U		5 U
METHYL CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U		5 U
METHYL IODIDE									10 U	
METHYL METHACRYLATE									10 U	
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U		5 U
METHYLENE CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
O-XYLENE	5 U	5 U	5 U	5 U		5 U		5 U		5 U
PENTACHLOROETHANE									10 U	
PROPIONITRILE									50 U	
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	5 U	0.6 J	5 U	5 U	5 U	5 U	61	33	190	15
TOLUENE	5 U	0.4 J	5 U	5 U	5 U	5 U	3 J	5 U	5 U	5 U
TOTAL 1,2-DICHLOROETHENE	69	89	1 J	8 J		10 U		2 J		0.6 J
TOTAL XYLENES	15 U	15 U	15 U	15 U	5 U	15 U	5 U	15 U	5 U	15 U
TRANS-1,2-DICHLOROETHENE	3 J	6	5 U	0.6 J	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,4-DICHLORO-2-BUTENE									40 U	
TRICHLOROETHENE	19000	27000	130	2700	5 U	5 U	2 J	6	9 U	5 U
TRICHLOROFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	2 J	0.5 J	5 U	5 U
VINYL ACETATE									5 U	
VINYL CHLORIDE	2 J	2 J	5 U	5 U	5 U	5 U	5 U	5 U	2 U	5 U
Semivolatile Organics (ug/L)										
1,1-BIPHENYL					10 U	10 U	10 U	10 U		10 U
1,2,4,5-TETRACHLOROBENZENE									10 U	
1,3,5-TRINITROBENZENE									10 U	
1,3-DINITROBENZENE									10 U	
1,4-NAPHTHOQUINONE									10 U	
1,4-PHENYLENEDIAMINE									10 U	
1-NAPHTHYLAMINE									10 U	
2,2'-OXYBIS(1-CHLOROPROPANE)					10 U	10 U	10 U	10 U	10 U	10 U
2,3,4,6-TETRACHLOROPHENOL									10 U	
2,4,5-TRICHLOROPHENOL					25 U	25 U	25 U	25 UR	25 U	10 U
2,4,6-TRICHLOROPHENOL					10 U	10 U	10 U	10 UR	10 U	10 U
2,4-DICHLOROPHENOL					10 U	10 U	10 U	10 UR	10 U	10 U
2,4-DIMETHYLPHENOL					10 U	10 U	10 U	10 UR	10 U	10 U
2,4-DINITROPHENOL					25 U	25 U	25 U	25 UR	25 U	25 U
2,4-DINITROTOLUENE					10 U	10 U	10 U	10 U	10 U	10 U
2,6-DICHLOROPHENOL									10 U	
2,6-DINITROTOLUENE					10 U	10 U	10 U	10 U	10 U	10 U
2-ACETYLAMINOFLUORENE									10 U	
2-CHLORONAPHTHALENE					10 U	10 U	10 U	10 U	10 U	10 U
2-CHLOROPHENOL					10 U	10 U	10 U	10 UR	10 U	10 U
2-METHYLNAPHTHALENE					10 U	10 U	10 U	10 U	10 U	10 U
2-METHYLPHENOL					10 U	10 U	10 U	10 UR	10 U	10 U
2-NAPHTHYLAMINE									10 U	
2-NITROANILINE					25 U	25 U	25 U	25 U	25 U	25 U
2-NITROPHENOL					10 U	10 U	10 U	10 UR	10 U	10 U
2-PICOLINE									10 U	
3&4-METHYLPHENOL										

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	17MIP52-TW61	17MIP53-TW62	17MIP54-TW63	17MIP55-TW64	17MW01	17MW01	17MW02S	17MW02S	17MW03S	17MW03S
Sample Number	17-Q-61-0105	17-Q-62-0105	17-Q-63-0105	17-Q-64-0105	17-G-01S-1001	17-G-01S-0205	17-G-02S-1001	17-G-02S-0205	17-G-03S-1001	17-G-03S-0205
Sample Date	01/17/05	01/16/05	01/16/05	01/16/05	10/16/01	02/24/05	10/17/01	02/27/05	10/17/01	02/14/05
3,3'-DICHLOROBENZIDINE					10 U	10 U	10 U	10 U	10 U	10 U
3,3'-DIMETHYLBENZIDINE									20 U	
3-METHYLCHOLANTHRENE									10 U	
3-NITROANILINE					25 U	25 U	25 U	25 U	25 U	25 U
4,6-DINITRO-2-METHYLPHENOL					25 U	25 U	25 U	25 UR	25 U	25 U
4-AMINOBIPHENYL									10 U	
4-BROMOPHENYL PHENYL ETHER					10 U	10 U	10 U	10 U	10 U	10 U
4-CHLORO-3-METHYLPHENOL					10 U	10 U	10 U	10 UR	10 U	10 U
4-CHLOROANILINE					10 U	10 U	10 U	10 U	10 U	10 U
4-CHLOROPHENYL PHENYL ETHER					10 U	10 U	10 U	10 U	10 U	10 U
4-METHYLPHENOL					10 U	10 U	10 U	10 UR	10 U	10 U
4-NITROANILINE					25 U	25 U	25 U	25 U	25 U	25 U
4-NITROPHENOL					25 U	25 U	25 U	25 UR	25 U	25 U
4-NITROQUINOLINE-1-OXIDE									20 UR	
5-NITRO-O-TOLUIDINE									20 U	
7,12-DIMETHYLBENZ(A)ANTHRACENE									10 U	
A,A-DIMETHYLPHENETHYLAMINE									10 U	
ACENAPHTHENE					10 U	10 U	10 U	10 U	10 U	10 U
ACENAPHTHYLENE					10 U	10 U	10 U	10 U	10 U	10 U
ACETOPHENONE					10 U	10 U	10 U	10 U	10 U	10 U
ANILINE									10 U	
ANTHRACENE					10 U	10 U	10 U	10 U	10 U	10 U
ARAMITE									20 U	
ATRAZINE					10 U	10 U	10 U	10 U		10 U
BENZALDEHYDE					10 U	10 UR	10 U	10 UR		10 U
BENZO(A)ANTHRACENE					10 U	10 U	10 U	10 U	10 U	10 U
BENZO(A)PYRENE					10 U	10 U	10 U	10 U	10 U	10 U
BENZO(B)FLUORANTHENE					10 U	10 U	10 U	10 U	10 U	10 U
BENZO(G,H,I)PERYLENE					10 U	10 U	10 U	10 U	10 U	10 U
BENZO(K)FLUORANTHENE					10 U	10 U	10 U	10 U	10 U	10 U
BENZYL ALCOHOL									20 U	
BIS(2-CHLOROETHOXY)METHANE					10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHYL)ETHER					10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROISOPROPYL)ETHER										
BIS(2-ETHYLHEXYL)PHTHALATE					10 U	10 U	10 U	10 U	10 U	10 U
BUTYL BENZYL PHTHALATE					10 U	10 U	10 U	10 U	10 U	10 U
CAPROLACTAM					10 U	10 U	10 U	10 U		10 U
CARBAZOLE					10 U	10 U	10 U	10 U		10 U
CHLOROBENZILATE									20 U	
CHRYSENE					10 U	10 U	10 U	10 U	10 U	10 U
DI-N-BUTYL PHTHALATE					10 U	2 J	10 U	2 J	10 U	10 U
DI-N-OCTYL PHTHALATE					10 U	10 U	10 U	10 U	10 U	10 U
DIALLATE									20 UR	
DIBENZO(A,H)ANTHRACENE					10 U	10 U	10 U	10 U	10 U	10 U
DIBENZOFURAN					10 U	10 U	10 U	10 U	10 U	10 U
DIETHYL PHTHALATE					10 U	10 U	10 U	10 U	10 U	10 U
DIMETHOATE									10 U	
DIMETHYL PHTHALATE					10 U	10 U	10 U	10 U	10 U	10 U
DINOSEB										
ETHYL METHANE SULFONATE									10 U	
ETHYL PARATHION										

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	17MIP52-TW61	17MIP53-TW62	17MIP54-TW63	17MIP55-TW64	17MW01	17MW01	17MW02S	17MW02S	17MW03S	17MW03S
Sample Number	17-Q-61-0105	17-Q-62-0105	17-Q-63-0105	17-Q-64-0105	17-G-01S-1001	17-G-01S-0205	17-G-02S-1001	17-G-02S-0205	17-G-03S-1001	17-G-03S-0205
Sample Date	01/17/05	01/16/05	01/16/05	01/16/05	10/16/01	02/24/05	10/17/01	02/27/05	10/17/01	02/14/05
FLUORANTHENE					10 U	10 U	10 U	10 U	10 U	10 U
FLUORENE					10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBENZENE					10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBUTADIENE					10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROCYCLOPENTADIENE					10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROETHANE					10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROPHENE									10 U	
HEXACHLOROPROPENE									10 U	
INDENO(1,2,3-CD)PYRENE					10 U	10 U	10 U	10 U	10 U	10 U
ISODRIN									20 U	
ISOPHORONE					10 U	10 U	10 U	10 U	10 U	10 U
ISOSAFROLE									20 U	
KEPONE										
METHAPYRILENE									10 UR	
METHYL METHANE SULFONATE									20 U	
N-NITROSO-DI-N-BUTYLAMINE									10 U	
N-NITROSO-DI-N-PROPYLAMINE					10 U	10 U	10 U	10 U	10 U	10 U
N-NITROSODIETHYLAMINE									20 U	
N-NITROSODIMETHYLAMINE									20 U	
N-NITROSODIPHENYLAMINE					10 U	10 U	10 U	10 U	10 U	10 U
N-NITROSOMETHYLETHYLAMINE									10 U	
N-NITROSOMORPHOLINE									10 U	
N-NITROSOPIPERIDINE									10 U	
N-NITROSOPYRROLIDINE									10 U	
NAPHTHALENE					10 U	10 U	10 U	10 U	10 U	10 U
NITROBENZENE					10 U	10 U	10 U	10 U	10 U	10 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE									20 U	
O-TOLUIDINE									10 U	
P-(DIMETHYLAMINO)AZOBENZENE									20 U	
PENTACHLOROBENZENE									10 U	
PENTACHLORONITROBENZENE									10 U	
PENTACHLOROPHENOL					25 U	25 UR	25 U	25 UR	25 U	25 U
PHENACETIN									10 U	
PHENANTHRENE					10 U	10 U	10 U	10 U	10 U	10 U
PHENOL					10 U	10 U	10 U	10 UR	10 U	10 U
PRONAMIDE									10 U	
PYRENE					10 U	10 U	10 U	10 U	10 U	10 U
PYRIDINE									50 U	
SAFROLE									10 U	
SULFOTEPP									10 U	
THIONAZIN									20 U	
Pesticides/PCBs (ug/L)										
4,4'-DDD					0.1 U	0.1 U	0.1 U	0.1 U	0.05 U	0.1 U
4,4'-DDE					0.1 U	0.1 U	0.1 U	0.1 U	0.05 U	0.1 U
4,4'-DDT					0.1 U	0.1 U	0.1 U	0.1 U	0.05 U	0.1 U
ALDRIN					0.052 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ALPHA-BHC					0.052 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ALPHA-CHLORDANE					0.052 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
AROCLOR-1016					0.52 U	0.5 U	0.5 U	0.5 U		0.5 U
AROCLOR-1221					0.52 U	0.5 U	0.5 U	0.5 U		0.5 U
AROCLOR-1232					0.52 U	0.5 U	0.5 U	0.5 U		0.5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	17MIP52-TW61	17MIP53-TW62	17MIP54-TW63	17MIP55-TW64	17MW01	17MW01	17MW02S	17MW02S	17MW03S	17MW03S
Sample Number	17-Q-61-0105	17-Q-62-0105	17-Q-63-0105	17-Q-64-0105	17-G-01S-1001	17-G-01S-0205	17-G-02S-1001	17-G-02S-0205	17-G-03S-1001	17-G-03S-0205
Sample Date	01/17/05	01/16/05	01/16/05	01/16/05	10/16/01	02/24/05	10/17/01	02/27/05	10/17/01	02/14/05
AROCLOR-1242					0.52 U	0.5 U	0.5 U	0.5 U		0.5 U
AROCLOR-1248					0.52 U	0.5 U	0.5 U	0.5 U		0.5 U
AROCLOR-1254					0.52 U	0.5 U	0.5 U	0.5 U		0.5 U
AROCLOR-1260					0.52 U	0.5 U	0.5 U	0.5 U		0.5 U
BETA-BHC					0.052 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
CHLORDANE									0.5 U	
DELTA-BHC					0.052 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
DIELDRIN					0.1 U	0.1 U	0.1 U	0.1 U	0.05 U	0.1 U
ENDOSULFAN I					0.052 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ENDOSULFAN II					0.1 U	0.1 U	0.1 U	0.1 U	0.05 U	0.1 U
ENDOSULFAN SULFATE					0.1 UJ	0.1 U	0.1 UJ	0.1 U	0.05 U	0.1 U
ENDRIN					0.1 U	0.1 U	0.1 U	0.1 U	0.05 U	0.1 U
ENDRIN ALDEHYDE					0.1 U	0.1 U	0.1 U	0.1 U	0.05 U	0.1 U
ENDRIN KETONE					0.1 UJ	0.1 U	0.1 UJ	0.1 U	0.05 U	0.1 U
GAMMA-BHC (LINDANE)					0.052 U	0.05 U	0.028 J	0.05 U	0.05 U	0.05 U
GAMMA-CHLORDANE					0.052 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR					0.052 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR EPOXIDE					0.052 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
KEPONE									1 U	
METHOXYCHLOR					0.52 U	0.5 U	0.5 U	0.5 U	0.1 U	0.5 U
TOXAPHENE					1 U	1 U	1 U	1 U	2 U	1 U
OrganoPhos Pesticides (ug/L)										
DIMETHOATE										
DISULFOTON									1 U	
ETHYL PARATHION									1 U	
FAMPHUR									1 U	
METHYL PARATHION									1 U	
O,O,O-TRIETHYL PHOSPHOROTHIOATE										
PHORATE									1 U	
SULFOTEPP										
THIONAZIN										
Herbicides (ug/L)										
2,4,5-T									1 U	
2,4,5-TP (SILVEX)									1 U	
2,4-D									2.8 J	
DINOSEB									0.6 U	
Explosives (ug/L)										
1,3,5-TRINITROBENZENE					0.2 U	0.25 U	0.2 U	0.17 U	0.2 U	0.27 U
1,3-DINITROBENZENE					0.2 U	0.25 U	0.2 U	0.17 U	0.2 U	0.27 U
2,4,6-TRINITROTOLUENE					0.2 U	0.25 U	0.2 U	0.17 U	0.2 U	0.27 U
2,4-DINITROTOLUENE					0.2 U	0.49 U	0.2 U	0.34 U	0.2 U	0.52 U
2,6-DINITROTOLUENE					0.2 U	0.49 U	0.2 U	0.34 U	0.2 U	0.52 U
2-AMINO-4,6-DINITROTOLUENE					0.2 U	0.49 U	0.2 U	0.34 U	0.2 U	0.52 U
2-NITROTOLUENE					0.2 U	0.49 U	0.2 U	0.34 U	0.38 U	0.52 U
3-NITROTOLUENE					0.2 U	0.49 U	0.58 U	0.34 U	0.2 U	0.52 U
4-AMINO-2,6-DINITROTOLUENE					0.2 U	0.49 U	0.2 U	0.34 U	0.2 U	0.52 U
4-NITROTOLUENE					0.2 U	0.49 U	0.34 U	0.34 U	0.2 U	0.52 U
HMX					0.5 U	0.49 U	0.5 U	0.34 U	0.5 U	0.52 U
NITROBENZENE					0.2 U	0.25 U	0.2 U	0.17 U	0.2 U	0.27 U
RDX					0.5 U	0.25 U	0.5 U	0.17 U	0.5 U	0.27 U
TETRYL					0.2 U	0.62 U	0.2 U	0.42 U	0.2 U	0.66 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	17MIP52-TW61	17MIP53-TW62	17MIP54-TW63	17MIP55-TW64	17MW01	17MW01	17MW02S	17MW02S	17MW03S	17MW03S
Sample Number	17-Q-61-0105	17-Q-62-0105	17-Q-63-0105	17-Q-64-0105	17-G-01S-1001	17-G-01S-0205	17-G-02S-1001	17-G-02S-0205	17-G-03S-1001	17-G-03S-0205
Sample Date	01/17/05	01/16/05	01/16/05	01/16/05	10/16/01	02/24/05	10/17/01	02/27/05	10/17/01	02/14/05
Inorganics (ug/L)										
ALUMINUM					71.8 U	20.5 U	2260	7060	244 U	69.0 U
ANTIMONY					3.9	3.54 U	3.65 U	3.54 U	3.7	3.54 U
ARSENIC					2.53 U	2.81 U	3.6	2.81 U	2.9	2.81 U
BARIUM					58.3	53.4	440	797	39.5	49.1
BERYLLIUM					0.87 U	0.40 U	4.7 U	7.7	1.6 U	0.40 U
CADMIUM					0.24 U	0.41 U	0.24 U	3.4 U	0.24 U	0.41 U
CALCIUM					25800	17700	125000	323000	19100	11000
CHROMIUM					0.57 U	1.2 U	1.5 U	2.2 U	0.57 U	1.0 U
COBALT					2.8	4.3 U	16.5	34.3	2	4.3 U
COPPER					0.84 U	2.52 U	0.84 U	2.52 U	0.84 U	24.1
IRON					408	283	8950	4980	1660	1130 J
LEAD					1.48 U	2.07 U	2.3 U	2.07 U	1.48 U	2.07 U
MAGNESIUM					4370	3440	17300	42300	2720	2580
MANGANESE					68.3	44.8	247	456	143	73.3
MERCURY					0.03 U	0.02 U	0.04 U	0.02 U	0.06 U	0.06 U
NICKEL					5.2 U	11.6 U	17.5 U	18.5	9.7 U	11.6 U
POTASSIUM					7040	6980	2050	3170	2270	2290
SELENIUM					3.04 U	4.08 U	3.04 U	4.08 U	3.04 U	4.08 U
SILVER					1.03 U	3.93 U	1.03 U	3.93 U	1.03 U	3.93 U
SODIUM					23900	24600	142000	412000	24200	25500
THALLIUM					4.74 U	4.26 U	4.74 U	4.26 U	4.74 U	4.26 U
VANADIUM					0.52 U	5.07 U	2.7	5.07 U	0.89	5.07 U
ZINC					6.2 U	6.3 U	25.6	51.2	41.1	37.8
Miscellaneous Parameters (ug/L)										
CYANIDE					10 U	10 U	10 U	10 U	10 U	10 U
Petroleum Hydrocarbons (mg/L)										
TOTAL PETROLEUM HYDROCARBONS										

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MW03S	17MW03S	17MW04S	17MW04S	17MW05S	17MW05S	17MW05S	17MW06D	17MW07S
Sample Number	17-G-03S-0205-AVG	17-G-03S-0205-D	17-G-04S-1001	17-G-04S-0205	17-G-05S-0205	17-G-05S-0205-AVG	17-G-05S-0205-D	17-G-06D-0205	17-G-07S-0205
Sample Date	02/14/05	02/14/05	10/17/01	02/27/05	02/25/05	02/25/05	02/25/05	02/24/05	02/28/05
Volatile Organics (ug/L)									
1,1,1,2-TETRACHLOROETHANE									
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
1,1,2,2-TETRACHLOROETHANE	5 U	5 U	5 U	5 U	8	8	8	100 U	50 U
1,1,2-TRICHLOROETHANE	5 U	5 U	5 U	5 U	39	41	43	100 U	93
1,1,2-TRICHLOROTRIFLUOROETHANE	2 J	2 J	5 U	1 J	5	5	5	23 J	50 U
1,1-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	1 J	1 J	100 U	5 J
1,1-DICHLOROETHENE	5 U	5 U	5 U	5 U	3 J	3 J	3 J	100 U	11 J
1,2,3-TRICHLOROPROPANE									
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
1,2,4-TRIMETHYLBENZENE									
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
1,2-DICHLOROETHANE	5 U	5 U	5 U	5 U	4 J	4 J	5 U	100 U	50 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
1,3,5-TRIMETHYLBENZENE									
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
1,4-DIOXANE									
2-BUTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 UR	50 U
2-CHLOROETHYL VINYL ETHER									
2-HEXANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
3-CHLOROPROPENE									
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
ACETONE	5 U	5 U	5 U	5 UR	5 J	6.5 J	8 J	100 UR	50 UR
ACETONITRILE									
ACROLEIN									
ACRYLONITRILE									
BENZENE	5 U	5 U	5 U	5 U	34	34.5	35	100 U	8 J
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	4 J	4 J	5 U	100 U	50 U
BROMOETHANE									
BROMOFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
CARBON TETRACHLORIDE	5 U	5 U	5 U	5 U	5 U	1 J	1 J	100 U	8 J
CHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
CHLORODIBROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
CHLOROFORM	5 U	5 U	5 U	5 U	93	95	97	42 J	770
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
CHLOROPRENE									
CIS-1,2-DICHLOROETHENE	0.6 J	0.6 J	5 U	5 U	380	400	420	140	1000
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
DIBROMOMETHANE									
DICHLORODIFLUOROMETHANE	5 U	5 U	5 U	5 U	33	32.5	32	100 U	87
ETHYL METHACRYLATE									
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
ISOBUTANOL									
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MW03S	17MW03S	17MW04S	17MW04S	17MW05S	17MW05S	17MW05S	17MW06D	17MW07S
Sample Number	17-G-03S-0205-AVG	17-G-03S-0205-D	17-G-04S-1001	17-G-04S-0205	17-G-05S-0205	17-G-05S-0205-AVG	17-G-05S-0205-D	17-G-06D-0205	17-G-07S-0205
Sample Date	02/14/05	02/14/05	10/17/01	02/27/05	02/25/05	02/25/05	02/25/05	02/24/05	02/28/05
M+P-XYLENES	10 U	10 U		10 U	10 U	10 U	10 U	200 U	100 U
METHACRYLONITRILE									
METHYL ACETATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
METHYL CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
METHYL IODIDE									
METHYL METHACRYLATE									
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
METHYLENE CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	67 U
O-XYLENE	5 U	5 U		5 U	5 U	5 U	5 U	100 U	50 U
PENTACHLOROETHANE									
PROPIONITRILE									
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
TETRACHLOROETHENE	15	15	5 U	5 U	5 U	5 U	5 U	100 U	50 U
TOLUENE	5 U	5 U	5 U	5 U	1 J	1 J	1 J	100 U	50 U
TOTAL 1,2-DICHLOROETHENE	0.6 J	0.6 J		10 U	420 J	415 J	410 J	140 J	1000
TOTAL XYLENES	15 U	15 U	5 U	15 U	15 U	15 U	15 U	300 U	150 U
TRANS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	12 J	8 J	4 J	100 U	7 J
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
TRANS-1,4-DICHLORO-2-BUTENE									
TRICHLOROETHENE	5 U	5 U	5 U	5 U	22000	22500	23000	14000	130000
TRICHLOROFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U
VINYL ACETATE									
VINYL CHLORIDE	5 U	5 U	5 U	5 U	4 J	4 J	4 J	100 U	21 J
Semivolatile Organics (ug/L)									
1,1-BIPHENYL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4,5-TETRACHLOROBENZENE									
1,3,5-TRINITROBENZENE									
1,3-DINITROBENZENE									
1,4-NAPHTHOQUINONE									
1,4-PHENYLENEDIAMINE									
1-NAPHTHYLAMINE									
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,3,4,6-TETRACHLOROPHENOL									
2,4,5-TRICHLOROPHENOL	10 U	10 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
2,4,6-TRICHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DICHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DIMETHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DINITROPHENOL	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
2,4-DINITROTOLUENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6-DICHLOROPHENOL									
2,6-DINITROTOLUENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-ACETYLAMINOFLUORENE									
2-CHLORONAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-CHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-METHYLNAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-NAPHTHYLAMINE									
2-NITROANILINE	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
2-NITROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-PICOLINE									
3&4-METHYLPHENOL									

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MW03S	17MW03S	17MW04S	17MW04S	17MW05S	17MW05S	17MW05S	17MW06D	17MW07S
Sample Number	17-G-03S-0205-AVG	17-G-03S-0205-D	17-G-04S-1001	17-G-04S-0205	17-G-05S-0205	17-G-05S-0205-AVG	17-G-05S-0205-D	17-G-06D-0205	17-G-07S-0205
Sample Date	02/14/05	02/14/05	10/17/01	02/27/05	02/25/05	02/25/05	02/25/05	02/24/05	02/28/05
3,3'-DICHLOROBENZIDINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3'-DIMETHYLBENZIDINE									
3-METHYLCHOLANTHRENE									
3-NITROANILINE	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4-AMINOBIPHENYL									
4-BROMOPHENYL PHENYL ETHER	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLORO-3-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLOROANILINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLOROPHENYL PHENYL ETHER	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-NITROANILINE	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4-NITROPHENOL	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4-NITROQUINOLINE-1-OXIDE									
5-NITRO-O-TOLUIDINE									
7,12-DIMETHYLBENZ(A)ANTHRACENE									
A,A-DIMETHYLPHENETHYLAMINE									
ACENAPHTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ACENAPHTHYLENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ACETOPHENONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ANILINE									
ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ARAMITE									
ATRAZINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BENZALDEHYDE	10 U	10 U	10 U	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR
BENZO(A)ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(A)PYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(B)FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(G,H,I)PERYLENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(K)FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BENZYL ALCOHOL									
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROISOPROPYL)ETHER									
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BUTYL BENZYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CAPROLACTAM	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CARBAZOLE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROBENZILATE									
CHRYSENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DI-N-BUTYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	3 J
DI-N-OCTYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DIALLATE									
DIBENZO(A,H)ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DIBENZOFURAN	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DIETHYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	2 J
DIMETHOATE									
DIMETHYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DINOSEB									
ETHYL METHANE SULFONATE									
ETHYL PARATHION									

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MW03S	17MW03S	17MW04S	17MW04S	17MW05S	17MW05S	17MW05S	17MW06D	17MW07S
Sample Number	17-G-03S-0205-AVG	17-G-03S-0205-D	17-G-04S-1001	17-G-04S-0205	17-G-05S-0205	17-G-05S-0205-AVG	17-G-05S-0205-D	17-G-06D-0205	17-G-07S-0205
Sample Date	02/14/05	02/14/05	10/17/01	02/27/05	02/25/05	02/25/05	02/25/05	02/24/05	02/28/05
FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
FLUORENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBUTADIENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROPHENE									
HEXACHLOROPROPENE									
INDENO(1,2,3-CD)PYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ISODRIN									
ISOPHORONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ISOSAFROLE									
KEPONE									
METHAPYRILENE									
METHYL METHANE SULFONATE									
N-NITROSO-DI-N-BUTYLAMINE									
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-NITROSODIETHYLAMINE									
N-NITROSODIMETHYLAMINE									
N-NITROSODIPHENYLAMINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-NITROSOMETHYLETHYLAMINE									
N-NITROSOMORPHOLINE									
N-NITROSOPIPERIDINE									
N-NITROSOPYRROLIDINE									
NAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	3 J
NITROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE									
O-TOLUIDINE									
P-(DIMETHYLAMINO)AZOBENZENE									
PENTACHLOROBENZENE									
PENTACHLORONITROBENZENE									
PENTACHLOROPHENOL	25 U	25 U	25 U	25 UR	25 UR	25 UR	25 UR	25 UR	25 UR
PHENACETIN									
PHENANTHRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PRONAMIDE									
PYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PYRIDINE									
SAFROLE									
SULFOTEPP									
THIONAZIN									
Pesticides/PCBs (ug/L)									
4,4'-DDD	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDT	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ALDRIN	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ALPHA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ALPHA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
AROCLOR-1016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1221	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1232	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MW03S	17MW03S	17MW04S	17MW04S	17MW05S	17MW05S	17MW05S	17MW06D	17MW07S
Sample Number	17-G-03S-0205-AVG	17-G-03S-0205-D	17-G-04S-1001	17-G-04S-0205	17-G-05S-0205	17-G-05S-0205-AVG	17-G-05S-0205-D	17-G-06D-0205	17-G-07S-0205
Sample Date	02/14/05	02/14/05	10/17/01	02/27/05	02/25/05	02/25/05	02/25/05	02/24/05	02/28/05
AROCLOR-1242	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1248	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1254	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1260	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BETA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
CHLORDANE									
DELTA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
DIELDRIN	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDOSULFAN I	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ENDOSULFAN II	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDOSULFAN SULFATE	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN ALDEHYDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN KETONE	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
GAMMA-BHC (LINDANE)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
GAMMA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR EPOXIDE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
KEPONE									
METHOXYCHLOR	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TOXAPHENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
OrganoPhos Pesticides (ug/L)									
DIMETHOATE									
DISULFOTON									
ETHYL PARATHION									
FAMPHUR									
METHYL PARATHION									
O,O,O-TRIETHYL PHOSPHOROTHIOATE									
PHORATE									
SULFOTEPP									
THIONAZIN									
Herbicides (ug/L)									
2,4,5-T									
2,4,5-TP (SILVEX)									
2,4-D									
DINOSEB									
Explosives (ug/L)									
1,3,5-TRINITROBENZENE	0.285 U	0.3 U	0.2 U	0.16 U	0.26 U	0.245 U	0.23 U	0.19 U	0.16 U
1,3-DINITROBENZENE	0.285 U	0.3 U	0.2 U	0.16 U	0.26 U	0.245 U	0.23 U	0.19 U	0.16 U
2,4,6-TRINITROTOLUENE	0.285 U	0.3 U	0.53	0.16 U	0.26 U	0.245 U	0.23 U	0.19 U	0.16 U
2,4-DINITROTOLUENE	0.545 U	0.57 U	0.2 U	0.31 U	0.51 U	0.48 U	0.45 U	0.36 U	0.31 U
2,6-DINITROTOLUENE	0.545 U	0.57 U	0.2 U	0.31 U	0.51 U	0.48 U	0.45 U	0.36 U	0.31 U
2-AMINO-4,6-DINITROTOLUENE	0.545 U	0.57 U	0.2 U	0.31 U	0.51 U	0.48 U	0.45 U	0.36 U	0.31 U
2-NITROTOLUENE	0.545 U	0.57 U	0.2 U	0.31 U	0.51 U	0.48 U	0.45 U	0.36 U	0.31 U
3-NITROTOLUENE	0.545 U	0.57 U	0.2 U	0.31 U	0.51 U	0.48 U	0.45 U	0.36 U	0.31 U
4-AMINO-2,6-DINITROTOLUENE	0.545 U	0.57 U	0.2 U	0.31 U	0.51 U	0.48 U	0.45 U	0.36 U	0.31 U
4-NITROTOLUENE	0.545 U	0.57 U	0.2 U	0.31 U	0.51 U	0.48 U	0.45 U	0.36 U	0.31 U
HMX	0.545 U	0.57 U	0.5 U	0.31 U	0.51 U	0.48 U	0.45 U	0.36 U	0.31 U
NITROBENZENE	0.285 U	0.3 U	0.2 U	0.16 U	0.26 U	0.245 U	0.23 U	0.19 U	0.16 U
RDX	0.285 U	0.3 U	0.5 U	0.16 U	1.8	1.95	2.1	0.19 U	0.92
TETRYL	0.69 U	0.72 U	0.2 U	0.39 U	0.64 U	0.605 U	0.57 U	0.46 U	0.39 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MW03S	17MW03S	17MW04S	17MW04S	17MW05S	17MW05S	17MW05S	17MW06D	17MW07S
Sample Number	17-G-03S-0205-AVG	17-G-03S-0205-D	17-G-04S-1001	17-G-04S-0205	17-G-05S-0205	17-G-05S-0205-AVG	17-G-05S-0205-D	17-G-06D-0205	17-G-07S-0205
Sample Date	02/14/05	02/14/05	10/17/01	02/27/05	02/25/05	02/25/05	02/25/05	02/24/05	02/28/05
Inorganics (ug/L)									
ALUMINUM	87.5 U	106 U	109 U	107 U	117 U	116 U	115 U	32.8 U	80.3 U
ANTIMONY	3.54 U	3.54 U	3.65 U	3.54 U	3.54 U	3.54 U	3.54 U	3.54 U	3.54 U
ARSENIC	2.81 U	2.81 U	6.7	3.9 U	6.7 U	6.95 U	7.2 U	2.81 U	10.1 U
BARIUM	49.45	49.8	38.4	96.6	206	203	200	42.6	252
BERYLLIUM	0.315	0.43	1.7 U	0.40 U	0.40 U	0.4 U	0.40 U	0.40 U	0.40 U
CADMIUM	0.41 U	0.41 U	0.24 U	2.29 U	0.41 U	0.41 U	0.41 U	0.41 U	2.29 U
CALCIUM	11050	11100	22900	126000	53600	52750	51900	86400	43000
CHROMIUM	1 U	1.0 U	0.57 U	1.2 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
COBALT	4.3 U	4.3 U	4.4	46.7	9.8	9.9	10	4.3 U	7.1
COPPER	24.5	24.9	0.84 U	2.52 U	2.52 U	2.52 U	2.52 U	2.52 U	2.52 U
IRON	1665 J	2200 J	7960	56400	10700	10650	10600	42.9 U	10300
LEAD	2.585 U	3.1 U	1.8 U	2.07 U	2.07 U	2.07 U	2.07 U	2.07 U	2.07 U
MAGNESIUM	2570	2560	7070	53500	10700	10550	10400	8600	8300
MANGANESE	73.8	74.3	43.5	300	98.4	97.55	96.7	202	67
MERCURY	0.055 U	0.05 U	0.04 U	0.03	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
NICKEL	11.6 U	11.6 U	5.1 U	34.9	11.6 U	11.6 U	11.6 U	11.6 U	11.6 U
POTASSIUM	2350	2410	1630	2680	1820	1830	1840	4080	1670
SELENIUM	4.08 U	4.08 U	3.04 U	4.08 U	4.08 U	4.08 U	4.08 U	4.08 U	4.08 U
SILVER	3.93 U	3.93 U	1.03 U	3.93 U	3.93 U	3.93 U	3.93 U	3.93 U	3.93 U
SODIUM	25450	25400	120000	331000	141000	139000	137000	65900	131000
THALLIUM	4.26 U	4.26 U	4.74 U	4.26 U	4.26 U	4.26 U	4.26 U	4.26 U	4.26 U
VANADIUM	5.07 U	5.07 U	0.52 U	5.07 U	5.07 U	3.9675	5.4	7.6	5.07 U
ZINC	38.7	39.6	4.9	47	25.7	24.7	23.7	5.4 U	15.5 U
Miscellaneous Parameters (ug/L)									
CYANIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Petroleum Hydrocarbons (mg/L)									
TOTAL PETROLEUM HYDROCARBONS									

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MW12D	17MW12D	17MW12D	17MW13S	17MW14D	17MW15D	17MW16D	17MIP40-TW49-MW16I	17MW17D
Sample Number	17-G-12D-0205	17-G-12D-0205-AVG	17-G-12D-0205-D	17-G-13S-0205	17-G-14D-0305	17-G-15D-0305	17-G-16D-0305	17-G-16I-0305	17-G-17D-0305
Sample Date	02/28/05	02/28/05	02/28/05	02/27/05	03/09/05	03/09/05	03/08/05	03/08/05	03/08/05
Volatile Organics (ug/L)									
1,1,1,2-TETRACHLOROETHANE	5 U	5 U							
1,1,1-TRICHLOROETHANE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROETHANE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE				5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHANE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-TRICHLOROPROPANE	5 U	5 U							
1,2,4-TRICHLOROBENZENE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRIMETHYLBENZENE									
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-TRIMETHYLBENZENE									
1,3-DICHLOROBENZENE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
1,4-DIOXANE	100 UR	100 UR							
2-BUTANONE	10 U	10 U		5 U	5 U	5 U	5 U	5 U	5 U
2-CHLOROETHYL VINYL ETHER									
2-HEXANONE	10 U	10 U		5 U	5 U	5 U	5 U	5 U	5 U
3-CHLOROPROPENE	10 U	10 U							
4-METHYL-2-PENTANONE	10 U	10 U		5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	10 UR	10 UR		5 UR	5 UR	5 UR	5 UR	5 UR	5 UR
ACETONITRILE	50 UR	50 UR							
ACROLEIN	50 UR	50 UR							
ACRYLONITRILE	10 UR	10 UR							
BENZENE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
BROMODICHLOROMETHANE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
BROMOETHANE									
BROMOFORM	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
BROMOMETHANE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
CHLORODIBROMOMETHANE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
CHLOROETHANE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
CHLOROMETHANE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
CHLOROPRENE	10 U	10 U							
CIS-1,2-DICHLOROETHENE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
CIS-1,3-DICHLOROPROPENE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
CYCLOHEXANE				5 U	5 U	5 U	5 U	5 U	5 U
DIBROMOMETHANE	5 U	5 U							
DICHLORODIFLUOROMETHANE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
ETHYL METHACRYLATE	10 U	10 U							
ETHYLBENZENE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
ISOBUTANOL	100 UR	100 UR							
ISOPROPYLBENZENE				5 U	5 U	5 U	5 U	5 U	5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MW12D	17MW12D	17MW12D	17MW13S	17MW14D	17MW15D	17MW16D	17MIP40-TW49-MW16I	17MW17D
Sample Number	17-G-12D-0205	17-G-12D-0205-AVG	17-G-12D-0205-D	17-G-13S-0205	17-G-14D-0305	17-G-15D-0305	17-G-16D-0305	17-G-16I-0305	17-G-17D-0305
Sample Date	02/28/05	02/28/05	02/28/05	02/27/05	03/09/05	03/09/05	03/08/05	03/08/05	03/08/05
M+P-XYLENES	10 U	10 U		10 U	10 U	10 U	10 U	10 U	10 U
METHACRYLONITRILE	50 U	50 U							
METHYL ACETATE				5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE				5 U	5 U	5 U	5 U	5 U	5 U
METHYL IODIDE	10 U	10 U							
METHYL METHACRYLATE	10 U	10 U							
METHYL TERT-BUTYL ETHER				5 U	5 U	5 U	5 U	5 U	5 U
METHYLENE CHLORIDE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
O-XYLENE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLOROETHANE	10 U	10 U							
PROPIONITRILE	50 U	50 U							
STYRENE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
TOLUENE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
TOTAL 1,2-DICHLOROETHENE				10 U	10 U	10 U	10 U	10 U	10 U
TOTAL XYLENES	15 U	15 U		15 U	15 U	15 U	15 U	15 U	15 U
TRANS-1,2-DICHLOROETHENE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,3-DICHLOROPROPENE	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,4-DICHLORO-2-BUTENE	10 U	10 U							
TRICHLOROETHENE	5 U	5 U		2 J	5 U	5 U	5 U	5 U	21
TRICHLOROFLUOROMETHANE	0.6 J	0.6 J		5 U	5 U	5 U	5 U	5 U	5 U
VINYL ACETATE	5 U	5 U							
VINYL CHLORIDE	2 U	2 U		5 U	5 U	5 U	5 U	5 U	5 U
Semivolatile Organics (ug/L)									
1,1-BIPHENYL				10 U	10 U	10 UR	10 U	10 U	10 U
1,2,4,5-TETRACHLOROBENZENE	10 U	10 U							
1,3,5-TRINITROBENZENE	10 U	10 U							
1,3-DINITROBENZENE	10 U	10 U							
1,4-NAPHTHOQUINONE	10 U	10 U							
1,4-PHENYLENEDIAMINE	10 U	10 U							
1-NAPHTHYLAMINE	10 U	10 U							
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
2,3,4,6-TETRACHLOROPHENOL	10 U	10 U							
2,4,5-TRICHLOROPHENOL	25 U	25 U		25 U	25 UR	25 UR	25 U	25 UR	25 UR
2,4,6-TRICHLOROPHENOL	10 U	10 U		10 U	10 UR	10 UR	10 U	10 UR	10 UR
2,4-DICHLOROPHENOL	10 U	10 U		10 U	10 UR	10 UR	10 U	10 UR	10 UR
2,4-DIMETHYLPHENOL	10 U	10 U		10 U	10 UR	10 UR	10 U	10 UR	10 UR
2,4-DINITROPHENOL	25 U	25 U		25 U	25 UR	25 UR	25 U	25 UR	25 UR
2,4-DINITROTOLUENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
2,6-DICHLOROPHENOL	10 U	10 U							
2,6-DINITROTOLUENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
2-ACETYLAMINOFLUORENE	10 U	10 U							
2-CHLORONAPHTHALENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
2-CHLOROPHENOL	10 U	10 U		10 U	10 UR	10 UR	10 U	10 UR	10 UR
2-METHYLNAPHTHALENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
2-METHYLPHENOL	10 U	10 U		10 U	10 UR	10 UR	10 U	10 UR	10 UR
2-NAPHTHYLAMINE	10 U	10 U							
2-NITROANILINE	25 U	25 U		25 U	25 U	25 UR	25 U	25 U	25 U
2-NITROPHENOL	10 U	10 U		10 U	10 UR	10 UR	10 U	10 UR	10 UR
2-PICOLINE	10 U	10 U							
3&4-METHYLPHENOL	10 U	10 U							

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MW12D	17MW12D	17MW12D	17MW13S	17MW14D	17MW15D	17MW16D	17MIP40-TW49-MW16I	17MW17D
Sample Number	17-G-12D-0205	17-G-12D-0205-AVG	17-G-12D-0205-D	17-G-13S-0205	17-G-14D-0305	17-G-15D-0305	17-G-16D-0305	17-G-16I-0305	17-G-17D-0305
Sample Date	02/28/05	02/28/05	02/28/05	02/27/05	03/09/05	03/09/05	03/08/05	03/08/05	03/08/05
3,3'-DICHLOROBENZIDINE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
3,3'-DIMETHYLBENZIDINE	20 U	20 U							
3-METHYLCHOLANTHRENE	10 U	10 U							
3-NITROANILINE	25 U	25 U		25 U	25 U	25 UR	25 U	25 U	25 U
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U		25 U	25 UR	25 UR	25 U	25 UR	25 UR
4-AMINOBIPHENYL	10 U	10 U							
4-BROMOPHENYL PHENYL ETHER	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
4-CHLORO-3-METHYLPHENOL	10 U	10 U		10 U	10 UR	10 UR	10 U	10 UR	10 UR
4-CHLOROANILINE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
4-CHLOROPHENYL PHENYL ETHER	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
4-METHYLPHENOL				10 U	10 UR	10 UR	10 U	10 UR	10 UR
4-NITROANILINE	25 U	25 U		25 U	25 U	25 UR	25 U	25 U	25 U
4-NITROPHENOL	25 U	25 U		25 U	25 UR	25 UR	25 UR	25 UR	25 UR
4-NITROQUINOLINE-1-OXIDE	20 UR	20 UR							
5-NITRO-O-TOLUIDINE	20 U	20 U							
7,12-DIMETHYLBENZ(A)ANTHRACENE	10 U	10 U							
A,A-DIMETHYLPHENETHYLAMINE	10 U	10 U							
ACENAPHTHENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
ACENAPHTHYLENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
ACETOPHENONE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
ANILINE	10 U	10 U							
ANTHRACENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
ARAMITE	20 U	20 U							
ATRAZINE				10 U	10 U	10 UR	10 U	10 U	10 U
BENZALDEHYDE				10 UR	10 U	10 UR	10 U	10 U	10 U
BENZO(A)ANTHRACENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
BENZO(A)PYRENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
BENZO(B)FLUORANTHENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
BENZO(G,H,I)PERYLENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
BENZO(K)FLUORANTHENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
BENZYL ALCOHOL	20 U	20 U							
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
BIS(2-CHLOROETHYL)ETHER	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
BIS(2-CHLOROISOPROPYL)ETHER									
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
BUTYL BENZYL PHTHALATE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
CAPROLACTAM				10 U	10 U	10 UR	10 U	10 U	10 U
CARBAZOLE				10 U	10 U	10 UR	10 U	10 U	10 U
CHLOROBENZILATE	20 U	20 U							
CHRYSENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
DI-N-BUTYL PHTHALATE	10 U	10 U		2 J	10 U	10 UR	10 U	10 U	10 U
DI-N-OCTYL PHTHALATE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
DIALLATE	20 U	20 U							
DIBENZO(A,H)ANTHRACENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
DIBENZOFURAN	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
DIETHYL PHTHALATE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
DIMETHOATE									
DIMETHYL PHTHALATE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
DINOSEB	5 U	5 U							
ETHYL METHANE SULFONATE	10 U	10 U							
ETHYL PARATHION									

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MW12D	17MW12D	17MW12D	17MW13S	17MW14D	17MW15D	17MW16D	17MIP40-TW49-MW16I	17MW17D
Sample Number	17-G-12D-0205	17-G-12D-0205-AVG	17-G-12D-0205-D	17-G-13S-0205	17-G-14D-0305	17-G-15D-0305	17-G-16D-0305	17-G-16I-0305	17-G-17D-0305
Sample Date	02/28/05	02/28/05	02/28/05	02/27/05	03/09/05	03/09/05	03/08/05	03/08/05	03/08/05
FLUORANTHENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
FLUORENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
HEXACHLOROBENZENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
HEXACHLOROBUTADIENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
HEXACHLOROCYCLOPENTADIENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
HEXACHLOROETHANE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
HEXACHLOROPHENE	10 UR	10 UR							
HEXACHLOROPROPENE	10 U	10 U							
INDENO(1,2,3-CD)PYRENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
ISODRIN	20 U	20 U							
ISOPHORONE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
ISOSAFROLE	20 U	20 U							
KEPONE	10 UR	10 UR							
METHAPYRILENE	10 U	10 U							
METHYL METHANE SULFONATE	20 U	20 U							
N-NITROSO-DI-N-BUTYLAMINE	10 U	10 U							
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
N-NITROSODIETHYLAMINE	20 U	20 U							
N-NITROSODIMETHYLAMINE	20 U	20 U							
N-NITROSODIPHENYLAMINE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
N-NITROSOMETHYLETHYLAMINE	10 U	10 U							
N-NITROSOMORPHOLINE	10 U	10 U							
N-NITROSOPIPERIDINE	10 U	10 U							
N-NITROSOPYRROLIDINE	10 U	10 U							
NAPHTHALENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
NITROBENZENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE									
O-TOLUIDINE	10 U	10 U							
P-(DIMETHYLAMINO)AZOBENZENE	20 U	20 U							
PENTACHLOROBENZENE	10 U	10 U							
PENTACHLORONITROBENZENE	10 U	10 U							
PENTACHLOROPHENOL	25 U	25 U		25 UR	25 UR	25 UR	25 U	25 UR	25 UR
PHENACETIN	10 U	10 U							
PHENANTHRENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
PHENOL	10 U	10 U		10 U	10 UR	10 UR	10 U	10 UR	10 UR
PRONAMIDE	10 U	10 U							
PYRENE	10 U	10 U		10 U	10 U	10 UR	10 U	10 U	10 U
PYRIDINE	50 U	50 U							
SAFROLE	10 U	10 U							
SULFOTEPP									
THIONAZIN									
Pesticides/PCBs (ug/L)									
4,4'-DDD	0.1 U	0.1 U		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDE	0.1 U	0.1 U		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDT	0.1 U	0.1 U		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ALDRIN	0.05 U	0.05 U		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ALPHA-BHC	0.05 U	0.05 U		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ALPHA-CHLORDANE	0.05 U	0.05 U		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
AROCLOR-1016	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1221	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1232	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MW12D	17MW12D	17MW12D	17MW13S	17MW14D	17MW15D	17MW16D	17MIP40-TW49-MW16I	17MW17D
Sample Number	17-G-12D-0205	17-G-12D-0205-AVG	17-G-12D-0205-D	17-G-13S-0205	17-G-14D-0305	17-G-15D-0305	17-G-16D-0305	17-G-16I-0305	17-G-17D-0305
Sample Date	02/28/05	02/28/05	02/28/05	02/27/05	03/09/05	03/09/05	03/08/05	03/08/05	03/08/05
AROCLOR-1242	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1248	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1254	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1260	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BETA-BHC	0.05 U	0.05 U		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
CHLORDANE	0.5 U	0.5 U							
DELTA-BHC	0.05 U	0.05 U		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
DIELDRIN	0.1 U	0.1 U		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDOSULFAN I	0.05 U	0.05 U		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ENDOSULFAN II	0.1 U	0.1 U		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDOSULFAN SULFATE	0.1 U	0.1 U		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN	0.1 U	0.1 U		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN ALDEHYDE	0.1 U	0.1 U		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN KETONE	0.1 U	0.1 U		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
GAMMA-BHC (LINDANE)	0.05 U	0.05 U		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
GAMMA-CHLORDANE	0.05 U	0.05 U		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR	0.05 U	0.05 U		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR EPOXIDE	0.05 U	0.05 U		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
KEPONE									
METHOXYCHLOR	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TOXAPHENE	1 U	1 U		1 U	1 U	1 U	1 U	1 U	1 U
OrganoPhos Pesticides (ug/L)									
DIMETHOATE	1.9 U	1.9 U	1.9 U						
DISULFOTON	1.9 U	1.9 U	1.9 U						
ETHYL PARATHION	1.9 U	1.9 U	1.9 U						
FAMPHUR	1.9 U	1.9 U	1.9 U						
METHYL PARATHION	1.9 U	1.9 U	1.9 U						
O,O,O-TRIETHYL PHOSPHOROTHIOATE	1.9 U	1.9 U	1.9 U						
PHORATE	1.9 U	1.9 U	1.9 U						
SULFOTEPP	1.9 U	1.9 U	1.9 U						
THIONAZIN	1.9 U	1.9 U	1.9 U						
Herbicides (ug/L)									
2,4,5-T	1.5 U	1.5 U	1.5 U						
2,4,5-TP (SILVEX)	1 U	1 U	1 U						
2,4-D	2.5 U	2.5 U	2.5 U						
DINOSEB									
Explosives (ug/L)									
1,3,5-TRINITROBENZENE	0.16 U	0.16 U		0.16 U	0.16 U	0.23 U	0.2 U	0.23 U	0.28 U
1,3-DINITROBENZENE	0.16 U	0.16 U		0.16 U	0.16 U	0.23 U	0.2 U	0.23 U	0.28 U
2,4,6-TRINITROTOLUENE	0.16 U	0.16 U		0.16 U	0.16 U	0.23 U	0.2 U	0.23 U	0.28 U
2,4-DINITROTOLUENE	0.31 U	0.31 U		0.31 U	0.31 U	0.44 U	0.39 U	0.45 U	0.55 U
2,6-DINITROTOLUENE	0.31 U	0.31 U		0.31 U	0.31 U	0.44 U	0.39 U	0.45 U	0.55 U
2-AMINO-4,6-DINITROTOLUENE	0.31 U	0.31 U		0.31 U	0.31 U	0.44 U	0.39 U	0.45 U	0.55 U
2-NITROTOLUENE	0.31 U	0.31 U		0.31 U	0.31 U	0.44 U	0.39 U	0.45 U	0.55 U
3-NITROTOLUENE	0.31 U	0.31 U		0.31 U	0.31 U	0.44 U	0.39 U	0.45 U	0.55 U
4-AMINO-2,6-DINITROTOLUENE	0.31 U	0.31 U		0.31 U	0.31 U	0.44 U	0.39 U	0.45 U	0.55 U
4-NITROTOLUENE	0.31 U	0.31 U		0.31 U	0.31 U	0.44 U	0.39 U	0.45 U	0.55 U
HMX	0.31 U	0.31 U		0.31 U	0.31 U	0.44 U	0.39 U	0.45 U	0.55 U
NITROBENZENE	0.16 U	0.16 U		0.16 U	0.16 U	0.23 U	0.2 U	0.23 U	0.28 U
RDX	0.16 U	0.16 U		0.16 U	0.16 U	0.23 U	0.2 U	0.23 U	0.28 U
TETRYL	0.39 U	0.39 U		0.39 U	0.39 U	0.56 U	0.49 U	0.57 U	0.69 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17MW12D	17MW12D	17MW12D	17MW13S	17MW14D	17MW15D	17MW16D	17MIP40-TW49-MW16I	17MW17D
Sample Number	17-G-12D-0205	17-G-12D-0205-AVG	17-G-12D-0205-D	17-G-13S-0205	17-G-14D-0305	17-G-15D-0305	17-G-16D-0305	17-G-16I-0305	17-G-17D-0305
Sample Date	02/28/05	02/28/05	02/28/05	02/27/05	03/09/05	03/09/05	03/08/05	03/08/05	03/08/05
Inorganics (ug/L)									
ALUMINUM	70.6 U	70.6 U		118 U	138	84.4 U	117	66.6 U	53.4 U
ANTIMONY	3.54 U	3.54 U		3.54 U	3.54 U	3.54 U	3.54 U	3.54 U	3.54 U
ARSENIC	22.7	22.7		2.81 U	2.81 U	2.81 U	2.81 U	2.81 U	2.81 U
BARIUM	3.4	3.4		22.6	210	21	17.8	127	11.8
BERYLLIUM	0.40 U	0.4 U		0.40 U	0.44 U	0.40 U	0.40 U	0.55 U	0.40 U
CADMIUM	2.5 U	2.5 U		2.29 U	2.29 U	2.29 U	2.29 U	4.2 U	2.29 U
CALCIUM	46000	46000		4710	929000	79200	83600	798000	52700
CHROMIUM	1.6 U	1.6 U		1.0 U	3.1 U	1.5 U	1.7 U	3.2 U	1.0 U
COBALT	4.3 U	4.3 U		4.3 U	187	4.3 U	4.3 U	127	4.3 U
COPPER	2.52 U	2.52 U		2.52 U	2.52 U	2.52 U	2.52 U	2.52 U	2.52 U
IRON	3550	3550		84	88400	1350	1350	208000	990
LEAD	2.07 U	2.07 U		2.07 U	2.07 U	2.07 U	2.07 U	2.07 U	2.07 U
MAGNESIUM	3100	3100		825	107000	9380	15500	161000	9890
MANGANESE	139	139		13.8	3890	258	297	1490	215
MERCURY	0.02 U	0.02 U		0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
NICKEL	11.6 U	11.6 U		11.8	57.3 U	11.6 U	11.6 U	56.1 U	16.5 U
POTASSIUM	2070	2070		1050	6210 U	6200	8020	5060	7200
SELENIUM	4.08 U	4.08 U		4.08 U	4.08 U	4.08 U	4.08 U	4.08 U	4.08 U
SILVER	3.93 U	3.93 U		3.93 U	3.93 U	3.93 U	3.93 U	3.93 U	3.93 U
SODIUM	61800	61800		18600	934000	107000	133000	1960000	120000
THALLIUM	4.26 U	4.26 U		4.7 U	4.4 U	4.26 U	4.26 U	4.26 U	4.26 U
VANADIUM	5.07 U	5.07 U		5.07 U	5.07 U	5.07 U	5.07 U	5.07 U	5.07 U
ZINC	3.1 U	3.1 U		11.6 U	3.2 U	6.0 U	4.2 U	9.2	2.9 U
Miscellaneous Parameters (ug/L)									
CYANIDE	10 U	10 U		10 U	10 U	10 U	10 U	10 U	10 U
Petroleum Hydrocarbons (mg/L)									
TOTAL PETROLEUM HYDROCARBONS									

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	17MIP41-TW50-MW17I	17MW18D	17MW21S	17MW23S	17TW01S	17TW02S	17TW03	17TW04S	17TW05S	17TW06D
Sample Number	17-G-17I-0205	17-G-18D-0205	17-G-21S-0205	17-G-23S-0205	17-Q-01-0302	17-Q-02-0302	17-Q-03-0302	17-Q-04-0302	17-Q-05-0302	17-Q-06D-0302
Sample Date	02/26/05	02/26/05	02/15/05	02/24/05	03/07/02	03/07/02	03/07/02	03/07/02	03/08/02	03/08/02
Volatile Organics (ug/L)										
1,1,1,2-TETRACHLOROETHANE										
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5 U	5 U	5 U	5 U	12	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROETHANE	5 U	5 U	5 U	5 U	34	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	5 U	5 U	5 U	410	30	170	5 U	5 U	5 U	5 U
1,1-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	5 U	5 U	5 U	5 U	4 J	5 U	5 U	5 U	5 U	5 U
1,2,3-TRICHLOROPROPANE										
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRIMETHYLBENZENE										
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-TRIMETHYLBENZENE										
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DIOXANE										
2-BUTANONE	5 U	5 U	5 UR	5 UR	5 U	5 U	5 U	5 U	5 U	5 U
2-CHLOROETHYL VINYL ETHER										
2-HEXANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-CHLOROPROPENE										
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	5 UR	5 UR	5 UR	5 UR	5 U	5 UR	5 UR	5 UR	5 UR	5 UR
ACETONITRILE										
ACROLEIN										
ACRYLONITRILE										
BENZENE	5 U	5 U	5 U	5 U	21	5 U	5 U	5 U	5 U	5 U
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOETHANE										
BROMOFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLORODIBROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	5 U	5 U	5 U	5 U	35	5 U	5 U	5 U	5 U	5 U
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROPRENE										
CIS-1,2-DICHLOROETHENE	5 U	5 U	0.7 J	5 U	350 J	11	5 U	5 U	5 U	5 U
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIBROMOMETHANE										
DICHLORODIFLUOROMETHANE	5 U	5 U	5 U	5 U	6	5 U	5 U	5 U	5 U	5 U
ETHYL METHACRYLATE										
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOBUTANOL										
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	17MIP41-TW50-MW17I	17MW18D	17MW21S	17MW23S	17TW01S	17TW02S	17TW03	17TW04S	17TW05S	17TW06D
Sample Number	17-G-17I-0205	17-G-18D-0205	17-G-21S-0205	17-G-23S-0205	17-Q-01-0302	17-Q-02-0302	17-Q-03-0302	17-Q-04-0302	17-Q-05-0302	17-Q-06D-0302
Sample Date	02/26/05	02/26/05	02/15/05	02/24/05	03/07/02	03/07/02	03/07/02	03/07/02	03/08/02	03/08/02
M+P-XYLENES	10 U	10 U	10 U	10 U						
METHACRYLONITRILE										
METHYL ACETATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL IODIDE										
METHYL METHACRYLATE										
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYLENE CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
O-XYLENE	5 U	5 U	5 U	5 U						
PENTACHLOROETHANE										
PROPIONITRILE										
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	5 U	5 U	23	2 J	5 U	110	5 U	5 U	5 U	5 U
TOLUENE	5 U	5 U	5 U	5 U	48	5 U	5 U	72	5 U	5 U
TOTAL 1,2-DICHLOROETHENE	10 U	10 U	0.7 J	10 U						
TOTAL XYLENES	15 U	15 U	15 U	15 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,4-DICHLORO-2-BUTENE										
TRICHLOROETHENE	0.3 J	5 U	5 U	25	31000	7	5 U	5 U	5 U	5 U
TRICHLOROFLUOROMETHANE	5 U	5 U	5 U	2 J	5 U	5 U	5 U	5 U	5 U	5 U
VINYL ACETATE										
VINYL CHLORIDE	5 U	5 U	5 U	5 U	6	5 U	5 U	5 U	5 U	5 U
Semivolatile Organics (ug/L)										
1,1-BIPHENYL	10 UJ	10 U	10 U	10 U						
1,2,4,5-TETRACHLOROBENZENE										
1,3,5-TRINITROBENZENE										
1,3-DINITROBENZENE										
1,4-NAPHTHOQUINONE										
1,4-PHENYLENEDIAMINE										
1-NAPHTHYLAMINE										
2,2'-OXYBIS(1-CHLOROPROPANE)	10 UJ	10 U	10 U	10 U						
2,3,4,6-TETRACHLOROPHENOL										
2,4,5-TRICHLOROPHENOL	25 U	25 U	10 U	25 U						
2,4,6-TRICHLOROPHENOL	10 U	10 U	10 U	10 U						
2,4-DICHLOROPHENOL	10 U	10 U	10 U	10 U						
2,4-DIMETHYLPHENOL	10 U	10 U	10 U	10 U						
2,4-DINITROPHENOL	25 U	25 U	25 U	25 U						
2,4-DINITROTOLUENE	10 UJ	10 U	10 U	10 U						
2,6-DICHLOROPHENOL										
2,6-DINITROTOLUENE	10 UJ	10 U	10 U	10 U						
2-ACETYLAMINOFLUORENE										
2-CHLORONAPHTHALENE	10 UJ	10 U	10 U	10 U						
2-CHLOROPHENOL	10 U	10 U	10 U	10 U						
2-METHYLNAPHTHALENE	10 UJ	10 U	10 U	10 U						
2-METHYLPHENOL	10 U	10 U	10 U	10 U						
2-NAPHTHYLAMINE										
2-NITROANILINE	25 UJ	25 U	25 U	25 U						
2-NITROPHENOL	10 U	10 U	10 U	10 U						
2-PICOLINE										
3&4-METHYLPHENOL										

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	17MIP41-TW50-MW17I	17MW18D	17MW21S	17MW23S	17TW01S	17TW02S	17TW03	17TW04S	17TW05S	17TW06D
Sample Number	17-G-17I-0205	17-G-18D-0205	17-G-21S-0205	17-G-23S-0205	17-Q-01-0302	17-Q-02-0302	17-Q-03-0302	17-Q-04-0302	17-Q-05-0302	17-Q-06D-0302
Sample Date	02/26/05	02/26/05	02/15/05	02/24/05	03/07/02	03/07/02	03/07/02	03/07/02	03/08/02	03/08/02
3,3'-DICHLOROBENZIDINE	10 UJ	10 U	10 U	10 U						
3,3'-DIMETHYLBENZIDINE										
3-METHYLCHOLANTHRENE										
3-NITROANILINE	25 UJ	25 U	25 U	25 U						
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U	25 U	25 U						
4-AMINOBIPHENYL										
4-BROMOPHENYL PHENYL ETHER	10 UJ	10 U	10 U	10 U						
4-CHLORO-3-METHYLPHENOL	10 U	10 U	10 U	10 U						
4-CHLOROANILINE	10 UJ	10 U	10 U	10 U						
4-CHLOROPHENYL PHENYL ETHER	10 UJ	10 U	10 U	10 U						
4-METHYLPHENOL	10 U	10 U	10 U	10 U						
4-NITROANILINE	25 UJ	25 U	25 U	25 U						
4-NITROPHENOL	25 U	25 U	25 U	25 U						
4-NITROQUINOLINE-1-OXIDE										
5-NITRO-O-TOLUIDINE										
7,12-DIMETHYLBENZ(A)ANTHRACENE										
A,A-DIMETHYLPHENETHYLAMINE										
ACENAPHTHENE	10 UJ	10 U	10 U	10 U						
ACENAPHTHYLENE	10 UJ	10 U	10 U	10 U						
ACETOPHENONE	10 UJ	10 U	10 U	10 U						
ANILINE										
ANTHRACENE	10 UJ	10 U	10 U	10 U						
ARAMITE										
ATRAZINE	10 UJ	10 U	10 U	10 U						
BENZALDEHYDE	10 UR	10 UR	10 U	10 UR						
BENZO(A)ANTHRACENE	10 UJ	10 U	10 U	10 U						
BENZO(A)PYRENE	10 UJ	10 U	10 U	10 U						
BENZO(B)FLUORANTHENE	10 UJ	10 U	10 U	10 U						
BENZO(G,H,I)PERYLENE	10 UJ	10 U	10 U	10 U						
BENZO(K)FLUORANTHENE	10 UJ	10 U	10 U	10 U						
BENZYL ALCOHOL										
BIS(2-CHLOROETHOXY)METHANE	10 UJ	10 U	10 U	10 U						
BIS(2-CHLOROETHYL)ETHER	10 UJ	10 U	10 U	10 U						
BIS(2-CHLOROISOPROPYL)ETHER										
BIS(2-ETHYLHEXYL)PHTHALATE	10 UJ	10 U	10 U	10 U						
BUTYL BENZYL PHTHALATE	10 UJ	10 U	10 U	10 U						
CAPROLACTAM	10 UJ	10 U	10 U	10 U						
CARBAZOLE	10 UJ	10 U	10 U	10 U						
CHLOROBENZILATE										
CHRYSENE	10 UJ	10 U	10 U	10 U						
DI-N-BUTYL PHTHALATE	10 UJ	3 J	10 U	10 U						
DI-N-OCTYL PHTHALATE	10 UJ	10 U	10 U	10 U						
DIALLATE										
DIBENZO(A,H)ANTHRACENE	10 UJ	10 U	10 U	10 U						
DIBENZOFURAN	10 UJ	10 U	10 U	10 U						
DIETHYL PHTHALATE	10 UJ	10 U	10 U	10 U						
DIMETHOATE										
DIMETHYL PHTHALATE	10 UJ	10 U	10 U	10 U						
DINOSEB										
ETHYL METHANE SULFONATE										
ETHYL PARATHION										

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	17MIP41-TW50-MW17I	17MW18D	17MW21S	17MW23S	17TW01S	17TW02S	17TW03	17TW04S	17TW05S	17TW06D
Sample Number	17-G-17I-0205	17-G-18D-0205	17-G-21S-0205	17-G-23S-0205	17-Q-01-0302	17-Q-02-0302	17-Q-03-0302	17-Q-04-0302	17-Q-05-0302	17-Q-06D-0302
Sample Date	02/26/05	02/26/05	02/15/05	02/24/05	03/07/02	03/07/02	03/07/02	03/07/02	03/08/02	03/08/02
FLUORANTHENE	10 UJ	10 U	10 U	10 U						
FLUORENE	10 UJ	10 U	10 U	10 U						
HEXACHLOROBENZENE	10 UJ	10 U	10 U	10 U						
HEXACHLOROBUTADIENE	10 UJ	10 U	10 U	10 U						
HEXACHLOROCYCLOPENTADIENE	10 UJ	10 U	10 U	10 U						
HEXACHLOROETHANE	10 UJ	10 U	10 U	10 U						
HEXACHLOROPHENE										
HEXACHLOROPROPENE										
INDENO(1,2,3-CD)PYRENE	10 UJ	10 U	10 U	10 U						
ISODRIN										
ISOPHORONE	10 UJ	10 U	10 U	10 U						
ISOSAFROLE										
KEPONE										
METHAPYRILENE										
METHYL METHANE SULFONATE										
N-NITROSO-DI-N-BUTYLAMINE										
N-NITROSO-DI-N-PROPYLAMINE	10 UJ	10 U	10 U	10 U						
N-NITROSODIETHYLAMINE										
N-NITROSODIMETHYLAMINE										
N-NITROSODIPHENYLAMINE	10 UJ	10 U	10 U	10 U						
N-NITROSOMETHYLETHYLAMINE										
N-NITROSOMORPHOLINE										
N-NITROSOPIPERIDINE										
N-NITROSOPYRROLIDINE										
NAPHTHALENE	10 UJ	10 U	10 U	10 U						
NITROBENZENE	10 UR	10 U	10 U	10 U						
O,O,O-TRIETHYL PHOSPHOROTHIOATE										
O-TOLUIDINE										
P-(DIMETHYLAMINO)AZOBENZENE										
PENTACHLOROBENZENE										
PENTACHLORONITROBENZENE										
PENTACHLOROPHENOL	25 UR	25 UR	25 U	25 UR						
PHENACETIN										
PHENANTHRENE	10 UJ	10 U	10 U	10 U						
PHENOL	10 U	10 U	10 U	10 U						
PRONAMIDE										
PYRENE	10 UJ	10 U	10 U	10 U						
PYRIDINE										
SAFROLE										
SULFOTEPP										
THIONAZIN										
Pesticides/PCBs (ug/L)										
4,4'-DDD	0.1 U	0.1 U	0.1 U	0.1 U						
4,4'-DDE	0.1 U	0.1 U	0.1 U	0.1 U						
4,4'-DDT	0.1 U	0.1 U	0.1 U	0.1 U						
ALDRIN	0.05 U	0.05 U	0.05 U	0.05 U						
ALPHA-BHC	0.05 U	0.05 U	0.05 U	0.05 U						
ALPHA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U						
AROCLOR-1016	0.5 U	0.5 U	0.5 U	0.5 U						
AROCLOR-1221	0.5 U	0.5 U	0.5 U	0.5 U						
AROCLOR-1232	0.5 U	0.5 U	0.5 U	0.5 U						

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	17MIP41-TW50-MW17I	17MW18D	17MW21S	17MW23S	17TW01S	17TW02S	17TW03	17TW04S	17TW05S	17TW06D
Sample Number	17-G-17I-0205	17-G-18D-0205	17-G-21S-0205	17-G-23S-0205	17-Q-01-0302	17-Q-02-0302	17-Q-03-0302	17-Q-04-0302	17-Q-05-0302	17-Q-06D-0302
Sample Date	02/26/05	02/26/05	02/15/05	02/24/05	03/07/02	03/07/02	03/07/02	03/07/02	03/08/02	03/08/02
AROCLOR-1242	0.5 U	0.5 U	0.5 U	0.5 U						
AROCLOR-1248	0.5 U	0.5 U	0.5 U	0.5 U						
AROCLOR-1254	0.5 U	0.5 U	0.5 U	0.5 U						
AROCLOR-1260	0.5 U	0.5 U	0.5 U	0.5 U						
BETA-BHC	0.05 U	0.05 U	0.05 U	0.05 U						
CHLORDANE										
DELTA-BHC	0.05 U	0.05 U	0.05 U	0.05 U						
DIELDRIN	0.1 U	0.1 U	0.1 U	0.1 U						
ENDOSULFAN I	0.05 U	0.05 U	0.05 U	0.05 U						
ENDOSULFAN II	0.1 U	0.1 U	0.1 U	0.1 U						
ENDOSULFAN SULFATE	0.1 U	0.1 U	0.1 U	0.1 U						
ENDRIN	0.1 U	0.1 U	0.1 U	0.1 U						
ENDRIN ALDEHYDE	0.1 U	0.1 U	0.1 U	0.1 U						
ENDRIN KETONE	0.1 U	0.1 U	0.1 U	0.1 U						
GAMMA-BHC (LINDANE)	0.05 U	0.05 U	0.05 U	0.05 U						
GAMMA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U						
HEPTACHLOR	0.05 U	0.05 U	0.05 U	0.05 U						
HEPTACHLOR EPOXIDE	0.05 U	0.05 U	0.05 U	0.05 U						
KEPONE										
METHOXYCHLOR	0.5 U	0.5 U	0.5 U	0.5 U						
TOXAPHENE	1 U	1 U	1 U	1 U						
OrganoPhos Pesticides (ug/L)										
DIMETHOATE										
DISULFOTON										
ETHYL PARATHION										
FAMPHUR										
METHYL PARATHION										
O,O,O-TRIETHYL PHOSPHOROTHIOATE										
PHORATE										
SULFOTEPP										
THIONAZIN										
Herbicides (ug/L)										
2,4,5-T										
2,4,5-TP (SILVEX)										
2,4-D										
DINOSEB										
Explosives (ug/L)										
1,3,5-TRINITROBENZENE	0.28 U	0.16 U	0.3 U	0.16 U						
1,3-DINITROBENZENE	0.28 U	0.16 U	0.3 U	0.16 U						
2,4,6-TRINITROTOLUENE	0.28 U	0.16 U	0.3 U	0.16 U						
2,4-DINITROTOLUENE	0.55 U	0.31 U	0.59 U	0.31 U						
2,6-DINITROTOLUENE	0.55 U	0.31 U	0.59 U	0.31 U						
2-AMINO-4,6-DINITROTOLUENE	0.55 U	0.31 U	0.59 U	0.31 U						
2-NITROTOLUENE	0.55 U	0.31 U	0.59 U	0.31 U						
3-NITROTOLUENE	0.55 U	0.31 U	0.59 U	0.31 U						
4-AMINO-2,6-DINITROTOLUENE	0.55 U	0.31 U	0.59 U	0.31 U						
4-NITROTOLUENE	0.55 U	0.31 U	0.59 U	0.31 U						
HMX	0.55 U	0.31 U	0.59 U	0.31 U						
NITROBENZENE	0.28 U	0.16 U	0.3 U	0.16 U						
RDX	0.28 U	0.16 U	0.3 U	0.16 U						
TETRYL	0.69 U	0.39 U	0.74 U	0.39 U						

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	17MIP41-TW50-MW17I	17MW18D	17MW21S	17MW23S	17TW01S	17TW02S	17TW03	17TW04S	17TW05S	17TW06D
Sample Number	17-G-17I-0205	17-G-18D-0205	17-G-21S-0205	17-G-23S-0205	17-Q-01-0302	17-Q-02-0302	17-Q-03-0302	17-Q-04-0302	17-Q-05-0302	17-Q-06D-0302
Sample Date	02/26/05	02/26/05	02/15/05	02/24/05	03/07/02	03/07/02	03/07/02	03/07/02	03/08/02	03/08/02
Inorganics (ug/L)										
ALUMINUM	168	53.7 U	463 U	52.9 U						
ANTIMONY	3.54 U	3.54 U	3.54 U	3.54 U						
ARSENIC	2.81 U	2.8 U	2.81 U	4.2 U						
BARIUM	206	113	103	55.4						
BERYLLIUM	0.47	0.42	0.43	0.40 U						
CADMIUM	2.29 U	2.29 U	0.41 U	0.41 U						
CALCIUM	927000	500000	30400	21200						
CHROMIUM	1.6 U	2.4 U	2.3 U	1.1 U						
COBALT	30.2	27	4.3 U	5.5						
COPPER	2.52 U	2.52 U	2.52 U	2.52 U						
IRON	90700	52700	52.3 U	2460						
LEAD	2.07 U	2.07 U	2.07 U	2.07 U						
MAGNESIUM	79100	88700	6740	7580						
MANGANESE	1910	2340	106	81.1						
MERCURY	0.02 U	0.02 U	0.05 U	0.02 U						
NICKEL	11.6 U	11.6 U	13.9	11.6 U						
POTASSIUM	6820	12700	10800	1810						
SELENIUM	4.08 U	4.08 U	4.08 U	4.08 U						
SILVER	3.93 U	3.93 U	3.93 U	3.93 U						
SODIUM	1470000	982000	42500	55700						
THALLIUM	4.26 U	4.26 U	4.26 U	4.26 U						
VANADIUM	5.07 U	5.07 U	5.07 U	5.07 U						
ZINC	5.9 U	7.0 U	24.8	32.9						
Miscellaneous Parameters (ug/L)										
CYANIDE	10 U	10 U	10 U	10 U						
Petroleum Hydrocarbons (mg/L)										
TOTAL PETROLEUM HYDROCARBONS										

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17TW06S	17TW07D	17TW07S	17TW08D	17TW08S	17TW09D	17TW09S	17TW10D	17TW10S
Sample Number	17-Q-06S-0302	17-Q-07D0302	17-Q-07S-0302	17-Q-08D-0302	17-Q-08S-0302	17-Q-09D-0302	17-Q-09S-0302	17-Q-10D-0302	17-Q-10S-0302
Sample Date	03/08/02	03/08/02	03/07/02	03/08/02	03/08/02	03/09/02	03/09/02	03/08/02	03/08/02
Volatile Organics (ug/L)									
1,1,1,2-TETRACHLOROETHANE									
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-TRICHLOROPROPANE									
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRIMETHYLBENZENE									
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-TRIMETHYLBENZENE									
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DIOXANE									
2-BUTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-CHLOROETHYL VINYL ETHER									
2-HEXANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-CHLOROPROPENE									
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	5 UR	5 UR	5 UR	5 UR	5 UR	5 U	5 U	5 UR	5 UR
ACETONITRILE									
ACROLEIN									
ACRYLONITRILE									
BENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOETHANE									
BROMOFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLORODIBROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROPRENE									
CIS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIBROMOMETHANE									
DICHLORODIFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ETHYL METHACRYLATE									
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOBUTANOL									
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17TW06S	17TW07D	17TW07S	17TW08D	17TW08S	17TW09D	17TW09S	17TW10D	17TW10S
Sample Number	17-Q-06S-0302	17-Q-07D0302	17-Q-07S-0302	17-Q-08D-0302	17-Q-08S-0302	17-Q-09D-0302	17-Q-09S-0302	17-Q-10D-0302	17-Q-10S-0302
Sample Date	03/08/02	03/08/02	03/07/02	03/08/02	03/08/02	03/09/02	03/09/02	03/08/02	03/08/02
M+P-XYLENES									
METHACRYLONITRILE									
METHYL ACETATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL IODIDE									
METHYL METHACRYLATE									
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYLENE CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
O-XYLENE									
PENTACHLOROETHANE									
PROPIONITRILE									
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOLUENE	31	5 U	5 U	5 U	87	5 U	6	15	98
TOTAL 1,2-DICHLOROETHENE									
TOTAL XYLENES	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,4-DICHLORO-2-BUTENE									
TRICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRICHLOROFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
VINYL ACETATE									
VINYL CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Semivolatile Organics (ug/L)									
1,1-BIPHENYL									
1,2,4,5-TETRACHLOROBENZENE									
1,3,5-TRINITROBENZENE									
1,3-DINITROBENZENE									
1,4-NAPHTHOQUINONE									
1,4-PHENYLENEDIAMINE									
1-NAPHTHYLAMINE									
2,2'-OXYBIS(1-CHLOROPROPANE)									
2,3,4,6-TETRACHLOROPHENOL									
2,4,5-TRICHLOROPHENOL									
2,4,6-TRICHLOROPHENOL									
2,4-DICHLOROPHENOL									
2,4-DIMETHYLPHENOL									
2,4-DINITROPHENOL									
2,4-DINITROTOLUENE									
2,6-DICHLOROPHENOL									
2,6-DINITROTOLUENE									
2-ACETYLAMINOFLUORENE									
2-CHLORONAPHTHALENE									
2-CHLOROPHENOL									
2-METHYLNAPHTHALENE									
2-METHYLPHENOL									
2-NAPHTHYLAMINE									
2-NITROANILINE									
2-NITROPHENOL									
2-PICOLINE									
3&4-METHYLPHENOL									

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17TW06S	17TW07D	17TW07S	17TW08D	17TW08S	17TW09D	17TW09S	17TW10D	17TW10S
Sample Number	17-Q-06S-0302	17-Q-07D0302	17-Q-07S-0302	17-Q-08D-0302	17-Q-08S-0302	17-Q-09D-0302	17-Q-09S-0302	17-Q-10D-0302	17-Q-10S-0302
Sample Date	03/08/02	03/08/02	03/07/02	03/08/02	03/08/02	03/09/02	03/09/02	03/08/02	03/08/02
3,3'-DICHLOROBENZIDINE									
3,3'-DIMETHYLBENZIDINE									
3-METHYLCHOLANTHRENE									
3-NITROANILINE									
4,6-DINITRO-2-METHYLPHENOL									
4-AMINOBIPHENYL									
4-BROMOPHENYL PHENYL ETHER									
4-CHLORO-3-METHYLPHENOL									
4-CHLOROANILINE									
4-CHLOROPHENYL PHENYL ETHER									
4-METHYLPHENOL									
4-NITROANILINE									
4-NITROPHENOL									
4-NITROQUINOLINE-1-OXIDE									
5-NITRO-O-TOLUIDINE									
7,12-DIMETHYLBENZ(A)ANTHRACENE									
A,A-DIMETHYLPHENETHYLAMINE									
ACENAPHTHENE									
ACENAPHTHYLENE									
ACETOPHENONE									
ANILINE									
ANTHRACENE									
ARAMITE									
ATRAZINE									
BENZALDEHYDE									
BENZO(A)ANTHRACENE									
BENZO(A)PYRENE									
BENZO(B)FLUORANTHENE									
BENZO(G,H,I)PERYLENE									
BENZO(K)FLUORANTHENE									
BENZYL ALCOHOL									
BIS(2-CHLOROETHOXY)METHANE									
BIS(2-CHLOROETHYL)ETHER									
BIS(2-CHLOROISOPROPYL)ETHER									
BIS(2-ETHYLHEXYL)PHTHALATE									
BUTYL BENZYL PHTHALATE									
CAPROLACTAM									
CARBAZOLE									
CHLOROBENZILATE									
CHRYSENE									
DI-N-BUTYL PHTHALATE									
DI-N-OCTYL PHTHALATE									
DIALLATE									
DIBENZO(A,H)ANTHRACENE									
DIBENZOFURAN									
DIETHYL PHTHALATE									
DIMETHOATE									
DIMETHYL PHTHALATE									
DINOSEB									
ETHYL METHANE SULFONATE									
ETHYL PARATHION									

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17TW06S	17TW07D	17TW07S	17TW08D	17TW08S	17TW09D	17TW09S	17TW10D	17TW10S
Sample Number	17-Q-06S-0302	17-Q-07D0302	17-Q-07S-0302	17-Q-08D-0302	17-Q-08S-0302	17-Q-09D-0302	17-Q-09S-0302	17-Q-10D-0302	17-Q-10S-0302
Sample Date	03/08/02	03/08/02	03/07/02	03/08/02	03/08/02	03/09/02	03/09/02	03/08/02	03/08/02
FLUORANTHENE									
FLUORENE									
HEXACHLOROBENZENE									
HEXACHLOROBUTADIENE									
HEXACHLOROCYCLOPENTADIENE									
HEXACHLOROETHANE									
HEXACHLOROPHENE									
HEXACHLOROPROPENE									
INDENO(1,2,3-CD)PYRENE									
ISODRIN									
ISOPHORONE									
ISOSAFROLE									
KEPONE									
METHAPYRILENE									
METHYL METHANE SULFONATE									
N-NITROSO-DI-N-BUTYLAMINE									
N-NITROSO-DI-N-PROPYLAMINE									
N-NITROSODIETHYLAMINE									
N-NITROSODIMETHYLAMINE									
N-NITROSODIPHENYLAMINE									
N-NITROSOMETHYLETHYLAMINE									
N-NITROSOMORPHOLINE									
N-NITROSOPIPERIDINE									
N-NITROSOPYRROLIDINE									
NAPHTHALENE									
NITROBENZENE									
O,O,O-TRIETHYL PHOSPHOROTHIOATE									
O-TOLUIDINE									
P-(DIMETHYLAMINO)AZOBENZENE									
PENTACHLOROBENZENE									
PENTACHLORONITROBENZENE									
PENTACHLOROPHENOL									
PHENACETIN									
PHENANTHRENE									
PHENOL									
PRONAMIDE									
PYRENE									
PYRIDINE									
SAFROLE									
SULFOTEPP									
THIONAZIN									
Pesticides/PCBs (ug/L)									
4,4'-DDD									
4,4'-DDE									
4,4'-DDT									
ALDRIN									
ALPHA-BHC									
ALPHA-CHLORDANE									
AROCLOR-1016									
AROCLOR-1221									
AROCLOR-1232									

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17TW06S	17TW07D	17TW07S	17TW08D	17TW08S	17TW09D	17TW09S	17TW10D	17TW10S
Sample Number	17-Q-06S-0302	17-Q-07D0302	17-Q-07S-0302	17-Q-08D-0302	17-Q-08S-0302	17-Q-09D-0302	17-Q-09S-0302	17-Q-10D-0302	17-Q-10S-0302
Sample Date	03/08/02	03/08/02	03/07/02	03/08/02	03/08/02	03/09/02	03/09/02	03/08/02	03/08/02
AROCLOR-1242									
AROCLOR-1248									
AROCLOR-1254									
AROCLOR-1260									
BETA-BHC									
CHLORDANE									
DELTA-BHC									
DIELDRIN									
ENDOSULFAN I									
ENDOSULFAN II									
ENDOSULFAN SULFATE									
ENDRIN									
ENDRIN ALDEHYDE									
ENDRIN KETONE									
GAMMA-BHC (LINDANE)									
GAMMA-CHLORDANE									
HEPTACHLOR									
HEPTACHLOR EPOXIDE									
KEPONE									
METHOXYCHLOR									
TOXAPHENE									
OrganoPhos Pesticides (ug/L)									
DIMETHOATE									
DISULFOTON									
ETHYL PARATHION									
FAMPHUR									
METHYL PARATHION									
O,O,O-TRIETHYL PHOSPHOROTHIOATE									
PHORATE									
SULFOTEPP									
THIONAZIN									
Herbicides (ug/L)									
2,4,5-T									
2,4,5-TP (SILVEX)									
2,4-D									
DINOSEB									
Explosives (ug/L)									
1,3,5-TRINITROBENZENE									
1,3-DINITROBENZENE									
2,4,6-TRINITROTOLUENE									
2,4-DINITROTOLUENE									
2,6-DINITROTOLUENE									
2-AMINO-4,6-DINITROTOLUENE									
2-NITROTOLUENE									
3-NITROTOLUENE									
4-AMINO-2,6-DINITROTOLUENE									
4-NITROTOLUENE									
HMX									
NITROBENZENE									
RDX									
TETRYL									

GROUNDWATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	17TW06S	17TW07D	17TW07S	17TW08D	17TW08S	17TW09D	17TW09S	17TW10D	17TW10S
Sample Number	17-Q-06S-0302	17-Q-07D0302	17-Q-07S-0302	17-Q-08D-0302	17-Q-08S-0302	17-Q-09D-0302	17-Q-09S-0302	17-Q-10D-0302	17-Q-10S-0302
Sample Date	03/08/02	03/08/02	03/07/02	03/08/02	03/08/02	03/09/02	03/09/02	03/08/02	03/08/02
Inorganics (ug/L)									
ALUMINUM									
ANTIMONY									
ARSENIC									
BARIUM									
BERYLLIUM									
CADMIUM									
CALCIUM									
CHROMIUM									
COBALT									
COPPER									
IRON									
LEAD									
MAGNESIUM									
MANGANESE									
MERCURY									
NICKEL									
POTASSIUM									
SELENIUM									
SILVER									
SODIUM									
THALLIUM									
VANADIUM									
ZINC									
Miscellaneous Parameters (ug/L)									
CYANIDE									
Petroleum Hydrocarbons (mg/L)									
TOTAL PETROLEUM HYDROCARBONS									

APPENDIX E-4
GROUNDWATER ANALYTICAL RESULTS (SOLUTIONS-IES)

SWMU 17
SOLUTIONS-IES GROUNDWATER DATA
SUMMARY OF POSITIVE DETECTIONS
SWMU 17 PILOT-SCALE TREATABILITY STUDY
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017	017	017
Sample Location	17-PSTW-10	17-PSTW-11	17-PSTW-12	17-PSTW-13	17-PSTW-14	17-PSTW-15	17-PSTW-4	17-PSTW-5	17-PSTW-6	17-PSTW-7	17-PSTW-8	17-PSTW-9
Sample Number	17-PSTW-10	17-PSTW-11	17-PSTW-12	17-PSTW-13	17-PSTW-14	17-PSTW-15	17-PSTW-4	17-PSTW-5	17-PSTW-6	17-PSTW-7	17-PSTW-8	17-PSTW-9
Sample Date	11/10/04	11/10/04	11/10/04	11/10/04	11/10/04	11/10/04	11/09/04	11/09/04	11/09/04	11/10/04	11/10/04	11/10/04
Volatile Organics (ug/L)												
1,1,2,2-TETRACHLOROETHANE												
1,1,2-TRICHLOROETHANE												
1,1-DICHLOROETHENE												
BENZENE												
CHLOROFORM	48	77	5 U	5 U	0.5 U	0.5 U	50 U	50 U	50 U	50 U	50 U	230
CIS-1,2-DICHLOROETHENE	190	71	5 U	100	36	0.5 U	490	700	590	300	260	170
DICHLORODIFLUOROMETHANE												
ETHANE	0.02	0.04	0.01	0.01	0.01	0.01	0.2	0.12	0.06	0.06	0.06	0.08
ETHENE	0.59	0.41	0.05	0.14	0.03	0.02	1.09	1.77	1.66	0.55	0.82	0.69
METHANE	53.2	69.2	56.6	18	13.1	10.2	32.3	49.5	38.6	47.1	89.3	113.9
METHYLENE CHLORIDE												
NAPHTHALENE												
TETRACHLOROETHENE												
TOLUENE												
TOTAL XYLENES												
TRANS-1,2-DICHLOROETHENE	16	5 U	5 U	25	11	0.5 U	50 U	50 U	50 U	50 U	50 U	50 U
TRICHLOROETHENE	11000	6800	710	3900	380	1.5	35000	49000	49000	30000	39000	31000
VINYL CHLORIDE												
Miscellaneous Parameters (mg/L)												
BROMIDE	2.3	4	1.6	3.7	4	7.9	1.6	1.2	0.7	1.7	1.7	0.5
CHLORIDE	860	1900	510	1400	1420	2800	710	490	230	520	480	51
SULFATE	97	130	97	130	180	320	79	78	81	39	35	34

SWMU 17
SOLUTIONS-IES GROUNDWATER DATA
SUMMARY OF POSITIVE DETECTIONS
SWMU 17 PILOT-SCALE TREATABILITY STUDY
NWS CHARLESTON, SOUTH CAROLINA

SWMU	**017**	**017**	**017**	**017**
Sample Location	**17MW06S**	**17-PS-1**	**17-PS-2**	**17-PS-3**
Sample Number	**17MW6S**	**17PS-01**	**17PS-02**	**17PS-03**
Sample Date	**11/16/04**	**04/01/04**	**04/01/04**	**04/01/04**
Volatile Organics (ug/L)				
1,1,2,2-TETRACHLOROETHANE	50 U	50 U	50 U	50 U
1,1,2-TRICHLOROETHANE	50 U	50 U	50 U	50 U
1,1-DICHLOROETHENE	50 U	50 U	50 U	50 U
BENZENE	50 U	50 U	50 U	50 U
CHLOROFORM	440	400	440	330
CIS-1,2-DICHLOROETHENE	2500	190	260	230
DICHLORODIFLUOROMETHANE	50 U	50 U	50 U	50 U
ETHANE	0.05	0.08	0.05	0.09
ETHENE	1.12	0.43	0.4	0.48
METHANE	71.15	27.2	30.8	36
METHYLENE CHLORIDE	200 U	200 U	200 U	200 U
NAPHTHALENE	50 U	50 U	50 U	50 U
TETRACHLOROETHENE	50 U	50 U	50 U	50 U
TOLUENE	50 U	50 U	50 U	50 U
TOTAL XYLENES	50 U	50 U	50 U	50 U
TRANS-1,2-DICHLOROETHENE	50 U	50 U	50 U	50 U
TRICHLOROETHENE	34000	22000	28000	26000
VINYL CHLORIDE	50 U	50 U	50 U	50 U
Miscellaneous Parameters (mg/L)				
BROMIDE				
CHLORIDE				
SULFATE				

APPENDIX E-5
SURFACE WATER ANALYTICAL RESULTS

SURFACE WATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	017
Sample Location	16SWSD01	16SWSD01	16SWSD01	16SWSD02	16SWSD03	16SWSD04	16SWSD05	16SWSD06	16SWSD07	17SWSD01
Sample Number	16-W-01-1001	16-W-01-1001-AVG	16-W-01-1001-D	16-W-02-1001	16-W-03-1001	16-W-04-1001	16-W-05-1001	16-W-06-1001	16-W-07-1001	17-W-01-1001
Sample Date	10/16/01	10/16/01	10/16/01	10/16/01	10/18/01	10/18/01	10/21/01	10/18/01	10/21/01	10/17/01
Volatile Organics (ug/L)										
1,1,1,2-TETRACHLOROETHANE				5 U						
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	5 U	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-TRICHLOROPROPANE				5 U						
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DIOXANE				100 U						
2-BUTANONE	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	5 U	5 U
2-HEXANONE	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	5 U	5 U
3-CHLOROPROPENE				10 U						
4-METHYL-2-PENTANONE	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	5 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONITRILE				50 U						
ACROLEIN				50 U						
ACRYLONITRILE				10 U						
BENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLORODIBROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROPRENE				10 U						
CIS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CYCLOHEXANE	5 U	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
DIBROMOMETHANE				5 U						
DICHLORODIFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ETHYL METHACRYLATE				10 U						
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOBUTANOL				6 J						
ISOPROPYLBENZENE	5 U	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
METHACRYLONITRILE				50 U						
METHYL ACETATE	5 U	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE	5 U	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
METHYL IODIDE				10 U						

SURFACE WATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	017
Sample Location	16SWSD01	16SWSD01	16SWSD01	16SWSD02	16SWSD03	16SWSD04	16SWSD05	16SWSD06	16SWSD07	17SWSD01
Sample Number	16-W-01-1001	16-W-01-1001-AVG	16-W-01-1001-D	16-W-02-1001	16-W-03-1001	16-W-04-1001	16-W-05-1001	16-W-06-1001	16-W-07-1001	17-W-01-1001
Sample Date	10/16/01	10/16/01	10/16/01	10/16/01	10/18/01	10/18/01	10/21/01	10/18/01	10/21/01	10/17/01
METHYL METHACRYLATE				10 U						
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U		5 U	5 U	5 U	5 U	5 U	5 U
METHYLENE CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLOROETHANE				10 U						
PROPIONITRILE				50 U						
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.7 J	5 U
TOLUENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOTAL XYLENES	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,4-DICHLORO-2-BUTENE				10 U						
TRICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRICHLOROFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
VINYL ACETATE				5 U						
VINYL CHLORIDE	5 U	5 U	5 U	2 U	5 U	5 U	5 U	5 U	5 U	5 U
Semivolatile Organics (ug/L)										
1,1-BIPHENYL	10 U	10 U	10 U		10 U	10 U	10 U	10 U	10 U	10 U
1,2,4,5-TETRACHLOROBENZENE				10 U						
1,3,5-TRINITROBENZENE				10 U						
1,3-DINITROBENZENE				10 U						
1,4-NAPHTHOQUINONE				10 U						
1,4-PHENYLENEDIAMINE				10 U						
1-NAPHTHYLAMINE				10 U						
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,3,4,6-TETRACHLOROPHENOL				10 U						
2,4,5-TRICHLOROPHENOL	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
2,4,6-TRICHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DICHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DIMETHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DINITROPHENOL	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
2,4-DINITROTOLUENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6-DICHLOROPHENOL				10 U						
2,6-DINITROTOLUENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-ACETYLAMINOFLUORENE				10 U						
2-CHLORONAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-CHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-METHYLNAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-NAPHTHYLAMINE				10 U						
2-NITROANILINE	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
2-NITROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-PICOLINE				10 U						
3,3'-DICHLOROBENZIDINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3'-DIMETHYLBENZIDINE				20 U						
3-METHYLCHOLANTHRENE				10 U						
3-NITROANILINE	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4-AMINOBIPHENYL				10 U						
4-BROMOPHENYL PHENYL ETHER	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLORO-3-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

SURFACE WATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	017
Sample Location	16SWSD01	16SWSD01	16SWSD01	16SWSD02	16SWSD03	16SWSD04	16SWSD05	16SWSD06	16SWSD07	17SWSD01
Sample Number	16-W-01-1001	16-W-01-1001-AVG	16-W-01-1001-D	16-W-02-1001	16-W-03-1001	16-W-04-1001	16-W-05-1001	16-W-06-1001	16-W-07-1001	17-W-01-1001
Sample Date	10/16/01	10/16/01	10/16/01	10/16/01	10/18/01	10/18/01	10/21/01	10/18/01	10/21/01	10/17/01
4-CHLOROANILINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLOROPHENYL PHENYL ETHER	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-NITROANILINE	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4-NITROPHENOL	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4-NITROQUINOLINE-1-OXIDE				20 UR						
5-NITRO-O-TOLUIDINE				20 U						
7,12-DIMETHYLBENZ(A)ANTHRACENE				10 U						
A,A-DIMETHYLPHENETHYLAMINE				10 U						
ACENAPHTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ACENAPHTHYLENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ACETOPHENONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ANILINE				10 U						
ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ARAMITE				20 U						
ATRAZINE	10 U	10 U	10 U		10 U	10 U	10 U	10 U	10 U	10 U
BENZALDEHYDE	10 U	10 U	10 U		10 U	10 U	10 U	10 U	10 U	10 U
BENZO(A)ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(A)PYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(B)FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(G,H,I)PERYLENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(K)FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BENZYL ALCOHOL				20 U						
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
BUTYL BENZYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CAPROLACTAM	10 U	10 U	10 U		10 U	10 U	10 U	10 U	10 U	10 U
CARBAZOLE	10 U	10 U	10 U		10 U	10 U	10 U	10 U	10 U	10 U
CHLOROBENZILATE				20 U						
CHRYSENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DI-N-BUTYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DI-N-OCTYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DIALLATE				20 UR						
DIBENZO(A,H)ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DIBENZOFURAN	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DIETHYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DIMETHOATE				10 U						
DIMETHYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ETHYL METHANE SULFONATE				10 U						
FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
FLUORENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBUTADIENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROPHENE				10 U						
HEXACHLOROPROPENE				10 U						
INDENO(1,2,3-CD)PYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ISODRIN				20 U						
ISOPHORONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

SURFACE WATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	017
Sample Location	16SWSD01	16SWSD01	16SWSD01	16SWSD02	16SWSD03	16SWSD04	16SWSD05	16SWSD06	16SWSD07	17SWSD01
Sample Number	16-W-01-1001	16-W-01-1001-AVG	16-W-01-1001-D	16-W-02-1001	16-W-03-1001	16-W-04-1001	16-W-05-1001	16-W-06-1001	16-W-07-1001	17-W-01-1001
Sample Date	10/16/01	10/16/01	10/16/01	10/16/01	10/18/01	10/18/01	10/21/01	10/18/01	10/21/01	10/17/01
ISOSAFROLE				20 U						
METHAPYRILENE				10 UR						
METHYL METHANE SULFONATE				20 U						
N-NITROSO-DI-N-BUTYLAMINE				10 U						
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-NITROSODIETHYLAMINE				20 U						
N-NITROSODIMETHYLAMINE				20 U						
N-NITROSODIPHENYLAMINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-NITROSOMETHYLETHYLAMINE				10 U						
N-NITROSOMORPHOLINE				10 U						
N-NITROSOPIPERIDINE				10 U						
N-NITROSOPYRROLIDINE				10 U						
NAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
NITROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE				20 U						
O-TOLUIDINE				10 U						
P-(DIMETHYLAMINO)AZOBENZENE				20 U						
PENTACHLOROBENZENE				10 U						
PENTACHLORONITROBENZENE				10 U						
PENTACHLOROPHENOL	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
PHENACETIN				10 U						
PHENANTHRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PRONAMIDE				10 U						
PYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PYRIDINE				50 U						
SAFROLE				10 U						
SULFOTEPP				10 U						
THIONAZIN				20 U						
Pesticides/PCBs (ug/L)										
4,4'-DDD	0.1 U	0.1 U	0.1 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDE	0.1 U	0.1 U	0.1 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDT	0.1 U	0.1 U	0.1 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ALDRIN	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ALPHA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ALPHA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
AROCLOR-1016	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1221	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1232	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1242	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1248	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1254	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AROCLOR-1260	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BETA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
CHLORDANE				0.5 U						
DELTA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
DIELDRIN	0.1 U	0.1 U	0.1 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDOSULFAN I	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ENDOSULFAN II	0.1 U	0.1 U	0.1 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDOSULFAN SULFATE	0.1 UJ	0.1 UJ	0.1 UJ	0.05 U	0.1 UJ	0.1 UJ	0.1 U	0.1 UJ	0.1 U	0.1 UJ
ENDRIN	0.1 U	0.1 U	0.1 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

SURFACE WATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	017
Sample Location	16SWSD01	16SWSD01	16SWSD01	16SWSD02	16SWSD03	16SWSD04	16SWSD05	16SWSD06	16SWSD07	17SWSD01
Sample Number	16-W-01-1001	16-W-01-1001-AVG	16-W-01-1001-D	16-W-02-1001	16-W-03-1001	16-W-04-1001	16-W-05-1001	16-W-06-1001	16-W-07-1001	17-W-01-1001
Sample Date	10/16/01	10/16/01	10/16/01	10/16/01	10/18/01	10/18/01	10/21/01	10/18/01	10/21/01	10/17/01
ENDRIN ALDEHYDE	0.1 U	0.1 U	0.1 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN KETONE	0.1 UJ	0.1 UJ	0.1 UJ	0.05 U	0.1 UJ	0.1 UJ	0.1 U	0.1 UJ	0.1 U	0.1 UJ
GAMMA-BHC (LINDANE)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
GAMMA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR EPOXIDE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
KEPONE				1 U						
METHOXYCHLOR	0.5 U	0.5 U	0.5 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TOXAPHENE	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U
OrganoPhPesticides (ug/L)										
DISULFOTON				1 U						
ETHYL PARATHION				1 U						
FAMPHUR				1 U						
METHYL PARATHION				1 U						
PHORATE				1 U						
Herbicides (ug/L)										
2,4,5-T				1 U						
2,4,5-TP (SILVEX)				1 U						
2,4-D				4 U						
DINOSEB				0.6 U						
Explosives (ug/L)										
1,3,5-TRINITROBENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-DINITROBENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,4,6-TRINITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.21	0.2 U
2,4-DINITROTOLUENE	0.66 J	0.38 J	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,6-DINITROTOLUENE	0.41 J	0.255 J	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-AMINO-4,6-DINITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-NITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
3-NITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-AMINO-2,6-DINITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-NITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
HMX	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
NITROBENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
RDX	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TETRYL	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Inorganics (ug/L)										
ALUMINUM	1140	1069.5	999	524	173 U	1260	11000	1010	5540	1400
ANTIMONY	3.65 U	3.65 U	3.65 U	3.65 U	11.2	11.8	3.65 U	3.65 U	3.65 U	5.5
ARSENIC	3.9	4.2	4.5	2.53 U	7.59 U	7.59 U	8.5 U	2.53 U	8.3 U	4.4
BARIUM	23.2	22.65	22.1	37.9	17.6	17.7	63.4	22.3	28.2	47.3
BERYLLIUM	2.0 U	2.15 U	2.3 U	2.3 U	0.41 U	0.66 U	0.68 U	0.27 U	0.39 U	2.0 U
CADMIUM	0.24 U	0.24 U	0.24 U	0.24 U	2.3 U	3 U	0.24 U	0.24 U	0.24 U	0.24 U
CALCIUM	170000	170000	170000	186000	161000	159000	142000	147000	154000	167000
CHROMIUM	2.6 U	2.15 U	1.7 U	2.0 U	4.81 U	4.81 U	18.1 U	1.8 U	10.6 U	4.8 U
COBALT	0.92 U	0.92 U	0.92 U	0.92 U	3.89 U	3.89 U	2.3 U	0.92 U	1.8 U	2.9
COPPER	0.84 U	0.84 U	0.84 U	12.8	2.0 U	2.7 U	11.7	0.84 U	6.4 U	0.84 U
IRON	822	763	704	1350	49.38 U	1060	9980	782	4880	2740
LEAD	2.6	2.5	2.4	2.1	4.44 U	6.4 U	15.5	1.48 U	4.4	1.48 U
MAGNESIUM	511000	506000	501000	512000	506000	501000	419000	425000	468000	488000
MANGANESE	31	29.9	28.8	116	1.5	20.9	199	37.6	388	169
MERCURY	0.06 U	0.05 U	0.04 U	0.06 U	0.03 U	0.06 U	0.09	0.03 U	0.05	0.03 U

SURFACE WATER DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	017
Sample Location	16SWSD01	16SWSD01	16SWSD01	16SWSD02	16SWSD03	16SWSD04	16SWSD05	16SWSD06	16SWSD07	17SWSD01
Sample Number	16-W-01-1001	16-W-01-1001-AVG	16-W-01-1001-D	16-W-02-1001	16-W-03-1001	16-W-04-1001	16-W-05-1001	16-W-06-1001	16-W-07-1001	17-W-01-1001
Sample Date	10/16/01	10/16/01	10/16/01	10/16/01	10/18/01	10/18/01	10/21/01	10/18/01	10/21/01	10/17/01
NICKEL	2.1 U	2.35 U	2.6 U	29.7 U	18 U	20.2 U	7.2 U	1.5 U	4.7 U	4.1 U
POTASSIUM	160000	159000	158000	158000	151000	145000	138000	149000	155000	143000
SELENIUM	3.04 U	3.04 U	3.04 U	3.04 U	9.12 U	9.12 U	3.04 U	3.04 U	3.04 U	3.04 U
SILVER	1.2	0.8575	1.03 U	1.03 U	4.15 U	4.15 U	1.03 U	1.03 U	1.03 U	1.3
SODIUM	4270000	4265000	4260000	4010000	3630000	3610000	3250000	3620000	3640000	4100000
THALLIUM	4.74 U	5.37 U	6 U	5.4 U	14.22 U	14.22 U	4.74 U	4.74 U	4.74 U	4.74 U
VANADIUM	3.1	3.1	3.1	2.1	4.66 U	8	24.2	3.2	14.5	5.2
ZINC	14.9 U	14.2 U	13.5 U	71	2	6.8	49.6	7.2 U	54.3	16.4
Miscellaneous Parameters (ug/L)										
CYANIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

APPENDIX E-6
SEDIMENT ANALYTICAL RESULTS

SEDIMENT DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	017
Sample Location	16SWSD01	16SWSD01	16SWSD01	16SWSD02	16SWSD03	16SWSD04	16SWSD05	16SWSD06	16SWSD07	17SWSD01
Sample Number	16-D-01-1001	16-D-01-1001-AVG	16-D-01-1001-D	16-D-02-1001	16-D-03-1001	16-D-04-1001	16-D-05-1001	16-D-06-1001	16-D-07-1001	17-D-01-1001
Depth Range	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date	10/16/01	10/16/01	10/16/01	10/16/01	10/18/01	10/18/01	10/18/01	10/18/01	10/21/01	10/17/01
Volatile Organics (ug/kg)										
1,1,1,2-TETRACHLOROETHANE				20 U						
1,1,1-TRICHLOROETHANE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
1,1,2,2-TETRACHLOROETHANE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
1,1,2-TRICHLOROETHANE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
1,1,2-TRICHLOROTRIFLUOROETHANE	7 U	6.5 U	6 U		40 U	28 U	34 U	20 U	22 U	32 U
1,1-DICHLOROETHANE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
1,1-DICHLOROETHENE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
1,2,3-TRICHLOROPROPANE				20 U						
1,2,4-TRICHLOROBENZENE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
1,2-DIBROMO-3-CHLOROPROPANE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
1,2-DIBROMOETHANE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
1,2-DICHLOROBENZENE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
1,2-DICHLOROETHANE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
1,2-DICHLOROPROPANE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
1,3-DICHLOROBENZENE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
1,4-DICHLOROBENZENE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
1,4-DIOXANE				800 UR						
2-BUTANONE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 UJ	20 U	22 UJ	32 U
2-HEXANONE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
3-CHLOROPROPENE				40 U						
4-METHYL-2-PENTANONE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
ACETONE	15 U	15 U	15 U	180 U	140 U	73 U	61 U	55 U	55 U	90 U
ACETONITRILE				400 U						
ACROLEIN				200 UR						
ACRYLONITRILE				40 U						
BENZENE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
BROMODICHLOROMETHANE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
BROMOFORM	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
BROMOMETHANE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
CARBON DISULFIDE	2 J	3.5 J	5 J	7 J	17 J	28 U	8 J	20 U	7 J	19 J
CARBON TETRACHLORIDE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
CHLOROBENZENE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
CHLORODIBROMOMETHANE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
CHLOROETHANE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
CHLOROFORM	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
CHLOROMETHANE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
CHLOROPRENE				40 U						
CIS-1,2-DICHLOROETHENE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
CIS-1,3-DICHLOROPROPENE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
CYCLOHEXANE	7 U	6.5 U	6 U		40 U	28 U	34 U	20 U	22 U	32 U
DIBROMOMETHANE				20 U						
DICHLORODIFLUOROMETHANE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
ETHYL METHACRYLATE				40 U						
ETHYLBENZENE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
ISOBUTANOL				800 UR						
ISOPROPYLBENZENE	7 U	6.5 U	6 U		40 U	28 U	34 U	20 U	22 U	32 U
METHACRYLONITRILE				400 U						
METHYL ACETATE	7 U	6.5 U	6 U		40 U	28 U	34 U	20 U	22 U	32 U
METHYL CYCLOHEXANE	7 U	6.5 U	6 U		40 U	28 U	34 U	20 U	22 U	32 U

SEDIMENT DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	017
Sample Location	16SWSD01	16SWSD01	16SWSD01	16SWSD02	16SWSD03	16SWSD04	16SWSD05	16SWSD06	16SWSD07	17SWSD01
Sample Number	16-D-01-1001	16-D-01-1001-AVG	16-D-01-1001-D	16-D-02-1001	16-D-03-1001	16-D-04-1001	16-D-05-1001	16-D-06-1001	16-D-07-1001	17-D-01-1001
Depth Range	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date	10/16/01	10/16/01	10/16/01	10/16/01	10/18/01	10/18/01	10/18/01	10/18/01	10/21/01	10/17/01
METHYL IODIDE				40 U						
METHYL METHACRYLATE				40 U						
METHYL TERT-BUTYL ETHER	7 U	6.5 U	6 U		40 U	28 U	34 U	20 U	22 U	32 U
METHYLENE CHLORIDE	8 U	8 U	8 U	70 U	69 U	44 U	64 U	34 U	29 U	59 U
PENTACHLOROETHANE				40 U						
PROPIONITRILE				400 U						
STYRENE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
TETRACHLOROETHENE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
TOLUENE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
TOTAL XYLENES	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
TRANS-1,2-DICHLOROETHENE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
TRANS-1,3-DICHLOROPROPENE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
TRANS-1,4-DICHLORO-2-BUTENE				40 U						
TRICHLOROETHENE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
TRICHLOROFLUOROMETHANE	7 U	6.5 U	6 U	20 U	40 U	28 U	34 U	20 U	22 U	32 U
VINYL ACETATE				20 U						
VINYL CHLORIDE	7 U	6.5 U	6 U	40 U	40 U	28 U	34 U	20 U	22 U	32 U
Semivolatile Organics (ug/kg)										
1,1-BIPHENYL	460 UJ	445 UJ	430 UJ		1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
1,2,4,5-TETRACHLOROBENZENE				1300 UJ						
1,3,5-TRINITROBENZENE				1300 UJ						
1,3-DINITROBENZENE				1300 UJ						
1,4-NAPHTHOQUINONE				1300 UJ						
1,4-PHENYLENEDIAMINE				1300 UJ						
1-NAPHTHYLAMINE				1300 UJ						
2,2'-OXYBIS(1-CHLOROPROPANE)	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
2,3,4,6-TETRACHLOROPHENOL				1300 UJ						
2,4,5-TRICHLOROPHENOL	1200 UJ	1150 UJ	1100 UJ	3300 UJ	4200 UJ	3000 UJ	3500 UJ	3200 UJ	2600 U	2700 UJ
2,4,6-TRICHLOROPHENOL	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
2,4-DICHLOROPHENOL	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
2,4-DIMETHYLPHENOL	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
2,4-DINITROPHENOL	1200 UJ	1150 UJ	1100 UJ	3300 UJ	4200 UJ	3000 UJ	3500 UJ	3200 UJ	2600 U	2700 UJ
2,4-DINITROTOLUENE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
2,6-DICHLOROPHENOL				1300 UJ						
2,6-DINITROTOLUENE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
2-ACETYLAMINOFLUORENE				1300 UJ						
2-CHLORONAPHTHALENE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
2-CHLOROPHENOL	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
2-METHYLNAPHTHALENE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
2-METHYLPHENOL	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
2-NAPHTHYLAMINE				1300 UJ						
2-NITROANILINE	1200 UJ	1150 UJ	1100 UJ	3300 UJ	4200 UJ	3000 UJ	3500 UJ	3200 UJ	2600 U	2700 UJ
2-NITROPHENOL	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
2-PICOLINE				1300 UJ						
3,3'-DICHLOROBENZIDINE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
3,3'-DIMETHYLBENZIDINE				2600 UJ						
3-METHYLCHOLANTHRENE				1300 UJ						
3-NITROANILINE	1200 UJ	1150 UJ	1100 UJ	3300 UJ	4200 UJ	3000 UJ	3500 UJ	3200 UJ	2600 U	2700 UJ
4,6-DINITRO-2-METHYLPHENOL	1200 UJ	1150 UJ	1100 UJ	3300 UJ	4200 UJ	3000 UJ	3500 UJ	3200 UJ	2600 U	2700 UJ
4-AMINOBIPHENYL				1300 UJ						

SEDIMENT DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	017
Sample Location	16SWSD01	16SWSD01	16SWSD01	16SWSD02	16SWSD03	16SWSD04	16SWSD05	16SWSD06	16SWSD07	17SWSD01
Sample Number	16-D-01-1001	16-D-01-1001-AVG	16-D-01-1001-D	16-D-02-1001	16-D-03-1001	16-D-04-1001	16-D-05-1001	16-D-06-1001	16-D-07-1001	17-D-01-1001
Depth Range	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date	10/16/01	10/16/01	10/16/01	10/16/01	10/18/01	10/18/01	10/18/01	10/18/01	10/21/01	10/17/01
4-BROMOPHENYL PHENYL ETHER	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
4-CHLORO-3-METHYLPHENOL	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
4-CHLOROANILINE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
4-CHLOROPHENYL PHENYL ETHER	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
4-METHYLPHENOL	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
4-NITROANILINE	1200 UJ	1150 UJ	1100 UJ	3300 UJ	4200 UJ	3000 UJ	3500 UJ	3200 UJ	2600 U	2700 UJ
4-NITROPHENOL	1200 UJ	1150 UJ	1100 UJ	3300 UJ	4200 UJ	3000 UJ	3500 UJ	3200 UJ	2600 U	2700 UJ
4-NITROQUINOLINE-1-OXIDE				2600 UR						
5-NITRO-O-TOLUIDINE				2600 UJ						
7,12-DIMETHYLBENZ(A)ANTHRACENE				1300 UJ						
A,A-DIMETHYLPHENETHYLAMINE				1300 UJ						
ACENAPHTHENE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
ACENAPHTHYLENE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
ACETOPHENONE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
ANILINE				1300 UJ						
ANTHRACENE	460 UJ	445 UJ	430 UJ	1300 UJ	68 J	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
ARAMITE				2600 UJ						
ATRAZINE	460 UJ	445 UJ	430 UJ		1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
BENZALDEHYDE	460 UJ	445 UJ	430 UJ		1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
BENZO(A)ANTHRACENE	460 UJ	445 UJ	430 UJ	1300 UJ	200 J	74 J	1400 UJ	87 J	44 J	1100 UJ
BENZO(A)PYRENE	19 J	19 J	430 UJ	1300 UJ	160 J	1200 UJ	1400 UJ	58 J	1000 U	1100 UJ
BENZO(B)FLUORANTHENE	21 J	21 J	430 UJ	1100 J	250 J	1200 UJ	1400 UJ	88 J	1000 U	1100 UJ
BENZO(G,H,I)PERYLENE	460 UJ	445 UJ	430 UJ	1300 UJ	130 J	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
BENZO(K)FLUORANTHENE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
BENZYL ALCOHOL				2600 UJ						
BIS(2-CHLOROETHOXY)METHANE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
BIS(2-CHLOROETHYL)ETHER	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
BIS(2-ETHYLHEXYL)PHTHALATE	460 UJ	1730 UJ	3000 U	1300 UJ	1700 U	1200 U	1400 U	1300 U	4300 U	1100 U
BUTYL BENZYL PHTHALATE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
CAPROLACTAM	460 UJ	445 UJ	430 UJ		1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
CARBAZOLE	460 UJ	445 UJ	430 UJ		1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
CHLOROBENZILATE				2600 UJ						
CHRYSENE	460 UJ	445 UJ	430 UJ	710 J	190 J	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
DI-N-BUTYL PHTHALATE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
DI-N-OCTYL PHTHALATE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
DIALLATE				2600 UJ						
DIBENZO(A,H)ANTHRACENE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
DIBENZOFURAN	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
DIETHYL PHTHALATE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
DIMETHOATE				1300 UJ						
DIMETHYL PHTHALATE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
ETHYL METHANE SULFONATE				1300 UJ						
FLUORANTHENE	460 UJ	445 UJ	430 UJ	1300 UJ	350 J	85 J	1400 UJ	88 J	42 J	1100 UJ
FLUORENE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
HEXACHLOROBENZENE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
HEXACHLOROBUTADIENE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
HEXACHLOROCYCLOPENTADIENE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
HEXACHLOROETHANE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
HEXACHLOROPHENE				1300 UJ						
HEXACHLOROPROPENE				1300 UJ						

SEDIMENT DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	017
Sample Location	16SWSD01	16SWSD01	16SWSD01	16SWSD02	16SWSD03	16SWSD04	16SWSD05	16SWSD06	16SWSD07	17SWSD01
Sample Number	16-D-01-1001	16-D-01-1001-AVG	16-D-01-1001-D	16-D-02-1001	16-D-03-1001	16-D-04-1001	16-D-05-1001	16-D-06-1001	16-D-07-1001	17-D-01-1001
Depth Range	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date	10/16/01	10/16/01	10/16/01	10/16/01	10/18/01	10/18/01	10/18/01	10/18/01	10/21/01	10/17/01
INDENO(1,2,3-CD)PYRENE	460 UJ	445 UJ	430 UJ	1300 UJ	120 J	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
ISODRIN				2600 UJ						
ISOPHORONE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
ISOSAFROLE				2600 UJ						
METHAPYRILENE				1300 UJ						
METHYL METHANE SULFONATE				2600 UJ						
N-NITROSO-DI-N-BUTYLAMINE				1300 UJ						
N-NITROSO-DI-N-PROPYLAMINE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
N-NITROSODIETHYLAMINE				2600 UJ						
N-NITROSODIMETHYLAMINE				2600 UJ						
N-NITROSODIPHENYLAMINE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
N-NITROSOMETHYLETHYLAMINE				1300 UJ						
N-NITROSOMORPHOLINE				1300 UJ						
N-NITROSOPIPERIDINE				1300 UJ						
N-NITROSOPYRROLIDINE				1300 UJ						
NAPHTHALENE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
NITROBENZENE	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
O,O,O-TRIETHYL PHOSPHOROTHIOATE				2600 UJ						
O-TOLUIDINE				1300 UJ						
P-(DIMETHYLAMINO)AZOBENZENE				2600 UJ						
PENTACHLOROBENZENE				1300 UJ						
PENTACHLORONITROBENZENE				1300 UJ						
PENTACHLOROPHENOL	1200 UJ	1150 UJ	1100 UJ	3300 UJ	4200 UJ	3000 UJ	3500 UJ	3200 UJ	2600 U	2700 UJ
PHENACETIN				1300 UJ						
PHENANTHRENE	460 UJ	445 UJ	430 UJ	1300 UJ	190 J	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
PHENOL	460 UJ	445 UJ	430 UJ	1300 UJ	1700 UJ	1200 UJ	1400 UJ	1300 UJ	1000 U	1100 UJ
PRONAMIDE				1300 UJ						
PYRENE	460 UJ	445 UJ	430 UJ	940 J	360 J	81 J	1400 UJ	1300 U	1000 U	1100 UJ
PYRIDINE				6400 UJ						
SAFROLE				1300 UJ						
SULFOTEPP				1300 UJ						
THIONAZIN				2600 UJ						
Pesticides/PCBs (ug/kg)										
4,4'-DDD	3 J	2.9 J	2.8 J	1.4 J	17 UJ	12 UJ	14 UJ	5.3 J	10 U	11 U
4,4'-DDE	3.9 J	3.9 J	3.9 J	2.7 J	4.2 J	3.3 J	14 UJ	3.5 J	2.2 J	3.6 J
4,4'-DDT	1.4 J	1.2 J	1 J	2.2 J	17 UJ	3.6 J	14 UJ	4.4 J	10 U	11 U
ALDRIN	2.4 U	2.3 U	2.2 U	6.5 UJ	8.6 UJ	6.2 UJ	7.1 UJ	6.6 UJ	5.3 U	5.6 U
ALPHA-BHC	2.4 U	2.3 U	2.2 U	6.5 UJ	14 J	12 J	7 J	6.6 UJ	5.3 U	5.6 U
ALPHA-CHLORDANE	2.4 U	2.3 U	2.2 U	3.7 J	8.6 UJ	6.2 UJ	7.1 UJ	6.6 UJ	5.3 U	5.6 U
AROCLOR-1016	24 U	23 U	22 U	69 UJ	86 UJ	62 UJ	71 UJ	66 UJ	53 U	46 U
AROCLOR-1221	24 U	23 U	22 U	69 UJ	86 UJ	62 UJ	71 UJ	66 UJ	53 U	46 U
AROCLOR-1232	24 U	23 U	22 U	69 UJ	86 UJ	62 UJ	71 UJ	66 UJ	53 U	46 U
AROCLOR-1242	24 U	23 U	22 U	160 J	86 UJ	62 UJ	71 UJ	66 UJ	53 U	46 U
AROCLOR-1248	24 U	23 U	22 U	69 UJ	86 UJ	62 UJ	71 UJ	66 UJ	53 U	46 U
AROCLOR-1254	24 U	23 U	22 U	69 UJ	86 UJ	62 UJ	71 UJ	66 UJ	53 U	46 U
AROCLOR-1260	24 U	23 U	22 U	26 J	86 UJ	62 UJ	71 UJ	66 UJ	53 U	46 U
BETA-BHC	2.4 U	2.3 U	2.2 U	6.5 UJ	8.6 UJ	6.2 UJ	7.1 UJ	6.6 UJ	5.3 U	5.6 U
CHLORDANE				65 UJ						
DELTA-BHC	2.4 U	2.3 U	2.2 U	6.5 UJ	8.6 UJ	6.2 UJ	7.1 UJ	6.6 UJ	5.3 U	5.6 U
DIELDRIN	4.7 U	4.5 U	4.3 U	6.5 UJ	17 UJ	12 UJ	14 UJ	13 UJ	10 U	11 U

SEDIMENT DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	017
Sample Location	16SWSD01	16SWSD01	16SWSD01	16SWSD02	16SWSD03	16SWSD04	16SWSD05	16SWSD06	16SWSD07	17SWSD01
Sample Number	16-D-01-1001	16-D-01-1001-AVG	16-D-01-1001-D	16-D-02-1001	16-D-03-1001	16-D-04-1001	16-D-05-1001	16-D-06-1001	16-D-07-1001	17-D-01-1001
Depth Range	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date	10/16/01	10/16/01	10/16/01	10/16/01	10/18/01	10/18/01	10/18/01	10/18/01	10/21/01	10/17/01
ENDOSULFAN I	2.4 U	2.3 U	2.2 U	6.5 UJ	8.6 UJ	6.2 UJ	7.1 UJ	6.6 UJ	5.3 U	5.6 U
ENDOSULFAN II	4.7 U	4.5 U	4.3 U	6.5 UJ	17 UJ	12 UJ	14 UJ	13 UJ	10 U	11 U
ENDOSULFAN SULFATE	4.7 U	4.5 U	4.3 U	6.5 UJ	17 UJ	12 UJ	14 UJ	13 UJ	10 U	2.8 J
ENDRIN	4.7 U	4.5 U	4.3 U	6.5 UJ	17 UJ	12 UJ	14 UJ	13 UJ	10 U	11 U
ENDRIN ALDEHYDE	4.7 U	4.5 U	4.3 U	6.5 UJ	17 UJ	12 UJ	14 UJ	13 UJ	10 U	11 U
ENDRIN KETONE	4.7 U	4.5 U	4.3 U	6.5 UJ	17 UJ	12 UJ	14 UJ	13 UJ	10 U	11 U
GAMMA-BHC (LINDANE)	2.4 U	2.3 U	2.2 U	6.5 UJ	6.4 J	5 J	5.1 J	6.6 UJ	5.3 U	5.6 U
GAMMA-CHLORDANE	2.4 U	2.3 U	2.2 U	3.3 J	8.6 UJ	6.2 UJ	7.1 UJ	6.6 UJ	5.3 U	5.6 U
HEPTACHLOR	2.4 U	2.3 U	2.2 U	6.5 UJ	8.6 UJ	6.2 UJ	7.1 UJ	6.6 UJ	5.3 U	1.5 J
HEPTACHLOR EPOXIDE	2.4 U	2.3 U	2.2 U	6.5 UJ	8.6 UJ	6.2 UJ	7.1 UJ	6.6 UJ	5.3 U	5.6 U
KEPONE				130 UJ						
METHOXYCHLOR	24 U	23 U	22 U	13 UJ	86 UJ	62 UJ	71 UJ	66 UJ	53 U	56 U
TOXAPHENE	47 U	45 U	43 U	260 UJ	170 UJ	120 UJ	140 UJ	130 UJ	100 U	110 U
OrganoPhos Pesticides (ug/kg)										
DISULFOTON				130 UJ						
ETHYL PARATHION				130 UJ						
FAMPHUR				130 UJ						
METHYL PARATHION				130 UJ						
PHORATE				130 UJ						
Herbicides (ug/kg)										
2,4,5-T				77 UJ						
2,4,5-TP (SILVEX)				77 UJ						
2,4-D				310 UJ						
DINOSEB				46 UJ						
Explosives (ug/kg)										
1,3,5-TRINITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
1,3-DINITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4,6-TRINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,4-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2-AMINO-4,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
2-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
3-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-AMINO-2,6-DINITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
4-NITROTOLUENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
HMX	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
NITROBENZENE	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
RDX	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
TETRYL	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U
Inorganics (mg/kg)										
ALUMINUM	4630	4135	3640	37400 J	37800 J	38200 J	45100 J	27800 J	28100	20900
ANTIMONY	0.42 U	0.425 U	0.43 U	1.36 UJ	1.74 UJ	1.30 UJ	1.43 UJ	1.39 UJ	1.05 U	1.18 U
ARSENIC	1.6 U	1.4 U	1.2 U	16.9 J	14.6 J	17.8 J	20.6 J	17.5 J	17.8	9.4
BARIUM	7.3	6.5	5.7	38.1 J	40.2 J	39.2 J	49.6 J	32.3 J	30.8	27.6
BERYLLIUM	0.18	0.1225	0.13 U	1.4 J	1.8 J	1.8 J	1.8 J	1.4 J	0.93	1.3
CADMIUM	0.03 U	0.03 U	0.03 U	0.09 UJ	0.58 U	0.09 UJ	1.11 UJ	0.20 U	0.82 U	0.08 U
CALCIUM	714	788	862	2530 J	3240 J	2740 J	2400 J	2740 J	2250	2410
CHROMIUM	6.9	4.85	5.6 U	58.3 J	68.0 J	71.6 J	60.8 J	54.7 J	54.2	40.2
COBALT	0.69	0.4625	0.47 U	8.8 J	11.7 J	13.5 J	9.5 J	14.1 J	7.7	10.5
COPPER	1.3	1.25	1.2	100 J	50.0 J	33.4 J	45.8 J	36.1 J	17.3	18.4

SEDIMENT DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	016	016	016	016	016	017
Sample Location	16SWSD01	16SWSD01	16SWSD01	16SWSD02	16SWSD03	16SWSD04	16SWSD05	16SWSD06	16SWSD07	17SWSD01
Sample Number	16-D-01-1001	16-D-01-1001-AVG	16-D-01-1001-D	16-D-02-1001	16-D-03-1001	16-D-04-1001	16-D-05-1001	16-D-06-1001	16-D-07-1001	17-D-01-1001
Depth Range	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date	10/16/01	10/16/01	10/16/01	10/16/01	10/18/01	10/18/01	10/18/01	10/18/01	10/21/01	10/17/01
IRON	3830	3775	3720	41800 J	37300 J	31100 J	51400 J	26400 J	30800	24500
LEAD	6.1	5.75	5.4	46.5 J	39.3 J	30.6 J	43.7 J	28.7 J	21	35.2
MAGNESIUM	578	532	486	6030 J	7960 J	7170 J	7200 J	6180 J	6150	5070
MANGANESE	13.5	13.15	12.8	160 J	184 J	126 J	234 J	117 J	171	256
MERCURY	0.02 U	0.015 U	0.01 U	0.16 U	0.14 U	0.11 U	0.29 J	0.1 U	0.12 U	0.39
NICKEL	2.2 U	1.85 U	1.5 U	29.1 J	23.8 J	21.8 J	19.2 J	16.6 U	12.2 U	12.0 U
POTASSIUM	356	320	284	3410 J	3980 J	3540 J	3720 J	2910 J	3440	2480
SELENIUM	0.35 U	0.35 U	0.35 U	1.13 UJ	1.45 UJ	1.5 J	2.6 J	1.4 J	1	0.98 U
SILVER	0.12 U	0.12 U	0.12 U	0.53 U	0.55 U	0.37 UJ	1.63 UJ	0.39 UJ	1.2 U	1.34 U
SODIUM	1760	1620	1480	14800 J	18500 J	13900 J	14800 J	13900 J	10600	11500
THALLIUM	0.54 U	0.57 U	0.60 U	1.76 UJ	2.26 UJ	1.68 UJ	1.86 UJ	1.80 UJ	1.36 U	1.53 U
VANADIUM	8.4	7.75	7.1	65.1 J	70.9 J	79.4 J	77.7 J	64.0 J	66.1	60.9
ZINC	13.4	10.9	8.4	158 J	128 J	95.6 J	135 J	84.1 J	54	73.4
Miscellaneous Parameters (mg/kg)										
CYANIDE	1.4 U	1.35 U	1.3 U	4.0 UJ	5.0 UJ	3.6 UJ	4.1 UJ	3.7 UJ	3.1 U	3.3 U
TOTAL SOLIDS (%)	70 %	73.5 %	77 %	25 %	20 %	27 %	24 %	26 %	32 %	30 %

APPENDIX E-7
QA/QC ANALYTICAL RESULTS

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	017	017	017	017	017
Sample Location	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank -DI Water	Field Blank -DI Water	Field Blank -Driller Plastic Tank
Sample Number	16-F-060501-01	16-F-060501-02	16-F-101901-03	16-F-101901-04	17-F-042703-01	17-F-042703-02	17-F-011405-02	17-F-0305-04	17-F-011405-01
Sample Date	06/05/01	06/05/01	10/19/01	10/19/01	04/27/03	04/27/03	01/14/05	03/01/05	01/14/05
Volatile Organics (ug/L)									
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	5 U	5 U	5 U	5 U	2 J	0.8 J	5 U	5 U	5 U
1,1-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRIMETHYLBENZENE					5 U	5 U			
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-TRIMETHYLBENZENE					5 U	5 U			
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-BUTANONE	5 U	2 J	5 U	5 U	5 U	4 J	4 J	5	5 UR
2-HEXANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	5 J	6	11	5 U	5 UR	5 UR	28 J	26	19 J
BENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMODICHLOROMETHANE	24	5 U	5 U	25	15	5 U	5 U	5 U	3 J
BROMOFORM	12	5 U	5 U	5 J	5 U	5 U	5 U	5 U	5 U
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLORODIBROMOMETHANE	30	5 U	5 U	22	3 J	5 U	5 U	5 U	2 J
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	17	5 U	5 U	21	50	5 U	0.5 J	5 U	3 J
CHLOROMETHANE	2 J	5 U	5 U	5 U	5 U	5 U	5 U	0.3 J	5 U
CIS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DICHLORODIFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.4 J
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
M+P-XYLENES					5 U	10 U	10 U	10 U	2 J
METHYL ACETATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYLENE CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	3 J	5 U
O-XYLENE					5 U	5 U	5 U	5 U	0.9 J
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	5 U	5 U	5 U	5 U	1 J	5 U	5 U	5 U	5 U
TOLUENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	2 J
TOTAL 1,2-DICHLOROETHENE					5 U	10 U	10 U	10 U	10 U
TOTAL XYLENES	5 U	5 U	5 U	5 U	5 U	15 U	15 U	15 U	2 J
TRANS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	017	017	017	017	017
Sample Location	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank -DI Water	Field Blank -DI Water	Field Blank -Driller Plastic Tank
Sample Number	16-F-060501-01	16-F-060501-02	16-F-101901-03	16-F-101901-04	17-F-042703-01	17-F-042703-02	17-F-011405-02	17-F-0305-04	17-F-011405-01
Sample Date	06/05/01	06/05/01	10/19/01	10/19/01	04/27/03	04/27/03	01/14/05	03/01/05	01/14/05
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRICHLOROETHENE	6	3 J	5 U	5 U	2 J	1 J	5 U	0.6 J	5 U
TRICHLOROFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
VINYL CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Semivolatile Organics (ug/L)									
1,1-BIPHENYL	10 U	10 U	10 U	10 U			11 U	10 U	10 U
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	10 U	10 U			11 U	10 U	10 U
2,4,5-TRICHLOROPHENOL	25 U	25 U	25 U	25 U			11 U	25 U	10 U
2,4,6-TRICHLOROPHENOL	10 U	10 U	10 U	10 U			11 U	10 U	10 U
2,4-DICHLOROPHENOL	10 U	10 U	10 U	10 U			11 U	10 U	10 U
2,4-DIMETHYLPHENOL	10 U	10 U	10 U	10 U			11 U	10 U	10 U
2,4-DINITROPHENOL	25 U	25 U	25 U	25 U			27 U	25 U	25 U
2,4-DINITROTOLUENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
2,6-DINITROTOLUENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
2-CHLORONAPHTHALENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
2-CHLOROPHENOL	10 U	10 U	10 U	10 U			11 U	10 U	10 U
2-METHYLNAPHTHALENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
2-METHYLPHENOL	10 U	10 U	10 U	10 U			11 U	10 U	10 U
2-NITROANILINE	25 U	25 U	25 U	25 U			27 U	25 U	25 U
2-NITROPHENOL	10 U	10 U	10 U	10 U			11 U	10 U	10 U
3,3'-DICHLOROBENZIDINE	10 UR	10 UR	10 U	10 U			11 U	10 U	10 U
3-NITROANILINE	25 U	25 U	25 U	25 U			27 U	25 U	25 U
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U	25 U	25 U			27 U	25 U	25 U
4-BROMOPHENYL PHENYL ETHER	10 U	10 U	10 U	10 U			11 U	10 U	10 U
4-CHLORO-3-METHYLPHENOL	10 U	10 U	10 U	10 U			11 U	10 U	10 U
4-CHLOROANILINE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
4-CHLOROPHENYL PHENYL ETHER	10 U	10 U	10 U	10 U			11 U	10 U	10 U
4-METHYLPHENOL	10 U	10 U	10 U	10 U			11 U	10 U	10 U
4-NITROANILINE	25 U	25 U	25 U	25 U			27 U	25 U	25 U
4-NITROPHENOL	25 U	25 U	25 U	25 U			27 U	25 UR	25 U
ACENAPHTHENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
ACENAPHTHYLENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
ACETOPHENONE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
ANTHRACENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
ATRAZINE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
BENZALDEHYDE	10 U	10 U	10 U	10 U			13	15 J	10 U
BENZO(A)ANTHRACENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
BENZO(A)PYRENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
BENZO(B)FLUORANTHENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
BENZO(G,H,I)PERYLENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
BENZO(K)FLUORANTHENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	10 U	10 U			11 U	10 U	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	23	8 J	10 U	10 U			11 U	10 U	10 U
BUTYL BENZYL PHTHALATE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
CAPROLACTAM	10 U	10 U	10 U	10 U			11 U	10 U	10 U
CARBAZOLE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
CHRYSENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
DI-N-BUTYL PHTHALATE	0.6 J	0.7 J	10 U	10 U			11 U	3 J	10 U
DI-N-OCTYL PHTHALATE	10 U	10 U	10 U	10 U			11 U	10 U	10 U

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	017	017	017	017	017
Sample Location	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank -DI Water	Field Blank -DI Water	Field Blank -Driller Plastic Tank
Sample Number	16-F-060501-01	16-F-060501-02	16-F-101901-03	16-F-101901-04	17-F-042703-01	17-F-042703-02	17-F-011405-02	17-F-0305-04	17-F-011405-01
Sample Date	06/05/01	06/05/01	10/19/01	10/19/01	04/27/03	04/27/03	01/14/05	03/01/05	01/14/05
DIBENZO(A,H)ANTHRACENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
DIBENZOFURAN	10 U	10 U	10 U	10 U			11 U	10 U	10 U
DIETHYL PHTHALATE	10 U	10 U	10 U	10 U			11 U	10 U	2 J
DIMETHYL PHTHALATE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
FLUORANTHENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
FLUORENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
HEXACHLOROBENZENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
HEXACHLOROBUTADIENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
HEXACHLOROETHANE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
INDENO(1,2,3-CD)PYRENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
ISOPHORONE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
N-NITROSODIPHENYLAMINE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
NAPHTHALENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
NITROBENZENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
PENTACHLOROPHENOL	25 U	25 U	25 U	25 U			27 U	25 UR	25 U
PHENANTHRENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
PHENOL	10 U	10 U	10 U	10 U			11 U	10 U	10 J
PYRENE	10 U	10 U	10 U	10 U			11 U	10 U	10 U
Pesticides/PCBs (ug/L)									
4,4'-DDD	0.1 U	0.1 U	0.1 U	0.1 U			0.1 U	0.1 U	0.1 U
4,4'-DDE	0.1 U	0.1 U	0.1 U	0.1 U			0.1 U	0.1 U	0.1 U
4,4'-DDT	0.1 U	0.1 U	0.1 U	0.1 U			0.1 U	0.1 U	0.1 U
ALDRIN	0.05 U	0.05 U	0.05 U	0.05 U			0.05 U	0.05 U	0.05 U
ALPHA-BHC	0.05 U	0.05 U	0.05 U	0.05 U			0.05 U	0.05 U	0.05 U
ALPHA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U			0.05 U	0.05 U	0.05 U
AROCLOR-1016	0.5 U	0.5 U	0.5 U	0.5 U			0.51 U	0.5 U	0.5 U
AROCLOR-1221	0.5 U	0.5 U	0.5 U	0.5 U			0.51 U	0.5 U	0.5 U
AROCLOR-1232	0.5 U	0.5 U	0.5 U	0.5 U			0.51 U	0.5 U	0.5 U
AROCLOR-1242	0.5 U	0.5 U	0.5 U	0.5 U			0.51 U	0.5 U	0.5 U
AROCLOR-1248	0.5 U	0.5 U	0.5 U	0.5 U			0.51 U	0.5 U	0.5 U
AROCLOR-1254	0.5 U	0.5 U	0.5 U	0.5 U			0.51 U	0.5 U	0.5 U
AROCLOR-1260	0.5 U	0.5 U	0.5 U	0.5 U			0.51 U	0.5 U	0.5 U
BETA-BHC	0.05 U	0.05 U	0.05 U	0.05 U			0.05 U	0.05 U	0.05 U
DELTA-BHC	0.05 U	0.05 U	0.05 U	0.05 U			0.05 U	0.05 U	0.05 U
DIELDRIN	0.1 U	0.1 U	0.1 U	0.1 U			0.1 U	0.1 U	0.1 U
ENDOSULFAN I	0.05 U	0.05 U	0.05 U	0.05 U			0.05 U	0.05 U	0.05 U
ENDOSULFAN II	0.1 U	0.1 U	0.1 U	0.1 U			0.1 U	0.1 U	0.1 U
ENDOSULFAN SULFATE	0.1 U	0.1 U	0.1 UJ	0.1 UJ			0.1 U	0.1 U	0.1 U
ENDRIN	0.1 U	0.1 U	0.1 U	0.1 U			0.1 U	0.1 U	0.1 U
ENDRIN ALDEHYDE	0.1 U	0.1 U	0.1 U	0.1 U			0.1 U	0.1 U	0.1 U
ENDRIN KETONE	0.1 U	0.1 U	0.1 UJ	0.1 UJ			0.1 U	0.1 U	0.1 U
GAMMA-BHC (LINDANE)	0.025 J	0.05 U	0.05 U	0.05 U			0.05 U	0.05 U	0.05 U
GAMMA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U			0.05 U	0.05 U	0.05 U
HEPTACHLOR	0.05 U	0.05 U	0.05 U	0.05 U			0.05 U	0.05 U	0.05 U
HEPTACHLOR EPOXIDE	0.05 U	0.05 U	0.05 U	0.05 U			0.05 U	0.05 U	0.05 U
METHOXYCHLOR	0.5 U	0.5 U	0.5 U	0.5 U			0.5 U	0.5 U	0.5 U
TOXAPHENE	1 U	1 U	1 U	1 U			1 U	1 U	1 U
Explosives (ug/L)									

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	016	016	016	016	017	017	017	017	017
Sample Location	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank -DI Water	Field Blank -DI Water	Field Blank -Driller Plastic Tank
Sample Number	16-F-060501-01	16-F-060501-02	16-F-101901-03	16-F-101901-04	17-F-042703-01	17-F-042703-02	17-F-011405-02	17-F-0305-04	17-F-011405-01
Sample Date	06/05/01	06/05/01	10/19/01	10/19/01	04/27/03	04/27/03	01/14/05	03/01/05	01/14/05
1,3,5-TRINITROBENZENE									
1,3-DINITROBENZENE									
2,4,6-TRINITROTOLUENE									
2,4-DINITROTOLUENE									
2,6-DINITROTOLUENE									
2-AMINO-4,6-DINITROTOLUENE									
2-NITROTOLUENE									
3-NITROTOLUENE									
4-AMINO-2,6-DINITROTOLUENE									
4-NITROTOLUENE									
HMX									
NITROBENZENE									
RDX									
TETRYL									
Inorganics (ug/L)									
ALUMINUM	86	29.5 U	33.6	136			18.3 U	20.5 U	1090
ANTIMONY	3.7 U	3.7 U	3.65 U	3.65 U			2.34 U	3.54 U	2.34 U
ARSENIC	2.5 U	2.5 U	2.53 U	2.53 U			3.03 U	2.81 U	3.03 U
BARIUM	11	0.15 U	0.15 U	14.1 U			0.17 U	0.50 U	10.4
BERYLLIUM	0.74	0.18 U	0.18 U	0.18 U			0.41	0.40 U	0.96
CADMIUM	0.67	0.24 U	0.24 U	0.24 U			0.3 U	2.29 U	0.3 U
CALCIUM	18200	19.4	7.68 U	20800			9.6	53.9	12200
CHROMIUM	0.57 U	0.57 U	0.57 U	0.57 U			0.8 U	2.6	0.8 U
COBALT	1	0.92 U	0.92 U	0.92 U			0.64 U	4.3 U	0.64 U
COPPER	4.2	2	0.84 U	20			0.86 U	3	13.8
IRON	165	16.5 U	22	128			10.7 U	13.7	4000
LEAD	1.5 U	1.5 U	1.48 U	1.48 U			1.7 U	2.07 U	1.7 U
MAGNESIUM	1280	7.1 U	16.1	1480			7.52 U	33.7 U	2270
MANGANESE	17.8	0.1	0.12	5			0.64	0.91 U	52.6
MERCURY	0.03 U	0.03 U	0.03 U	0.06			0.02	0.02 U	0.02
NICKEL	0.94	0.72 U	1.3	1.2			0.85 U	64.4	1.1
POTASSIUM	1190	15.1 U	305.21 U	3440			238 U	621 U	2610
SELENIUM	3 U	3 U	3.04 U	3.04 U			3.71 U	4.08 U	3.71 U
SILVER	1 U	1 U	1.03 U	1.03 U			0.7 U	3.93 U	0.7 U
SODIUM	11300	184 U	91.7	23500			179	182	13300
THALLIUM	4.7 U	4.7 U	4.74 U	4.74 U			4.09 U	4.26 U	4.09 U
VANADIUM	4.9	0.78	0.52 U	1.8			0.75 U	5.07 U	0.75 U
ZINC	2.4	0.47 U	0.47 U	8.1			0.29	30.9	65.2
Miscellaneous Parameters (ug/L)									
CYANIDE	10 U	10 U	10 U	10 U			10 U	10 U	10 U

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	016	016	016	017	017	017
Sample Location	Field Blank -Fire Hydrant	Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank	Trip Blank
Sample Number	17-F-0305-03	17-R-060501-01	17-R-060601-02	17-R-060701-03	16-R-061101-04	16-R-101901-05	16-R-101901-06	17-R-042803-01	17-R-042803-02	17-T-060501-01
Sample Date	03/01/05	06/05/01	06/06/01	06/07/01	06/11/01	10/19/01	10/19/01	04/28/03	04/28/03	06/05/01
Volatile Organics (ug/L)										
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRIMETHYLBENZENE								5 U	5 U	
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-TRIMETHYLBENZENE								5 U	5 U	
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-BUTANONE	5 U	3 J	4 J	4 J	5 U	5 U	5 U	3 J	3 J	5 U
2-HEXANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	3 J	8	6	8	9	12	9	5 UR	5 UR	3 J
BENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMODICHLOROMETHANE	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLORODIBROMOMETHANE	4 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	3 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	0.9 J	5 U	5 U	5 U	5 U
CIS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DICHLORODIFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
M+P-XYLENES	10 U							10 U	10 U	
METHYL ACETATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE	5 U	5 U	2 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYLENE CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
O-XYLENE	5 U							5 U	5 U	
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	5 U	5 U	5 U	0.8 J	5 U	5 U	5 U	5 U	5 U	5 U
TOLUENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOTAL 1,2-DICHLOROETHENE	10 U							10 U	10 U	
TOTAL XYLENES	15 U	5 U	5 U	5 U	5 U	5 U	5 U	15 U	15 U	5 U
TRANS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	016	016	016	017	017	017
Sample Location	Field Blank -Fire Hydrant	Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank	Trip Blank
Sample Number	17-F-0305-03	17-R-060501-01	17-R-060601-02	17-R-060701-03	16-R-061101-04	16-R-101901-05	16-R-101901-06	17-R-042803-01	17-R-042803-02	17-T-060501-01
Sample Date	03/01/05	06/05/01	06/06/01	06/07/01	06/11/01	10/19/01	10/19/01	04/28/03	04/28/03	06/05/01
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRICHLOROETHENE	1 J	8	1 J	0.9 J	0.7 J	5 U	5 U	1 J	2 J	5 U
TRICHLOROFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
VINYL CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Semivolatile Organics (ug/L)										
1,1-BIPHENYL	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
2,4,5-TRICHLOROPHENOL	25 U	25 U	25 U	25 U	25 U	25 U	25 U			
2,4,6-TRICHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
2,4-DICHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
2,4-DIMETHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
2,4-DINITROPHENOL	25 U	25 U	25 U	25 U	25 U	25 U	25 U			
2,4-DINITROTOLUENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
2,6-DINITROTOLUENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
2-CHLORONAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
2-CHLOROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
2-METHYLNAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
2-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
2-NITROANILINE	25 U	25 U	25 U	25 U	25 U	25 U	25 U			
2-NITROPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
3,3'-DICHLOROBENZIDINE	10 U	10 UR	10 UR	10 UR	10 UR	10 U	10 U			
3-NITROANILINE	25 U	25 U	25 U	25 U	25 U	25 U	25 U			
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U	25 U	25 U	25 U	25 U	25 U			
4-BROMOPHENYL PHENYL ETHER	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
4-CHLORO-3-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
4-CHLOROANILINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
4-CHLOROPHENYL PHENYL ETHER	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
4-METHYLPHENOL	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
4-NITROANILINE	25 U	25 U	25 UJ	25 UJ	25 U	25 U	25 U			
4-NITROPHENOL	25 UR	25 U	25 U	25 U	25 U	25 U	25 U			
ACENAPHTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
ACENAPHTHYLENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
ACETOPHENONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
ATRAZINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
BENZALDEHYDE	5 J	10 U	10 U	10 U	10 U	10 U	10 U			
BENZO(A)ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
BENZO(A)PYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
BENZO(B)FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
BENZO(G,H,I)PERYLENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
BENZO(K)FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	8 J	10	9 J	10 U	10 U	10 U			
BUTYL BENZYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
CAPROLACTAM	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
CARBAZOLE	10 U	10 U	10 U	10 U	0.7 J	10 U	10 U			
CHRYSENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
DI-N-BUTYL PHTHALATE	2 J	0.7 J	0.7 J	2 J	2 J	10 U	10 U			
DI-N-OCTYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	016	016	016	017	017	017
Sample Location	Field Blank -Fire Hydrant	Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank	Trip Blank
Sample Number	17-F-0305-03	17-R-060501-01	17-R-060601-02	17-R-060701-03	16-R-061101-04	16-R-101901-05	16-R-101901-06	17-R-042803-01	17-R-042803-02	17-T-060501-01
Sample Date	03/01/05	06/05/01	06/06/01	06/07/01	06/11/01	10/19/01	10/19/01	04/28/03	04/28/03	06/05/01
DIBENZO(A,H)ANTHRACENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
DIBENZOFURAN	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
DIETHYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
DIMETHYL PHTHALATE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
FLUORANTHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
FLUORENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
HEXACHLOROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
HEXACHLOROBUTADIENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
HEXACHLOROETHANE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
INDENO(1,2,3-CD)PYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
ISOPHORONE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
N-NITROSODIPHENYLAMINE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
NAPHTHALENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
NITROBENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
PENTACHLOROPHENOL	25 UR	25 U	25 U	25 U	25 U	25 U	25 U			
PHENANTHRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
PHENOL	10 U	10 U	10 U	10 U	6 J	10 U	10 U			
PYRENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
Pesticides/PCBs (ug/L)										
4,4'-DDD	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U					
4,4'-DDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U					
4,4'-DDT	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U					
ALDRIN	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U					
ALPHA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U					
ALPHA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U					
AROCLOR-1016	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U					
AROCLOR-1221	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U					
AROCLOR-1232	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U					
AROCLOR-1242	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U					
AROCLOR-1248	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U					
AROCLOR-1254	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U					
AROCLOR-1260	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U					
BETA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U					
DELTA-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U					
DIELDRIN	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U					
ENDOSULFAN I	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U					
ENDOSULFAN II	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U					
ENDOSULFAN SULFATE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U					
ENDRIN	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U					
ENDRIN ALDEHYDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U					
ENDRIN KETONE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U					
GAMMA-BHC (LINDANE)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U					
GAMMA-CHLORDANE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U					
HEPTACHLOR	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U					
HEPTACHLOR EPOXIDE	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U					
METHOXYCHLOR	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U					
TOXAPHENE	1 U	1 U	1 U	1 U	1 U					
Explosives (ug/L)										

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	016	016	016	017	017	017
Sample Location	Field Blank -Fire Hydrant	Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank	Trip Blank
Sample Number	17-F-0305-03	17-R-060501-01	17-R-060601-02	17-R-060701-03	16-R-061101-04	16-R-101901-05	16-R-101901-06	17-R-042803-01	17-R-042803-02	17-T-060501-01
Sample Date	03/01/05	06/05/01	06/06/01	06/07/01	06/11/01	10/19/01	10/19/01	04/28/03	04/28/03	06/05/01
1,3,5-TRINITROBENZENE			0.6 U	0.6 U						
1,3-DINITROBENZENE			0.6 U	0.6 U						
2,4,6-TRINITROTOLUENE			0.6 U	0.6 U						
2,4-DINITROTOLUENE			0.6 U	0.6 U						
2,6-DINITROTOLUENE			0.6 U	0.6 U						
2-AMINO-4,6-DINITROTOLUENE			0.6 U	0.6 U						
2-NITROTOLUENE			0.6 U	0.6 U						
3-NITROTOLUENE			0.6 U	0.6 U						
4-AMINO-2,6-DINITROTOLUENE			0.6 U	0.6 U						
4-NITROTOLUENE			0.6 U	0.6 U						
HMX			1.5 U	1.5 U						
NITROBENZENE			0.6 U	0.6 U						
RDX			1.5 U	21 U						
TETRYL			0.6 U	0.6 U						
Inorganics (ug/L)										
ALUMINUM	134	29.5 U	59.7	117	29.5 U	34.1	31			
ANTIMONY	3.54 U	3.7 U	6.2	3.7 U	4.8	3.65 U	3.65 U			
ARSENIC	2.81 U	2.5 U	2.5 U	2.5 U	2.5 U	2.53 U	2.53 U			
BARIUM	13.1	1.8	0.15 U	0.15 U	0.55	0.15 U	0.15 U			
BERYLLIUM	0.40 U	0.31	0.32	0.79	0.18 U	0.18 U	0.18 U			
CADMIUM	2.29 U	0.24 U	0.24 U	0.59	0.24 U	0.24 U	0.24 U			
CALCIUM	9100	123	7.7 U	7.7 U	91.2	7.68 U	7.68 U			
CHROMIUM	2.8	3.2	0.57 U	0.57 U	0.95	0.57 U	0.57 U			
COBALT	4.3 U	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U			
COPPER	6.6	9.5	0.84 U	0.84 U	0.84 U	0.84 U	0.84 U			
IRON	61.6	1060	34.1	40.9	95.2	21.2	16.46 U			
LEAD	2.07 U	1.5 U	1.5 U	1.5 U	1.5 U	2.2	2			
MAGNESIUM	2350	14	11.9	7.1 U	12.6	7.06 U	7.06 U			
MANGANESE	6.7	12.1	0.7	0.1 U	2.6	0.18	0.14			
MERCURY	0.02 U	0.03 U	0.03 U	0.03 U	0.03 U	0.04	0.07			
NICKEL	11.6 U	2.8	1.2	0.72 U	0.72 U	0.72 U	1.1			
POTASSIUM	2970	62.5	21	15.1 U	28.7	305.21 U	305.21 U			
SELENIUM	4.08 U	3 U	3 U	3.7	3 U	3.04 U	3.04 U			
SILVER	3.93 U	1 U	1 U	1 U	1 U	1.03 U	1.03 U			
SODIUM	25600	480	269	184 U	549	54.6	60.3			
THALLIUM	4.26 U	4.7 U	4.7 U	4.7 U	4.7 U	4.74 U	4.74 U			
VANADIUM	5.07 U	1.4	0.72	1.2	0.52 U	0.53	0.52 U			
ZINC	4.7	8.3	0.47 U	0.84	0.95	0.47 U	0.47 U			
Miscellaneous Parameters (ug/L)										
CYANIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U			

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	016	016	017	016	016	016	017	017
Sample Location	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank
Sample Number	17-T-060601-02	17-T-060701-03	16-T-061101-04	16-T-101601-06	17-T-101701-07	16-T-101801-08	16-T-101901-05	16-T-101901-09	17-T-030702-10	17-T-030802-11
Sample Date	06/06/01	06/07/01	06/11/01	10/16/01	10/17/01	10/18/01	10/19/01	10/19/01	03/07/02	03/08/02
Volatile Organics (ug/L)										
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRIMETHYLBENZENE										
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-TRIMETHYLBENZENE										
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-BUTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-HEXANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	2 J	5 U	5 U	5 U	5 U	5 U
ACETONE	2 J	2 J	6	5 U	2 J	5 U	5 U	5 U	5 U	5 UR
BENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLORODIBROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CIS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DICHLORODIFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
M+P-XYLENES										
METHYL ACETATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYLENE CHLORIDE	0.6 J	5 U	5 U	5 U	5 U	5 U	0.7 J	5 U	5 U	5 U
O-XYLENE										
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	5 U	1 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOLUENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOTAL 1,2-DICHLOROETHENE										
TOTAL XYLENES	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	016	016	017	016	016	016	017	017
Sample Location	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank
Sample Number	17-T-060601-02	17-T-060701-03	16-T-061101-04	16-T-101601-06	17-T-101701-07	16-T-101801-08	16-T-101901-05	16-T-101901-09	17-T-030702-10	17-T-030802-11
Sample Date	06/06/01	06/07/01	06/11/01	10/16/01	10/17/01	10/18/01	10/19/01	10/19/01	03/07/02	03/08/02
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRICHLOROETHENE	1 J	2 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRICHLOROFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
VINYL CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Semivolatile Organics (ug/L)										
1,1-BIPHENYL										
2,2'-OXYBIS(1-CHLOROPROPANE)										
2,4,5-TRICHLOROPHENOL										
2,4,6-TRICHLOROPHENOL										
2,4-DICHLOROPHENOL										
2,4-DIMETHYLPHENOL										
2,4-DINITROPHENOL										
2,4-DINITROTOLUENE										
2,6-DINITROTOLUENE										
2-CHLORONAPHTHALENE										
2-CHLOROPHENOL										
2-METHYLNAPHTHALENE										
2-METHYLPHENOL										
2-NITROANILINE										
2-NITROPHENOL										
3,3'-DICHLOROBENZIDINE										
3-NITROANILINE										
4,6-DINITRO-2-METHYLPHENOL										
4-BROMOPHENYL PHENYL ETHER										
4-CHLORO-3-METHYLPHENOL										
4-CHLOROANILINE										
4-CHLOROPHENYL PHENYL ETHER										
4-METHYLPHENOL										
4-NITROANILINE										
4-NITROPHENOL										
ACENAPHTHENE										
ACENAPHTHYLENE										
ACETOPHENONE										
ANTHRACENE										
ATRAZINE										
BENZALDEHYDE										
BENZO(A)ANTHRACENE										
BENZO(A)PYRENE										
BENZO(B)FLUORANTHENE										
BENZO(G,H,I)PERYLENE										
BENZO(K)FLUORANTHENE										
BIS(2-CHLOROETHOXY)METHANE										
BIS(2-CHLOROETHYL)ETHER										
BIS(2-ETHYLHEXYL)PHTHALATE										
BUTYL BENZYL PHTHALATE										
CAPROLACTAM										
CARBAZOLE										
CHRYSENE										
DI-N-BUTYL PHTHALATE										
DI-N-OCTYL PHTHALATE										

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	016	016	017	016	016	016	017	017
Sample Location	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank
Sample Number	17-T-060601-02	17-T-060701-03	16-T-061101-04	16-T-101601-06	17-T-101701-07	16-T-101801-08	16-T-101901-05	16-T-101901-09	17-T-030702-10	17-T-030802-11
Sample Date	06/06/01	06/07/01	06/11/01	10/16/01	10/17/01	10/18/01	10/19/01	10/19/01	03/07/02	03/08/02
DIBENZO(A,H)ANTHRACENE										
DIBENZOFURAN										
DIETHYL PHTHALATE										
DIMETHYL PHTHALATE										
FLUORANTHENE										
FLUORENE										
HEXACHLOROBENZENE										
HEXACHLOROBUTADIENE										
HEXACHLOROCYCLOPENTADIENE										
HEXACHLOROETHANE										
INDENO(1,2,3-CD)PYRENE										
ISOPHORONE										
N-NITROSO-DI-N-PROPYLAMINE										
N-NITROSODIPHENYLAMINE										
NAPHTHALENE										
NITROBENZENE										
PENTACHLOROPHENOL										
PHENANTHRENE										
PHENOL										
PYRENE										
Pesticides/PCBs (ug/L)										
4,4'-DDD										
4,4'-DDE										
4,4'-DDT										
ALDRIN										
ALPHA-BHC										
ALPHA-CHLORDANE										
AROCLOR-1016										
AROCLOR-1221										
AROCLOR-1232										
AROCLOR-1242										
AROCLOR-1248										
AROCLOR-1254										
AROCLOR-1260										
BETA-BHC										
DELTA-BHC										
DIELDRIN										
ENDOSULFAN I										
ENDOSULFAN II										
ENDOSULFAN SULFATE										
ENDRIN										
ENDRIN ALDEHYDE										
ENDRIN KETONE										
GAMMA-BHC (LINDANE)										
GAMMA-CHLORDANE										
HEPTACHLOR										
HEPTACHLOR EPOXIDE										
METHOXYCHLOR										
TOXAPHENE										
Explosives (ug/L)										

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	016	016	017	016	016	016	017	017
Sample Location	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank
Sample Number	17-T-060601-02	17-T-060701-03	16-T-061101-04	16-T-101601-06	17-T-101701-07	16-T-101801-08	16-T-101901-05	16-T-101901-09	17-T-030702-10	17-T-030802-11
Sample Date	06/06/01	06/07/01	06/11/01	10/16/01	10/17/01	10/18/01	10/19/01	10/19/01	03/07/02	03/08/02
1,3,5-TRINITROBENZENE										
1,3-DINITROBENZENE										
2,4,6-TRINITROTOLUENE										
2,4-DINITROTOLUENE										
2,6-DINITROTOLUENE										
2-AMINO-4,6-DINITROTOLUENE										
2-NITROTOLUENE										
3-NITROTOLUENE										
4-AMINO-2,6-DINITROTOLUENE										
4-NITROTOLUENE										
HMX										
NITROBENZENE										
RDX										
TETRYL										
Inorganics (ug/L)										
ALUMINUM										
ANTIMONY										
ARSENIC										
BARIUM										
BERYLLIUM										
CADMIUM										
CALCIUM										
CHROMIUM										
COBALT										
COPPER										
IRON										
LEAD										
MAGNESIUM										
MANGANESE										
MERCURY										
NICKEL										
POTASSIUM										
SELENIUM										
SILVER										
SODIUM										
THALLIUM										
VANADIUM										
ZINC										
Miscellaneous Parameters (ug/L)										
CYANIDE										

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank
Sample Number	17-T-030902-12	17-T-042603-1	17-T-042703-02	17-T-011305-01	17-T-011505-01	TB-011605-01	17-T-011705-01	17-T-011805-01	17-T-021405-01	17-T-022305-01
Sample Date	03/09/02	04/26/03	04/27/03	01/13/05	01/15/05	01/16/05	01/17/05	01/18/05	02/14/05	02/23/05
Volatile Organics (ug/L)										
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRICHLOROBENZENE	5 U	5 U	0.4 J	5 U	5 U	0.5 J	5 U	5 U	5 U	5 U
1,2,4-TRIMETHYLBENZENE		5 U	5 U							
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-TRIMETHYLBENZENE		5 U	5 U							
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-BUTANONE	5 U	5 U	5 U	5 UR	5 UR	5 U	5 UR	5 UR	5 UR	5 U
2-HEXANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	5 U	5 U	5 U	19 J	5 UR	5 U	19 J	19 J	5 UR	2 J
BENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLORODIBROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CIS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DICHLORODIFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
M+P-XYLENES		5 U	5 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
METHYL ACETATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYLENE CHLORIDE	5 U	5 U	5 U	5 U	5 U	4 J	4 J	2 J	5 U	3 J
O-XYLENE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOLUENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOTAL 1,2-DICHLOROETHENE		5 U	5 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TOTAL XYLENES	5 U	5 U	5 U	15 U	15 U	15 U	15 U	15 U	15 U	15 U
TRANS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank
Sample Number	17-T-030902-12	17-T-042603-1	17-T-042703-02	17-T-011305-01	17-T-011505-01	TB-011605-01	17-T-011705-01	17-T-011805-01	17-T-021405-01	17-T-022305-01
Sample Date	03/09/02	04/26/03	04/27/03	01/13/05	01/15/05	01/16/05	01/17/05	01/18/05	02/14/05	02/23/05
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRICHLOROETHENE	5 U	5 U	3 J	5 U	5 U	5 U	0.4 J	5 U	5 U	5 U
TRICHLOROFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
VINYL CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Semivolatile Organics (ug/L)										
1,1-BIPHENYL										
2,2'-OXYBIS(1-CHLOROPROPANE)										
2,4,5-TRICHLOROPHENOL										
2,4,6-TRICHLOROPHENOL										
2,4-DICHLOROPHENOL										
2,4-DIMETHYLPHENOL										
2,4-DINITROPHENOL										
2,4-DINITROTOLUENE										
2,6-DINITROTOLUENE										
2-CHLORONAPHTHALENE										
2-CHLOROPHENOL										
2-METHYLNAPHTHALENE										
2-METHYLPHENOL										
2-NITROANILINE										
2-NITROPHENOL										
3,3'-DICHLOROBENZIDINE										
3-NITROANILINE										
4,6-DINITRO-2-METHYLPHENOL										
4-BROMOPHENYL PHENYL ETHER										
4-CHLORO-3-METHYLPHENOL										
4-CHLOROANILINE										
4-CHLOROPHENYL PHENYL ETHER										
4-METHYLPHENOL										
4-NITROANILINE										
4-NITROPHENOL										
ACENAPHTHENE										
ACENAPHTHYLENE										
ACETOPHENONE										
ANTHRACENE										
ATRAZINE										
BENZALDEHYDE										
BENZO(A)ANTHRACENE										
BENZO(A)PYRENE										
BENZO(B)FLUORANTHENE										
BENZO(G,H,I)PERYLENE										
BENZO(K)FLUORANTHENE										
BIS(2-CHLOROETHOXY)METHANE										
BIS(2-CHLOROETHYL)ETHER										
BIS(2-ETHYLHEXYL)PHTHALATE										
BUTYL BENZYL PHTHALATE										
CAPROLACTAM										
CARBAZOLE										
CHRYSENE										
DI-N-BUTYL PHTHALATE										
DI-N-OCTYL PHTHALATE										

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank
Sample Number	17-T-030902-12	17-T-042603-1	17-T-042703-02	17-T-011305-01	17-T-011505-01	TB-011605-01	17-T-011705-01	17-T-011805-01	17-T-021405-01	17-T-022305-01
Sample Date	03/09/02	04/26/03	04/27/03	01/13/05	01/15/05	01/16/05	01/17/05	01/18/05	02/14/05	02/23/05
DIBENZO(A,H)ANTHRACENE										
DIBENZOFURAN										
DIETHYL PHTHALATE										
DIMETHYL PHTHALATE										
FLUORANTHENE										
FLUORENE										
HEXACHLOROBENZENE										
HEXACHLOROBUTADIENE										
HEXACHLOROCYCLOPENTADIENE										
HEXACHLOROETHANE										
INDENO(1,2,3-CD)PYRENE										
ISOPHORONE										
N-NITROSO-DI-N-PROPYLAMINE										
N-NITROSODIPHENYLAMINE										
NAPHTHALENE										
NITROBENZENE										
PENTACHLOROPHENOL										
PHENANTHRENE										
PHENOL										
PYRENE										
Pesticides/PCBs (ug/L)										
4,4'-DDD										
4,4'-DDE										
4,4'-DDT										
ALDRIN										
ALPHA-BHC										
ALPHA-CHLORDANE										
AROCLOR-1016										
AROCLOR-1221										
AROCLOR-1232										
AROCLOR-1242										
AROCLOR-1248										
AROCLOR-1254										
AROCLOR-1260										
BETA-BHC										
DELTA-BHC										
DIELDRIN										
ENDOSULFAN I										
ENDOSULFAN II										
ENDOSULFAN SULFATE										
ENDRIN										
ENDRIN ALDEHYDE										
ENDRIN KETONE										
GAMMA-BHC (LINDANE)										
GAMMA-CHLORDANE										
HEPTACHLOR										
HEPTACHLOR EPOXIDE										
METHOXYCHLOR										
TOXAPHENE										
Explosives (ug/L)										

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank
Sample Number	17-T-030902-12	17-T-042603-1	17-T-042703-02	17-T-011305-01	17-T-011505-01	TB-011605-01	17-T-011705-01	17-T-011805-01	17-T-021405-01	17-T-022305-01
Sample Date	03/09/02	04/26/03	04/27/03	01/13/05	01/15/05	01/16/05	01/17/05	01/18/05	02/14/05	02/23/05
1,3,5-TRINITROBENZENE										
1,3-DINITROBENZENE										
2,4,6-TRINITROTOLUENE										
2,4-DINITROTOLUENE										
2,6-DINITROTOLUENE										
2-AMINO-4,6-DINITROTOLUENE										
2-NITROTOLUENE										
3-NITROTOLUENE										
4-AMINO-2,6-DINITROTOLUENE										
4-NITROTOLUENE										
HMX										
NITROBENZENE										
RDX										
TETRYL										
Inorganics (ug/L)										
ALUMINUM										
ANTIMONY										
ARSENIC										
BARIUM										
BERYLLIUM										
CADMIUM										
CALCIUM										
CHROMIUM										
COBALT										
COPPER										
IRON										
LEAD										
MAGNESIUM										
MANGANESE										
MERCURY										
NICKEL										
POTASSIUM										
SELENIUM										
SILVER										
SODIUM										
THALLIUM										
VANADIUM										
ZINC										
Miscellaneous Parameters (ug/L)										
CYANIDE										

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank
Sample Number	17-T-022405-02	17-T-022505-03	17-T-022605-04	17-T-022705-05	17-T-022805-06	17-T-030105-07	17-T-030805-08	17-T-030905-09	17-T-031005-10	17-T-031105-11
Sample Date	02/24/05	02/25/05	02/26/05	02/27/05	02/28/05	03/01/05	03/08/05	03/09/05	03/10/05	03/11/05
Volatile Organics (ug/L)										
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRIMETHYLBENZENE										
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-TRIMETHYLBENZENE										
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-BUTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-HEXANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	5 UR	5 UR	5 U	5 U	5 U	5 UR	5 UR	5 J	3 J	3 J
BENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLORODIBROMOMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CIS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DICHLORODIFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
M+P-XYLENES	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
METHYL ACETATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYLENE CHLORIDE	5 U	2 J	5 U	5 U	5 U	2 J	2 J	3 J	5 U	5 U
O-XYLENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOLUENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOTAL 1,2-DICHLOROETHENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TOTAL XYLENES	15 U	15 U	15 U	15 U	15 U	15 U	15 U	15 U	15 U	15 U
TRANS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank
Sample Number	17-T-022405-02	17-T-022505-03	17-T-022605-04	17-T-022705-05	17-T-022805-06	17-T-030105-07	17-T-030805-08	17-T-030905-09	17-T-031005-10	17-T-031105-11
Sample Date	02/24/05	02/25/05	02/26/05	02/27/05	02/28/05	03/01/05	03/08/05	03/09/05	03/10/05	03/11/05
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRICHLOROETHENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRICHLOROFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
VINYL CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Semivolatile Organics (ug/L)										
1,1-BIPHENYL										
2,2'-OXYBIS(1-CHLOROPROPANE)										
2,4,5-TRICHLOROPHENOL										
2,4,6-TRICHLOROPHENOL										
2,4-DICHLOROPHENOL										
2,4-DIMETHYLPHENOL										
2,4-DINITROPHENOL										
2,4-DINITROTOLUENE										
2,6-DINITROTOLUENE										
2-CHLORONAPHTHALENE										
2-CHLOROPHENOL										
2-METHYLNAPHTHALENE										
2-METHYLPHENOL										
2-NITROANILINE										
2-NITROPHENOL										
3,3'-DICHLOROBENZIDINE										
3-NITROANILINE										
4,6-DINITRO-2-METHYLPHENOL										
4-BROMOPHENYL PHENYL ETHER										
4-CHLORO-3-METHYLPHENOL										
4-CHLOROANILINE										
4-CHLOROPHENYL PHENYL ETHER										
4-METHYLPHENOL										
4-NITROANILINE										
4-NITROPHENOL										
ACENAPHTHENE										
ACENAPHTHYLENE										
ACETOPHENONE										
ANTHRACENE										
ATRAZINE										
BENZALDEHYDE										
BENZO(A)ANTHRACENE										
BENZO(A)PYRENE										
BENZO(B)FLUORANTHENE										
BENZO(G,H,I)PERYLENE										
BENZO(K)FLUORANTHENE										
BIS(2-CHLOROETHOXY)METHANE										
BIS(2-CHLOROETHYL)ETHER										
BIS(2-ETHYLHEXYL)PHTHALATE										
BUTYL BENZYL PHTHALATE										
CAPROLACTAM										
CARBAZOLE										
CHRYSENE										
DI-N-BUTYL PHTHALATE										
DI-N-OCTYL PHTHALATE										

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank
Sample Number	17-T-022405-02	17-T-022505-03	17-T-022605-04	17-T-022705-05	17-T-022805-06	17-T-030105-07	17-T-030805-08	17-T-030905-09	17-T-031005-10	17-T-031105-11
Sample Date	02/24/05	02/25/05	02/26/05	02/27/05	02/28/05	03/01/05	03/08/05	03/09/05	03/10/05	03/11/05
DIBENZO(A,H)ANTHRACENE										
DIBENZOFURAN										
DIETHYL PHTHALATE										
DIMETHYL PHTHALATE										
FLUORANTHENE										
FLUORENE										
HEXACHLOROBENZENE										
HEXACHLOROBUTADIENE										
HEXACHLOROCYCLOPENTADIENE										
HEXACHLOROETHANE										
INDENO(1,2,3-CD)PYRENE										
ISOPHORONE										
N-NITROSO-DI-N-PROPYLAMINE										
N-NITROSODIPHENYLAMINE										
NAPHTHALENE										
NITROBENZENE										
PENTACHLOROPHENOL										
PHENANTHRENE										
PHENOL										
PYRENE										
Pesticides/PCBs (ug/L)										
4,4'-DDD										
4,4'-DDE										
4,4'-DDT										
ALDRIN										
ALPHA-BHC										
ALPHA-CHLORDANE										
AROCLOR-1016										
AROCLOR-1221										
AROCLOR-1232										
AROCLOR-1242										
AROCLOR-1248										
AROCLOR-1254										
AROCLOR-1260										
BETA-BHC										
DELTA-BHC										
DIELDRIN										
ENDOSULFAN I										
ENDOSULFAN II										
ENDOSULFAN SULFATE										
ENDRIN										
ENDRIN ALDEHYDE										
ENDRIN KETONE										
GAMMA-BHC (LINDANE)										
GAMMA-CHLORDANE										
HEPTACHLOR										
HEPTACHLOR EPOXIDE										
METHOXYCHLOR										
TOXAPHENE										
Explosives (ug/L)										

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017	017
Sample Location	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank
Sample Number	17-T-022405-02	17-T-022505-03	17-T-022605-04	17-T-022705-05	17-T-022805-06	17-T-030105-07	17-T-030805-08	17-T-030905-09	17-T-031005-10	17-T-031105-11
Sample Date	02/24/05	02/25/05	02/26/05	02/27/05	02/28/05	03/01/05	03/08/05	03/09/05	03/10/05	03/11/05
1,3,5-TRINITROBENZENE										
1,3-DINITROBENZENE										
2,4,6-TRINITROTOLUENE										
2,4-DINITROTOLUENE										
2,6-DINITROTOLUENE										
2-AMINO-4,6-DINITROTOLUENE										
2-NITROTOLUENE										
3-NITROTOLUENE										
4-AMINO-2,6-DINITROTOLUENE										
4-NITROTOLUENE										
HMX										
NITROBENZENE										
RDX										
TETRYL										
Inorganics (ug/L)										
ALUMINUM										
ANTIMONY										
ARSENIC										
BARIUM										
BERYLLIUM										
CADMIUM										
CALCIUM										
CHROMIUM										
COBALT										
COPPER										
IRON										
LEAD										
MAGNESIUM										
MANGANESE										
MERCURY										
NICKEL										
POTASSIUM										
SELENIUM										
SILVER										
SODIUM										
THALLIUM										
VANADIUM										
ZINC										
Miscellaneous Parameters (ug/L)										
CYANIDE										

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017
Sample Location	Rinsate -Hand Auger	Rinsate -GW Tubing
Sample Number	17-R-011805-02	17-R-011305-01
Sample Date	01/18/05	01/13/05
Volatile Organics (ug/L)		
1,1,1-TRICHLOROETHANE	5 U	5 U
1,1,2,2-TETRACHLOROETHANE	5 U	5 U
1,1,2-TRICHLOROETHANE	5 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	5 U	5 U
1,1-DICHLOROETHANE	5 U	5 U
1,1-DICHLOROETHENE	5 U	5 U
1,2,4-TRICHLOROBENZENE	5 U	5 U
1,2,4-TRIMETHYLBENZENE		
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U
1,2-DICHLOROETHANE	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U
1,3,5-TRIMETHYLBENZENE		
1,3-DICHLOROBENZENE	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U
2-BUTANONE	5 UR	4 J
2-HEXANONE	3 J	5 U
4-METHYL-2-PENTANONE	5 U	5 U
ACETONE	35 J	30 J
BENZENE	5 U	5 U
BROMODICHLOROMETHANE	5 U	5 U
BROMOFORM	5 U	5 U
BROMOMETHANE	5 U	5 U
CARBON DISULFIDE	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U
CHLOROBENZENE	5 U	5 U
CHLORODIBROMOMETHANE	5 U	5 U
CHLOROETHANE	5 U	5 U
CHLOROFORM	0.4 J	0.5 J
CHLOROMETHANE	5 U	5 U
CIS-1,2-DICHLOROETHENE	5 U	5 U
CIS-1,3-DICHLOROPROPENE	5 U	5 U
CYCLOHEXANE	5 U	5 U
DICHLORODIFLUOROMETHANE	5 U	5 U
ETHYLBENZENE	5 U	5 U
ISOPROPYLBENZENE	5 U	5 U
M+P-XYLENES	10 U	10 U
METHYL ACETATE	5 U	5 U
METHYL CYCLOHEXANE	5 U	5 U
METHYL TERT-BUTYL ETHER	5 U	5 U
METHYLENE CHLORIDE	5 U	5 U
O-XYLENE	5 U	5 U
STYRENE	5 U	5 U
TETRACHLOROETHENE	5 U	5 U
TOLUENE	5 U	5 U
TOTAL 1,2-DICHLOROETHENE	10 U	10 U
TOTAL XYLENES	15 U	15 U
TRANS-1,2-DICHLOROETHENE	5 U	5 U

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017
Sample Location	Rinsate -Hand Auger	Rinsate -GW Tubing
Sample Number	17-R-011805-02	17-R-011305-01
Sample Date	01/18/05	01/13/05
TRANS-1,3-DICHLOROPROPENE	5 U	5 U
TRICHLOROETHENE	0.7 J	5 U
TRICHLOROFLUOROMETHANE	5 U	5 U
VINYL CHLORIDE	5 U	5 U
Semivolatile Organics (ug/L)		
1,1-BIPHENYL	10 U	11 U
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	11 U
2,4,5-TRICHLOROPHENOL	10 U	11 U
2,4,6-TRICHLOROPHENOL	10 U	11 U
2,4-DICHLOROPHENOL	10 U	11 U
2,4-DIMETHYLPHENOL	10 U	11 U
2,4-DINITROPHENOL	25 U	26 U
2,4-DINITROTOLUENE	10 U	11 U
2,6-DINITROTOLUENE	10 U	11 U
2-CHLORONAPHTHALENE	10 U	11 U
2-CHLOROPHENOL	10 U	11 U
2-METHYLNAPHTHALENE	10 U	11 U
2-METHYLPHENOL	10 U	11 U
2-NITROANILINE	25 U	26 U
2-NITROPHENOL	10 U	11 U
3,3'-DICHLOROBENZIDINE	10 U	11 U
3-NITROANILINE	25 U	26 U
4,6-DINITRO-2-METHYLPHENOL	25 U	26 U
4-BROMOPHENYL PHENYL ETHER	10 U	11 U
4-CHLORO-3-METHYLPHENOL	10 U	11 U
4-CHLOROANILINE	10 U	11 U
4-CHLOROPHENYL PHENYL ETHER	10 U	11 U
4-METHYLPHENOL	10 U	11 U
4-NITROANILINE	25 U	26 U
4-NITROPHENOL	25 U	26 U
ACENAPHTHENE	10 U	11 U
ACENAPHTHYLENE	10 U	11 U
ACETOPHENONE	10 U	11 U
ANTHRACENE	10 U	11 U
ATRAZINE	10 U	11 U
BENZALDEHYDE	5 J	13
BENZO(A)ANTHRACENE	10 U	11 U
BENZO(A)PYRENE	10 U	11 U
BENZO(B)FLUORANTHENE	10 U	11 U
BENZO(G,H,I)PERYLENE	10 U	11 U
BENZO(K)FLUORANTHENE	10 U	11 U
BIS(2-CHLOROETHOXY)METHANE	10 U	11 U
BIS(2-CHLOROETHYL)ETHER	10 U	11 U
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	11 U
BUTYL BENZYL PHTHALATE	10 U	11 U
CAPROLACTAM	10 U	11 U
CARBAZOLE	10 U	11 U
CHRYSENE	10 U	11 U
DI-N-BUTYL PHTHALATE	10 U	11 U
DI-N-OCTYL PHTHALATE	10 U	11 U

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017
Sample Location	Rinsate -Hand Auger	Rinsate -GW Tubing
Sample Number	17-R-011805-02	17-R-011305-01
Sample Date	01/18/05	01/13/05
DIBENZO(A,H)ANTHRACENE	10 U	11 U
DIBENZOFURAN	10 U	11 U
DIETHYL PHTHALATE	2 J	11 U
DIMETHYL PHTHALATE	10 U	11 U
FLUORANTHENE	10 U	11 U
FLUORENE	10 U	11 U
HEXACHLOROBENZENE	10 U	11 U
HEXACHLOROBUTADIENE	10 U	11 U
HEXACHLOROCYCLOPENTADIENE	10 U	11 U
HEXACHLOROETHANE	10 U	11 U
INDENO(1,2,3-CD)PYRENE	10 U	11 U
ISOPHORONE	10 U	11 U
N-NITROSO-DI-N-PROPYLAMINE	10 U	11 U
N-NITROSODIPHENYLAMINE	10 U	11 U
NAPHTHALENE	10 U	11 U
NITROBENZENE	10 U	11 U
PENTACHLOROPHENOL	25 U	26 U
PHENANTHRENE	10 U	11 U
PHENOL	10 U	11 U
PYRENE	10 U	11 U
Pesticides/PCBs (ug/L)		
4,4'-DDD	0.1 U	0.1 U
4,4'-DDE	0.1 U	0.1 U
4,4'-DDT	0.1 U	0.1 U
ALDRIN	0.05 U	0.05 U
ALPHA-BHC	0.05 U	0.05 U
ALPHA-CHLORDANE	0.05 U	0.05 U
AROCLOR-1016	0.5 U	0.52 U
AROCLOR-1221	0.5 U	0.52 U
AROCLOR-1232	0.5 U	0.52 U
AROCLOR-1242	0.5 U	0.52 U
AROCLOR-1248	0.5 U	0.52 U
AROCLOR-1254	0.5 U	0.52 U
AROCLOR-1260	0.5 U	0.52 U
BETA-BHC	0.05 U	0.05 U
DELTA-BHC	0.05 U	0.05 U
DIELDRIN	0.1 U	0.1 U
ENDOSULFAN I	0.05 U	0.05 U
ENDOSULFAN II	0.1 U	0.1 U
ENDOSULFAN SULFATE	0.1 U	0.1 U
ENDRIN	0.1 U	0.1 U
ENDRIN ALDEHYDE	0.1 U	0.1 U
ENDRIN KETONE	0.1 U	0.1 U
GAMMA-BHC (LINDANE)	0.05 U	0.05 U
GAMMA-CHLORDANE	0.05 U	0.05 U
HEPTACHLOR	0.05 U	0.05 U
HEPTACHLOR EPOXIDE	0.05 U	0.05 U
METHOXYCHLOR	0.5 U	0.5 U
TOXAPHENE	1 U	1 U
Explosives (ug/L)		

QA/QC DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017
Sample Location	Rinsate -Hand Auger	Rinsate -GW Tubing
Sample Number	17-R-011805-02	17-R-011305-01
Sample Date	01/18/05	01/13/05
1,3,5-TRINITROBENZENE	0.3 U	0.27 U
1,3-DINITROBENZENE	0.3 U	0.27 U
2,4,6-TRINITROTOLUENE	0.3 U	0.27 U
2,4-DINITROTOLUENE	0.57 U	0.52 U
2,6-DINITROTOLUENE	0.57 U	0.52 U
2-AMINO-4,6-DINITROTOLUENE	0.57 U	0.52 U
2-NITROTOLUENE	0.57 U	0.52 U
3-NITROTOLUENE	0.57 U	0.52 U
4-AMINO-2,6-DINITROTOLUENE	0.57 U	0.52 U
4-NITROTOLUENE	0.57 U	0.52 U
HMX	0.57 U	0.52 U
NITROBENZENE	0.3 U	0.27 U
RDX	0.3 U	0.27 U
TETRYL	0.72 U	0.65 U
Inorganics (ug/L)		
ALUMINUM	17.9 U	18.3 U
ANTIMONY	4.6	2.34 U
ARSENIC	3.03 U	3.03 U
BARIUM	0.53 U	0.17 U
BERYLLIUM	0.27 U	0.47
CADMIUM	3.97 U	0.3 U
CALCIUM	3.13 U	15.6
CHROMIUM	0.8 U	0.8 U
COBALT	0.64 U	0.64 U
COPPER	3.3	0.86 U
IRON	6.1	10.7 U
LEAD	1.7 U	1.7 U
MAGNESIUM	24.7 U	7.52 U
MANGANESE	1.17 U	0.57
MERCURY	0.01 U	0.03
NICKEL	10.8 U	0.85 U
POTASSIUM	382	238 U
SELENIUM	3.71 U	3.71 U
SILVER	2.84 U	0.7 U
SODIUM	165	178
THALLIUM	4.09 U	4.09 U
VANADIUM	4.14 U	0.75 U
ZINC	3.1	0.6
Miscellaneous Parameters (ug/L)		
CYANIDE	10 U	10 U

APPENDIX E-8
IDW ANALYTICAL RESULTS

IDW DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	IDW	IDW	IDW	IDW	IDW	IDW	IDW -TW Purge Water	IDW-TCLP Drill Cuttings	IDW -Decon Water
Sample Number	17-O-042803-01	17-O-042803-02	17-O-032404-2	17-O-032404-3	17-O-032404-2EXP	17-O-032404-3EXP	17-O-011805-01	17-O-011805-02	17-O-01-0305
Sample Date	04/28/03	04/28/03	03/24/04	03/24/04	03/25/04	03/25/04	01/18/05	01/18/05	03/10/05
Volatile Organics (ug/L)									
1,1,1-TRICHLOROETHANE	5 U	5 U	5 U	5 U			5 U		5 U
1,1,2,2-TETRACHLOROETHANE	2 J	5 U	5 U	9			5 J		5 U
1,1,2-TRICHLOROETHANE	3 J	5 U	5 U	56			2 J		5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	90	5 U	5 U	2 J			18		5 U
1,1-DICHLOROETHANE	5 U	5 U	5 U	3 J			5 U		5 U
1,1-DICHLOROETHENE	5 U	5 U	5 U	5			0.5 J		5 U
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U			5 U		5 U
1,2,4-TRIMETHYLBENZENE	5 U	5 U							
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U			5 U		5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U			5 U		5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U			5 U		5 U
1,2-DICHLOROETHANE	0.6 J	5 U	5 U	5 U			5 U		5 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U			5 U		5 U
1,3,5-TRIMETHYLBENZENE	5 U	5 U							
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U			5 U		5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U	5 U			5 U		5 U
2-BUTANONE	5 U	5 U	3 J	5 U			5 UR		5 U
2-HEXANONE	5 U	5 U	5 U	5 U			5 U		5 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U			5 U		5 U
ACETONE	69 J	66 J	610 J	8 J			23 J		31 J
BENZENE	0.6 J	5 U	5 U	79			0.4 J		5 U
BROMODICHLOROMETHANE	5 U	5 U	4 J	5 U			5 U		5 U
BROMOFORM	5 U	5 U	5 U	5 U			5 U		5 U
BROMOMETHANE	5 U	5 U	5 U	5 U			5 U		5 U
CARBON DISULFIDE	5 U	5 U	0.4 J	5 U			5 U		5 U
CARBON TETRACHLORIDE	5 U	5 U	5 U	63			0.4 J		5 U
CHLOROBENZENE	5 U	5 U	5 U	5 U			5 U		5 U
CHLORODIBROMOMETHANE	5 U	5 U	2 J	5 U			5 U		5 U
CHLOROETHANE	5 U	5 U	5 U	5 U			5 U		5 U
CHLOROFORM	10	2 J	8	330 J			10		5 U
CHLOROMETHANE	5 U	5 U	5 U	5 U			5 U		5 U
CIS-1,2-DICHLOROETHENE	15	5 U	5 U	1100 J			8		5 U
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U			5 U		5 U
CYCLOHEXANE	5 U	4 J	1 J	5 U			5 U		5 U
DICHLORODIFLUOROMETHANE	12	5 U	5 U	32			8		5 U
ETHYLBENZENE	5 U	5 U	5 U	0.4 J			5 U		5 U
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U			5 U		5 U
M+P-XYLENES	10 U	10 U	10 U	0.8 J			10 U		10 U
METHYL ACETATE	5 U	5 U	5 U	5 U			5 U		5 U
METHYL CYCLOHEXANE	5 U	6	5 U	5 U			5 U		5 U
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U			5 U		5 U
METHYLENE CHLORIDE	5 U	5 U	5 U	20 U			1500		5 U
O-XYLENE	5 U	5 U	5 U	0.5 J			5 U		5 U
STYRENE	5 U	5 U	5 U	5 U			5 U		5 U
TETRACHLOROETHENE	23	5 U	5 U	5 U			0.5 J		5 U
TOLUENE	5 U	5 U	5 U	6			0.6 J		5 U
TOTAL 1,2-DICHLOROETHENE	15	10 U	10 U	330			9 J		10 U
TOTAL XYLENES	15 U	15 U	15 U	1.3 J			15 U		15 U

IDW DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	IDW	IDW	IDW	IDW	IDW	IDW	IDW -TW Purge Water	IDW-TCLP Drill Cuttings	IDW -Decon Water
Sample Number	17-O-042803-01	17-O-042803-02	17-O-032404-2	17-O-032404-3	17-O-032404-2EXP	17-O-032404-3EXP	17-O-011805-01	17-O-011805-02	17-O-01-0305
Sample Date	04/28/03	04/28/03	03/24/04	03/24/04	03/25/04	03/25/04	01/18/05	01/18/05	03/10/05
TRANS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5			0.3 J		5 U
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U			5 U		5 U
TRICHLOROETHENE	2300	5 U	87	53000			2600		5 U
TRICHLOROFLUOROMETHANE	0.6 J	5 U	5 U	5 U			5 U		5 U
VINYL CHLORIDE	5 U	5 U	5 U	11			5 U		5 U
Semivolatile Organics (ug/L)									
1,1-BIPHENYL	10 U	10 U	10 U	10 U			10 U		10 U
1,4-DICHLOROBENZENE									
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U	10 U	10 U			10 U		10 U
2,4,5-TRICHLOROPHENOL	26 U	25 U	25 U	25 U			10 U		25 U
2,4,6-TRICHLOROPHENOL	10 U	10 U	10 U	10 U			10 U		10 U
2,4-DICHLOROPHENOL	10 U	10 U	10 U	10 U			10 U		10 U
2,4-DIMETHYLPHENOL	10 U	10 U	10 U	10 U			10 U		10 U
2,4-DINITROPHENOL	26 U	25 U	25 U	25 U			25 U		25 U
2,4-DINITROTOLUENE	10 U	10 U	10 U	10 U			10 U		10 U
2,6-DINITROTOLUENE	10 U	10 U	10 U	10 U			10 U		10 U
2-CHLORONAPHTHALENE	10 U	10 U	10 U	10 U			10 U		10 U
2-CHLOROPHENOL	10 U	10 U	10 U	10 U			10 U		10 U
2-METHYLNAPHTHALENE	10 U	10 U	10 U	10 U			10 U		10 U
2-METHYLPHENOL	10 U	10 U	10 U	10 U			10 U		10 U
2-NITROANILINE	26 U	25 U	25 U	25 U			25 U		25 U
2-NITROPHENOL	10 U	10 U	10 U	10 U			10 U		10 U
3&4-METHYLPHENOL									
3,3'-DICHLOROBENZIDINE	10 U	10 U	10 U	10 U			10 U		10 U
3-NITROANILINE	26 U	25 U	25 U	25 U			25 U		25 U
4,6-DINITRO-2-METHYLPHENOL	26 U	25 U	25 U	25 U			25 U		25 U
4-BROMOPHENYL PHENYL ETHER	10 U	10 U	10 U	10 U			10 U		10 U
4-CHLORO-3-METHYLPHENOL	10 U	10 U	10 U	10 U			10 U		10 U
4-CHLOROANILINE	10 U	10 U	10 U	10 U			10 U		10 U
4-CHLOROPHENYL PHENYL ETHER	10 U	10 U	10 U	10 U			10 U		10 U
4-METHYLPHENOL	10 U	10 U	10 U	10 U			10 U		10 U
4-NITROANILINE	26 U	25 U	25 U	25 U			25 U		25 U
4-NITROPHENOL	26 U	25 U	25 U	25 U			25 U		25 UR
ACENAPHTHENE	10 U	10 U	10 U	10 U			10 U		10 U
ACENAPHTHYLENE	10 U	10 U	10 U	10 U			10 U		10 U
ACETOPHENONE	10 U	10 U	10 U	10 U			10 U		10 U
ANTHRACENE	10 U	10 U	10 U	10 U			10 U		10 U
ATRAZINE	10 U	10 U	10 U	10 U			10 U		10 U
BENZALDEHYDE	10 U	10 U	10 U	10 U			10 U		10 UR
BENZO(A)ANTHRACENE	10 U	10 U	10 U	10 U			10 U		10 U
BENZO(A)PYRENE	10 U	10 U	10 U	10 U			10 U		10 U
BENZO(B)FLUORANTHENE	10 U	10 U	10 U	10 U			10 U		10 U
BENZO(G,H,I)PERYLENE	10 U	10 U	10 U	10 U			10 U		10 U
BENZO(K)FLUORANTHENE	10 U	10 U	10 U	10 U			10 U		10 U
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U	10 U	10 U			10 U		10 U
BIS(2-CHLOROETHYL)ETHER	10 U	10 U	10 U	10 U			10 U		10 U
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	10 U	10 U	10 U			10 U		10 U
BUTYL BENZYL PHTHALATE	10 U	0.8 J	6 J	3 J			10 U		10 U
CAPROLACTAM	10 U	10 U	10 U	10 U			10 U		10 U

IDW DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	IDW	IDW	IDW	IDW	IDW	IDW	IDW -TW Purge Water	IDW-TCLP Drill Cuttings	IDW -Decon Water
Sample Number	17-O-042803-01	17-O-042803-02	17-O-032404-2	17-O-032404-3	17-O-032404-2EXP	17-O-032404-3EXP	17-O-011805-01	17-O-011805-02	17-O-01-0305
Sample Date	04/28/03	04/28/03	03/24/04	03/24/04	03/25/04	03/25/04	01/18/05	01/18/05	03/10/05
CARBAZOLE	10 U	10 U	10 U	10 U			10 U		10 U
CHRYSENE	10 U	10 U	10 U	10 U			10 U		10 U
DI-N-BUTYL PHTHALATE	10 U	10 U	10 U	4 J			10 U		10 U
DI-N-OCTYL PHTHALATE	10 U	10 U	3 J	10 U			10 U		10 U
DIBENZO(A,H)ANTHRACENE	10 U	10 U	10 U	10 U			10 U		10 U
DIBENZOFURAN	10 U	10 U	10 U	10 U			10 U		10 U
DIETHYL PHTHALATE	10 U	10 U	10 U	10 U			10 U		10 U
DIMETHYL PHTHALATE	10 U	10 U	10 U	10 U			10 U		36
FLUORANTHENE	10 U	10 U	10 U	10 U			10 U		10 U
FLUORENE	10 U	10 U	10 U	10 U			10 U		10 U
HEXACHLOROBENZENE	10 U	10 U	10 U	10 U			10 U		10 U
HEXACHLOROBUTADIENE	10 U	10 U	10 U	10 U			10 U		10 U
HEXACHLOROCYCLOPENTADIENE	10 U	10 U	10 U	10 U			10 U		10 U
HEXACHLOROETHANE	10 U	10 U	10 U	10 U			10 U		10 U
INDENO(1,2,3-CD)PYRENE	10 U	10 U	10 U	10 U			10 U		10 U
ISOPHORONE	10 U	10 U	10 U	10 U			10 U		10 U
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U	10 U	10 U			10 U		10 U
N-NITROSODIPHENYLAMINE	10 U	10 U	10 U	10 U			10 U		10 U
NAPHTHALENE	10 U	10 U	10 U	10 U			10 U		10 U
NITROBENZENE	10 U	10 U	10 U	10 U			10 U		10 U
PENTACHLOROPHENOL	26 U	25 U	25 U	25 U			25 U		25 U
PHENANTHRENE	10 U	10 U	10 U	10 U			10 U		10 U
PHENOL	10 U	10 U	6 J	6 J			10 U		10 U
PYRENE	10 U	10 U	10 U	10 U			10 U		10 U
PYRIDINE									
Pesticides/PCBs (ug/L)									
4,4'-DDD	0.11 U	0.11 U	0.1 U	0.1 U			0.1 U		0.1 U
4,4'-DDE	0.11 U	0.11 U	0.1 U	0.1 U			0.1 U		0.1 U
4,4'-DDT	0.11 U	0.11 U	0.1 U	0.1 U			0.1 U		0.1 U
ALDRIN	0.056 U	0.054 U	0.052 U	0.05 U			0.05 U		0.05 U
ALPHA-BHC	0.056 U	0.054 U	0.052 U	0.05 U			0.05 U		0.05 U
ALPHA-CHLORDANE	0.056 U	0.054 U	0.052 U	0.05 U			0.05 U		0.05 U
AROCLOR-1016	0.56 U	0.54 U	0.52 U	0.5 U			0.5 U		0.5 U
AROCLOR-1221	0.56 U	0.54 U	0.52 U	0.5 U			0.5 U		0.5 U
AROCLOR-1232	0.56 U	0.54 U	0.52 U	0.5 U			0.5 U		0.5 U
AROCLOR-1242	0.56 U	0.54 U	0.52 U	0.5 U			0.5 U		0.5 U
AROCLOR-1248	0.56 U	0.54 U	0.52 U	0.5 U			0.5 U		0.5 U
AROCLOR-1254	0.56 U	0.54 U	0.52 U	0.5 U			0.5 U		0.5 U
AROCLOR-1260	0.56 U	0.54 U	0.52 U	0.5 U			0.5 U		0.5 U
BETA-BHC	0.056 U	0.054 U	0.052 U	0.05 U			0.05 U		0.05 U
CHLORDANE									
DELTA-BHC	0.056 U	0.054 U	0.052 U	0.05 U			0.05 U		0.05 U
DIELDRIN	0.11 U	0.11 U	0.1 U	0.1 U			0.1 U		0.1 U
ENDOSULFAN I	0.056 U	0.054 U	0.052 U	0.05 U			0.05 U		0.05 U
ENDOSULFAN II	0.11 U	0.11 U	0.1 U	0.1 U			0.1 U		0.1 U
ENDOSULFAN SULFATE	0.11 U	0.11 U	0.1 U	0.1 U			0.1 U		0.1 U
ENDRIN	0.11 U	0.11 U	0.1 U	0.1 U			0.1 U		0.1 U
ENDRIN ALDEHYDE	0.11 U	0.11 U	0.1 U	0.1 U			0.1 U		0.1 U
ENDRIN KETONE	0.11 U	0.11 U	0.1 U	0.1 U			0.1 U		0.1 U

IDW DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	IDW	IDW	IDW	IDW	IDW	IDW	IDW -TW Purge Water	IDW-TCLP Drill Cuttings	IDW -Decon Water
Sample Number	17-O-042803-01	17-O-042803-02	17-O-032404-2	17-O-032404-3	17-O-032404-2EXP	17-O-032404-3EXP	17-O-011805-01	17-O-011805-02	17-O-01-0305
Sample Date	04/28/03	04/28/03	03/24/04	03/24/04	03/25/04	03/25/04	01/18/05	01/18/05	03/10/05
GAMMA-BHC (LINDANE)	0.056 U	0.054 U	0.052 U	0.05 U			0.05 U		0.05 U
GAMMA-CHLORDANE	0.056 U	0.054 U	0.052 U	0.05 U			0.05 U		0.05 U
HEPTACHLOR	0.056 U	0.054 U	0.052 U	0.05 U			0.05 U		0.05 U
HEPTACHLOR EPOXIDE	0.056 U	0.054 U	0.052 U	0.05 U			0.05 U		0.05 U
METHOXYCHLOR	0.56 U	0.54 U	0.52 U	0.5 U			0.5 U		0.5 U
TOXAPHENE	1.1 U	1.1 U	1 U	1 U			1 U		1 U
Herbicides (ug/L)									
2,4,5-TP (SILVEX)									
2,4-D									
Explosives (ug/L)									
1,3,5-TRINITROBENZENE	0.26 U	0.26 U			0.27 U	0.27 U	0.28 U		0.23 U
1,3-DINITROBENZENE	0.26 U	0.26 U			0.27 U	0.27 U	0.28 U		0.23 U
2,4,6-TRINITROTOLUENE	0.26 U	0.26 U			0.27 U	0.27 U	0.28 U		0.23 U
2,4-DINITROTOLUENE	0.26 U	0.26 U			0.27 U	0.27 U	0.54 U		0.44 U
2,6-DINITROTOLUENE	0.26 U	0.26 U			0.52 U	0.52 U	0.54 U		0.44 U
2-AMINO-4,6-DINITROTOLUENE	0.26 U	0.26 U			0.52 U	0.52 U	0.54 U		0.44 U
2-NITROTOLUENE	0.52 U	0.52 U			0.52 U	0.52 U	0.54 U		0.44 U
3-NITROTOLUENE	0.52 U	0.52 U			0.52 U	0.52 U	0.54 U		0.44 U
4-AMINO-2,6-DINITROTOLUENE	0.26 U	0.26 U			0.52 U	0.52 U	0.54 U		0.44 U
4-NITROTOLUENE	0.52 U	0.52 U			1.3 U	1.3 U	0.54 U		0.44 U
HMX	0.52 U	0.52 U			0.65 U	0.65 U	0.54 U		0.44 U
NITROBENZENE	0.26 U	0.26 U			0.27 U	0.27 U	0.28 U		0.23 U
RDX	0.52 U	0.52 U			0.27 U	0.27 U	0.28 U		0.23 U
TETRYL	0.52 U	0.52 U			0.52 U	0.52 U	0.68 U		0.56 U
Inorganics (ug/L)									
ALUMINUM	5540	2830	23300	295 U			820		20.5 U
ANTIMONY	1.3 U	1.3 U	1.74 U	1.74 U			3.2 U		3.54 U
ARSENIC	1.8 U	1.8 U	7.5 U	2.13 U			3.03 U		2.81 U
BARIUM	84	1330	269	192			233		35.4
BERYLLIUM	0.31 U	0.31 U	2.6 U	1.4 U			0.81 U		0.40 U
CADMIUM	3.7 U	3.7 U	0.25 U	0.25 U			3.97 U		2.29 U
CALCIUM	35400	30100	14900	50700			234000		12600
CHROMIUM	38.7	19.3	58.5	2.9 U			0.8 U		1.7 U
COBALT	4.4	0.44 U	5.9	9.2			51.8		4.3 U
COPPER	12.9	29.2	50.8	1.14 U			3 U		2.52 U
IRON	14900	3340	32400	16300			68400		4020
LEAD	5.6 U	6.5 U	11.8	1.9 U			1.7 U		2.07 U
MAGNESIUM	7120	1480	4680	8860			53000		2850
MANGANESE	232	18	135	177			833		303
MERCURY	0.11 U	0.08 U	0.1	0.01 U			0.01 U		0.08 U
NICKEL	19.4	11.7 U	21.8 U	21.4 U			17.9		11.6 U
POTASSIUM	4110	2400	2680	1660			5410		5260
SELENIUM	3.3	2.1 U	2.7 U	2.32 U			3.71 U		4.08 U
SILVER	40.3	1330	1.16 U	1.16 U			2.84 U		3.93 U
SODIUM	61800	9930	14300	99500			449000		20200
THALLIUM	3.0 U	3.0 U	2.77 U	2.77 U			4.09 U		6.0 U
VANADIUM	16.6	10.2	59.2	1.1 U			4.14 U		5.07 U
ZINC	93.8	40.5	998	60.8 U			129		7.1 U
Miscellaneous Parameters (ug/L)									

IDW DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	IDW	IDW	IDW	IDW	IDW	IDW	IDW -TW Purge Water	IDW-TCLP Drill Cuttings	IDW -Decon Water
Sample Number	17-O-042803-01	17-O-042803-02	17-O-032404-2	17-O-032404-3	17-O-032404-2EXP	17-O-032404-3EXP	17-O-011805-01	17-O-011805-02	17-O-01-0305
Sample Date	04/28/03	04/28/03	03/24/04	03/24/04	03/25/04	03/25/04	01/18/05	01/18/05	03/10/05
CYANIDE	10 U	10 U	10 U	10 U			10 U		10 U
TCLP Volatiles (ug/L)									
1,1-DICHLOROETHENE								100 U	
1,2-DICHLOROETHANE								100 U	
2-BUTANONE								300 UR	
BENZENE								100 U	
CARBON TETRACHLORIDE								100 U	
CHLOROBENZENE								100 U	
CHLOROFORM								100 U	
TETRACHLOROETHENE								100 U	
TRICHLOROETHENE								8 J	
VINYL CHLORIDE								100 U	
TCLP Semivolatile Organics (ug/L)									
1,4-DICHLOROBENZENE								50 U	
2,4,5-TRICHLOROPHENOL								120 U	
2,4,6-TRICHLOROPHENOL								50 U	
2,4-DINITROTOLUENE								50 U	
2-METHYLPHENOL								50 U	
3&4-METHYLPHENOL								100 U	
HEXACHLOROBENZENE								50 U	
HEXACHLOROBUTADIENE								50 U	
HEXACHLOROETHANE								50 U	
NITROBENZENE								50 U	
PENTACHLOROPHENOL								120 U	
PYRIDINE								250 U	
TCLP Pesticides (ug/L)									
CHLORDANE								2.5 U	
ENDRIN								0.5 U	
GAMMA-BHC (LINDANE)								0.25 U	
HEPTACHLOR								0.25 U	
HEPTACHLOR EPOXIDE								0.25 U	
METHOXYCHLOR								2.5 U	
TOXAPHENE								5 U	
TCLP Herbicides (ug/L)									
2,4,5-TP (SILVEX)								5 U	
2,4-D								15 U	
TCLP Inorganics (ug/L)									
ARSENIC								12.7 U	
BARIUM								221	
CADMIUM								0.3 U	
CHROMIUM								84.4	
LEAD								43.4	
MERCURY								0.05 U	
SELENIUM								6.7 U	
SILVER								0.7 U	

IDW DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	IDW - TCLP Decon Pad	IDW - TCLP Drum Spill	IDW - TCLP Drill Cuttings	IDW - Development Water	IDW-TCLP Drill Cuttings	IDW - Development Water	IDW - TCLP Drill Cuttings	IDW - Development Water	IDW - Purge Water
Sample Number	17-O-02-0305	17-O-03-0305	17-O-04-0305	17-O-05-0305	17-O-06-0305	17-O-07-0305	17-O-08-0305	17-O-09-0305	17-O-10-0305
Sample Date	03/10/05	03/10/05	03/11/05	03/11/05	03/11/05	03/11/05	03/11/05	03/11/05	03/11/05
Volatile Organics (ug/L)									
1,1,1-TRICHLOROETHANE				5 U		5 U		5 U	5 U
1,1,2,2-TETRACHLOROETHANE				5 U		5 U		5 U	5 U
1,1,2-TRICHLOROETHANE				0.3 J		5 U		5 U	3 J
1,1,2-TRICHLOROTRIFLUOROETHANE				23		5 U		73	7
1,1-DICHLOROETHANE				5 U		5 U		5 U	5 U
1,1-DICHLOROETHENE	100 U	100 U	100 U	5 U	100 U	5 U	100 U	5 U	0.4 J
1,2,4-TRICHLOROBENZENE				5 U		5 U		5 U	5 U
1,2,4-TRIMETHYLBENZENE									
1,2-DIBROMO-3-CHLOROPROPANE				5 U		5 U		5 U	5 U
1,2-DIBROMOETHANE				5 U		5 U		5 U	5 U
1,2-DICHLOROBENZENE				5 U		5 U		5 U	5 U
1,2-DICHLOROETHANE	100 U	100 U	100 U	5 U	100 U	5 U	100 U	5 U	5 U
1,2-DICHLOROPROPANE				5 U		5 U		5 U	5 U
1,3,5-TRIMETHYLBENZENE									
1,3-DICHLOROBENZENE				5 U		5 U		5 U	5 U
1,4-DICHLOROBENZENE				5 U		5 U		5 U	5 U
2-BUTANONE	300 UR	300 UR	300 UR	5 U	300 UR	5 U	300 UR	5 U	5 U
2-HEXANONE				5 U		5 U		5 U	5 U
4-METHYL-2-PENTANONE				5 U		5 U		5 U	5 U
ACETONE				23 U		50 J		180 J	5 U
BENZENE	100 U	100 U	100 U	5 U	100 U	5 U	100 U	5 U	0.5 J
BROMODICHLOROMETHANE				5 U		5 U		5 U	5 U
BROMOFORM				5 U		5 U		5 U	5 U
BROMOMETHANE				5 U		5 U		5 U	5 U
CARBON DISULFIDE				5 U		5 U		5 U	5 U
CARBON TETRACHLORIDE	100 U	100 U	100 U	5 U	100 U	5 U	100 U	5 U	5 U
CHLOROBENZENE	100 U	100 U	100 U	5 U	100 U	5 U	100 U	5 U	5 U
CHLORODIBROMOMETHANE				5 U		5 U		5 U	5 U
CHLOROETHANE				5 U		5 U		5 U	5 U
CHLOROFORM	100 U	100 U	100 U	2 J	100 U	5 U	100 U	5 U	15
CHLOROMETHANE				5 U		5 U		5 U	5 U
CIS-1,2-DICHLOROETHENE				10		5 U		2 J	35
CIS-1,3-DICHLOROPROPENE				5 U		5 U		5 U	5 U
CYCLOHEXANE				5 U		5 U		5 U	5 U
DICHLORODIFLUOROMETHANE				5 U		5 U		5 U	5 U
ETHYLBENZENE				5 U		5 U		5 U	5 U
ISOPROPYLBENZENE				5 U		5 U		5 U	5 U
M+P-XYLENES				10 U		10 U		10 U	10 U
METHYL ACETATE				5 U		5 U		5 U	5 U
METHYL CYCLOHEXANE				5 U		5 U		5 U	5 U
METHYL TERT-BUTYL ETHER				5 U		5 U		5 U	5 U
METHYLENE CHLORIDE				55		280		140	3 J
O-XYLENE				5 U		5 U		5 U	5 U
STYRENE				5 U		5 U		5 U	5 U
TETRACHLOROETHENE	100 U	100 U	100 U	5 U	100 U	5 U	100 U	39	5 U
TOLUENE				2 J		2 J		5 U	15
TOTAL 1,2-DICHLOROETHENE				10 J		10 U		2 J	35
TOTAL XYLENES				15 U		15 U		15 U	15 U

IDW DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	IDW - TCLP Decon Pad	IDW - TCLP Drum Spill	IDW - TCLP Drill Cuttings	IDW - Development Water	IDW-TCLP Drill Cuttings	IDW - Development Water	IDW - TCLP Drill Cuttings	IDW - Development Water	IDW - Purge Water
Sample Number	17-O-02-0305	17-O-03-0305	17-O-04-0305	17-O-05-0305	17-O-06-0305	17-O-07-0305	17-O-08-0305	17-O-09-0305	17-O-10-0305
Sample Date	03/10/05	03/10/05	03/11/05	03/11/05	03/11/05	03/11/05	03/11/05	03/11/05	03/11/05
TRANS-1,2-DICHLOROETHENE				5 U		5 U		5 U	5 U
TRANS-1,3-DICHLOROPROPENE				5 U		5 U		5 U	5 U
TRICHLOROETHENE	100 U	100 U	100 U	360	100 U	3 J	100 U	5	1800
TRICHLOROFLUOROMETHANE				5 U		5 U		5 U	5 U
VINYL CHLORIDE	100 U	100 U	100 U	5 U	100 U	5 U	100 U	5 U	5 U
Semivolatile Organics (ug/L)									
1,1-BIPHENYL				10 U		10 U		10 U	10 U
1,4-DICHLOROBENZENE	50 U	50 U	50 U		50 U		50 U		
2,2'-OXYBIS(1-CHLOROPROPANE)				10 U		10 U		10 U	10 U
2,4,5-TRICHLOROPHENOL	120 U	120 U	120 U	25 U	120 U	25 U	120 U	25 U	25 U
2,4,6-TRICHLOROPHENOL	50 U	50 U	50 U	10 U	50 U	10 U	50 U	10 U	10 U
2,4-DICHLOROPHENOL				10 U		10 U		10 U	10 U
2,4-DIMETHYLPHENOL				10 U		10 U		10 U	10 U
2,4-DINITROPHENOL				25 U		25 U		25 U	25 U
2,4-DINITROTOLUENE	50 U	50 U	50 U	10 U	50 U	10 U	50 U	10 U	10 U
2,6-DINITROTOLUENE				10 U		10 U		10 U	10 U
2-CHLORONAPHTHALENE				10 U		10 U		10 U	10 U
2-CHLOROPHENOL				10 U		10 U		10 U	10 U
2-METHYLNAPHTHALENE				10 U		10 U		10 U	10 U
2-METHYLPHENOL	50 U	50 U	50 U	10 U	50 U	10 U	50 U	10 U	10 U
2-NITROANILINE				25 U		25 U		25 U	25 U
2-NITROPHENOL				10 U		10 U		10 U	10 U
3&4-METHYLPHENOL	100 U	100 U	100 U		100 U		100 U		
3,3'-DICHLOROBENZIDINE				10 U		10 U		10 U	10 U
3-NITROANILINE				25 U		25 U		25 U	25 U
4,6-DINITRO-2-METHYLPHENOL				25 U		25 U		25 U	25 U
4-BROMOPHENYL PHENYL ETHER				10 U		10 U		10 U	10 U
4-CHLORO-3-METHYLPHENOL				10 U		10 U		10 U	10 U
4-CHLOROANILINE				10 U		10 U		10 U	10 U
4-CHLOROPHENYL PHENYL ETHER				10 U		10 U		10 U	10 U
4-METHYLPHENOL				10 U		10 U		10 U	10 U
4-NITROANILINE				25 U		25 U		25 U	25 U
4-NITROPHENOL				25 UR		25 UR		25 UR	25 UR
ACENAPHTHENE				10 U		10 U		10 U	10 U
ACENAPHTHYLENE				10 U		10 U		10 U	10 U
ACETOPHENONE				10 U		10 U		10 U	10 U
ANTHRACENE				10 U		10 U		10 U	10 U
ATRAZINE				10 U		10 U		10 U	10 U
BENZALDEHYDE				10 UR		10 UR		10 UR	10 UR
BENZO(A)ANTHRACENE				10 U		10 U		10 U	10 U
BENZO(A)PYRENE				10 U		10 U		10 U	10 U
BENZO(B)FLUORANTHENE				10 U		10 U		10 U	10 U
BENZO(G,H,I)PERYLENE				10 U		10 U		10 U	10 U
BENZO(K)FLUORANTHENE				10 U		10 U		10 U	10 U
BIS(2-CHLOROETHOXY)METHANE				10 U		10 U		10 U	10 U
BIS(2-CHLOROETHYL)ETHER				10 U		10 U		10 U	10 U
BIS(2-ETHYLHEXYL)PHTHALATE				10 U		10 U		10 U	10 U
BUTYL BENZYL PHTHALATE				10 U		10 U		10 U	10 U
CAPROLACTAM				10 U		10 U		10 U	10 U

IDW DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	IDW - TCLP Decon Pad	IDW - TCLP Drum Spill	IDW - TCLP Drill Cuttings	IDW - Development Water	IDW-TCLP Drill Cuttings	IDW - Development Water	IDW - TCLP Drill Cuttings	IDW - Development Water	IDW - Purge Water
Sample Number	17-O-02-0305	17-O-03-0305	17-O-04-0305	17-O-05-0305	17-O-06-0305	17-O-07-0305	17-O-08-0305	17-O-09-0305	17-O-10-0305
Sample Date	03/10/05	03/10/05	03/11/05	03/11/05	03/11/05	03/11/05	03/11/05	03/11/05	03/11/05
CARBAZOLE				10 U		10 U		10 U	10 U
CHRYSENE				10 U		10 U		10 U	10 U
DI-N-BUTYL PHTHALATE				10 U		10 U		10 U	10 U
DI-N-OCTYL PHTHALATE				10 U		10 U		10 U	10 U
DIBENZO(A,H)ANTHRACENE				10 U		10 U		10 U	10 U
DIBENZOFURAN				10 U		10 U		10 U	10 U
DIETHYL PHTHALATE				10 U		10 U		10 U	10 U
DIMETHYL PHTHALATE				10 U		10 U		10 U	10 U
FLUORANTHENE				10 U		10 U		10 U	10 U
FLUORENE				10 U		10 U		10 U	10 U
HEXACHLOROBENZENE	50 U	50 U	50 U	10 U	50 U	10 U	50 U	10 U	10 U
HEXACHLOROBUTADIENE	50 U	50 U	50 U	10 U	50 U	10 U	50 U	10 U	10 U
HEXACHLOROCYCLOPENTADIENE				10 U		10 U		10 U	10 U
HEXACHLOROETHANE	50 U	50 U	50 U	10 U	50 U	10 U	50 U	10 U	10 U
INDENO(1,2,3-CD)PYRENE				10 U		10 U		10 U	10 U
ISOPHORONE				10 U		10 U		10 U	10 U
N-NITROSO-DI-N-PROPYLAMINE				10 U		10 U		10 U	10 U
N-NITROSODIPHENYLAMINE				10 U		10 U		10 U	10 U
NAPHTHALENE				10 U		10 U		10 U	10 U
NITROBENZENE	50 U	50 U	50 U	10 U	50 U	10 U	50 U	10 U	10 U
PENTACHLOROPHENOL	120 U	120 U	120 U	25 U	120 U	25 U	120 U	25 U	25 U
PHENANTHRENE				10 U		10 U		10 U	10 U
PHENOL				10 U		10 U		10 U	10 U
PYRENE				10 U		10 U		10 U	10 U
PYRIDINE	250 U	250 U	250 U		250 U		250 U		
Pesticides/PCBs (ug/L)									
4,4'-DDD				0.1 U		0.1 U		0.1 U	0.1 U
4,4'-DDE				0.1 U		0.1 U		0.1 U	0.1 U
4,4'-DDT				0.1 U		0.1 U		0.1 U	0.1 U
ALDRIN				0.05 U		0.05 U		0.05 U	0.05 U
ALPHA-BHC				0.05 U		0.05 U		0.05 U	0.05 U
ALPHA-CHLORDANE				0.05 U		0.05 U		0.05 U	0.05 U
AROCLOR-1016				0.5 U		0.5 U		0.5 U	0.5 U
AROCLOR-1221				0.5 U		0.5 U		0.5 U	0.5 U
AROCLOR-1232				0.5 U		0.5 U		0.5 U	0.5 U
AROCLOR-1242				0.5 U		0.5 U		0.5 U	0.5 U
AROCLOR-1248				0.5 U		0.5 U		0.5 U	0.5 U
AROCLOR-1254				0.5 U		0.5 U		0.5 U	0.5 U
AROCLOR-1260				0.5 U		0.5 U		0.5 U	0.5 U
BETA-BHC				0.05 U		0.05 U		0.05 U	0.05 U
CHLORDANE	2.5 U	2.5 U	2.5 U		2.5 U		2.5 U		
DELTA-BHC				0.05 U		0.05 U		0.05 U	0.05 U
DIELDRIN				0.1 U		0.1 U		0.1 U	0.1 U
ENDOSULFAN I				0.05 U		0.05 U		0.05 U	0.05 U
ENDOSULFAN II				0.1 U		0.1 U		0.1 U	0.1 U
ENDOSULFAN SULFATE				0.1 U		0.1 U		0.1 U	0.1 U
ENDRIN	0.5 U	0.5 U	0.5 U	0.1 U	0.5 U	0.1 U	0.5 U	0.1 U	0.1 U
ENDRIN ALDEHYDE				0.1 U		0.1 U		0.1 U	0.1 U
ENDRIN KETONE				0.1 U		0.1 U		0.1 U	0.1 U

IDW DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	IDW - TCLP Decon Pad	IDW - TCLP Drum Spill	IDW - TCLP Drill Cuttings	IDW - Development Water	IDW-TCLP Drill Cuttings	IDW - Development Water	IDW - TCLP Drill Cuttings	IDW - Development Water	IDW - Purge Water
Sample Number	17-O-02-0305	17-O-03-0305	17-O-04-0305	17-O-05-0305	17-O-06-0305	17-O-07-0305	17-O-08-0305	17-O-09-0305	17-O-10-0305
Sample Date	03/10/05	03/10/05	03/11/05	03/11/05	03/11/05	03/11/05	03/11/05	03/11/05	03/11/05
GAMMA-BHC (LINDANE)	0.25 U	0.25 U	0.25 U	0.05 U	0.25 U	0.05 U	0.25 U	0.05 U	0.05 U
GAMMA-CHLORDANE				0.05 U		0.05 U		0.05 U	0.05 U
HEPTACHLOR	0.25 U	0.25 U	0.25 U	0.05 U	0.25 U	0.05 U	0.25 U	0.05 U	0.05 U
HEPTACHLOR EPOXIDE	0.25 U	0.25 U	0.25 U	0.05 U	0.25 U	0.05 U	0.25 U	0.05 U	0.05 U
METHOXYCHLOR	2.5 U	2.5 U	2.5 U	0.5 U	2.5 U	0.5 U	2.5 U	0.5 U	0.5 U
TOXAPHENE	5 U	5 U	5 U	1 U	5 U	1 U	5 U	1 U	1 U
Herbicides (ug/L)									
2,4,5-TP (SILVEX)	5 U	5 U	5 U		5 UR		5 UR		
2,4-D	15 U	15 U	15 U		15 UR		15 UR		
Explosives (ug/L)									
1,3,5-TRINITROBENZENE				0.16 U		0.26 U		0.25 U	0.19 U
1,3-DINITROBENZENE				0.16 U		0.26 U		0.25 U	0.19 U
2,4,6-TRINITROTOLUENE				0.16 U		0.26 U		0.25 U	0.19 U
2,4-DINITROTOLUENE				0.31 U		0.5 U		0.48 U	0.37 U
2,6-DINITROTOLUENE				0.31 U		0.5 U		0.48 U	0.37 U
2-AMINO-4,6-DINITROTOLUENE				0.31 U		0.5 U		0.48 U	0.37 U
2-NITROTOLUENE				0.31 U		0.5 U		0.48 U	0.37 U
3-NITROTOLUENE				0.31 U		0.5 U		0.48 U	0.37 U
4-AMINO-2,6-DINITROTOLUENE				0.31 U		0.5 U		0.48 U	0.37 U
4-NITROTOLUENE				0.31 U		0.5 U		0.48 U	0.37 U
HMX				0.31 U		0.5 U		0.48 U	0.37 U
NITROBENZENE				0.16 U		0.26 U		0.25 U	0.19 U
RDX				0.16 U		0.26 U		0.25 U	0.19 U
TETRYL				0.39 U		0.62 U		0.6 U	0.47 U
Inorganics (ug/L)									
ALUMINUM				20.5 U		358		20.5 U	149
ANTIMONY				3.54 U		3.54 U		3.54 U	3.54 U
ARSENIC	5.0 U	5.3 U	5.0 U	2.81 U	5.0 U	2.81 U	6.5 U	2.81 U	2.81 U
BARIUM	548	603	518	30.7	222	186	186	73.4	617
BERYLLIUM				0.40 U		1.2 U		0.40 U	0.82 U
CADMIUM	0.66 U	17.9	0.25 U	2.9 U	0.25 U	2.29 U	0.35 U	2.29 U	2.29 U
CALCIUM				24400		374000		34800	196000
CHROMIUM	10.5 U	10.5 U	10.5 U	1.0 U	10.5 U	3.0 U	10.5 U	3.0 U	1.3 U
COBALT				4.3 U		81.1		4.3 U	38.6
COPPER				2.52 U		2.52 U		2.52 U	2.52 U
IRON				22600		59600		55400	71700
LEAD	12.1	80.8	3.1	2.07 U	2.4	2.07 U	1.3	2.07 U	2.07 U
MAGNESIUM				3870		67100		6050	131000
MANGANESE				392		1350		426	945
MERCURY	0.10 U	0.09 U	0.09 U	0.07 U	0.02 U	0.08 U	0.02 U	0.08 U	0.08 U
NICKEL				20.3 U		32.8 U		11.6 U	23.9 U
POTASSIUM				2080		6210 U		3260	22700
SELENIUM	6.0 U	6.0 U	6.0 U	4.08 U	6.0 U	4.08 U	6.0 U	6.6 U	4.08 U
SILVER	0.25 U	0.25 U	0.25 U	3.93 U	0.25 U	3.93 U	0.25 U	3.93 U	3.93 U
SODIUM				45700		660000		46600	1110000
THALLIUM				4.26 U		6.9 U		4.26 U	4.26 U
VANADIUM				5.07 U		5.07 U		5.07 U	5.07 U
ZINC				13.5		42.3		46.5	56.3
Miscellaneous Parameters (ug/L)									

IDW DATA
SWMU 16 AND 17
NWS CHARLESTON, SOUTH CAROLINA

SWMU	017	017	017	017	017	017	017	017	017
Sample Location	IDW - TCLP Decon Pad	IDW - TCLP Drum Spill	IDW - TCLP Drill Cuttings	IDW - Development Water	IDW-TCLP Drill Cuttings	IDW - Development Water	IDW - TCLP Drill Cuttings	IDW - Development Water	IDW - Purge Water
Sample Number	17-O-02-0305	17-O-03-0305	17-O-04-0305	17-O-05-0305	17-O-06-0305	17-O-07-0305	17-O-08-0305	17-O-09-0305	17-O-10-0305
Sample Date	03/10/05	03/10/05	03/11/05	03/11/05	03/11/05	03/11/05	03/11/05	03/11/05	03/11/05
CYANIDE				7.2 J		10 U		10 U	6.9 J
TCLP Volatiles (ug/L)									
1,1-DICHLOROETHENE									
1,2-DICHLOROETHANE									
2-BUTANONE									
BENZENE									
CARBON TETRACHLORIDE									
CHLOROBENZENE									
CHLOROFORM									
TETRACHLOROETHENE									
TRICHLOROETHENE									
VINYL CHLORIDE									
TCLP Semivolatile Organics (ug/L)									
1,4-DICHLOROBENZENE									
2,4,5-TRICHLOROPHENOL									
2,4,6-TRICHLOROPHENOL									
2,4-DINITROTOLUENE									
2-METHYLPHENOL									
3&4-METHYLPHENOL									
HEXACHLOROBENZENE									
HEXACHLOROBUTADIENE									
HEXACHLOROETHANE									
NITROBENZENE									
PENTACHLOROPHENOL									
PYRIDINE									
TCLP Pesticides (ug/L)									
CHLORDANE									
ENDRIN									
GAMMA-BHC (LINDANE)									
HEPTACHLOR									
HEPTACHLOR EPOXIDE									
METHOXYCHLOR									
TOXAPHENE									
TCLP Herbicides (ug/L)									
2,4,5-TP (SILVEX)									
2,4-D									
TCLP Inorganics (ug/L)									
ARSENIC									
BARIUM									
CADMIUM									
CHROMIUM									
LEAD									
MERCURY									
SELENIUM									
SILVER									

APPENDIX E-1
SURFACE SOIL ANALYTICAL RESULTS

APPENDIX E-2
SUBSURFACE SOIL ANALYTICAL RESULTS

APPENDIX E-3
GROUNDWATER ANALYTICAL RESULTS (TtNUS)

APPENDIX E-4
GROUNDWATER ANALYTICAL RESULTS (SOLUTIONS-IES)

APPENDIX E-5
SURFACE WATER ANALYTICAL RESULTS

APPENDIX E-6
SEDIMENT ANALYTICAL RESULTS

APPENDIX E-7
QA/QC ANALYTICAL RESULTS

APPENDIX E-8
IDW ANALYTICAL RESULTS

APPENDIX E-9
CHAIN OF CUSTODY FORMS

TRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 17-060501 PAGE 1 OF

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO-137/0528	NWS CHARLESTON	LINDA KLINK 412-921-8650	KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER	ADDRESS
		FRANK WUDKWYCH 412-921-8868	340 COUNTY Rd NO.5
		CARRIER/WAYBILL NUMBER	CITY, STATE
		FED EX 8216 5043 9300	WESTBROOK, ME 04098

STANDARD TAT ☑
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G G P P G G G G G

PRESERVATIVE USED: HCL HNO3 NaOH

DATE YEAR 2001	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOCS	TCL SVOCS/PEST/PCB	TAL METALS	CYANIDE	EXPLOSIVES	APP. IX VOCS	APP. IX SVOCS PEST/PCBS	HERBICIDES	ORGANOPHOS PEST	COMMENTS
6-5	0700	17-T-060501-01	AQ	G	2	X									TRIP BLANK
	0750	17-B-19-00	SOIL	G	9			X	X	X	X	X	X	X	
	0805	17-B-19-01			6	X	X	X	X	X					
	0814	17-B-19-03			6	X	X	X	X	X					
	0823	17-B-19-05			6	X	X	X	X	X					
	0845	17-B-17-00			6	X	X	X	X	X					
	0857	17-B-17-01			9			X	X	X	X	X	X	X	
	0915	17-B-17-03			6	X	X	X	X	X					
	0921	17-B-17-05			6	X	X	X	X	X					
	0000	17-B-17-00-D			6	X	X	X	X	X					DUPLICATE
	0940	17-B-14-00			6	X	X	X	X	X					
	0953	17-B-14-01			6	X	X	X	X	X					
	1007	17-B-14-03			6	X	X	X	X	X					

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY:	6-5-01	1930	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 17-060501 | PAGE 2 OF 3

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO-157/0528	NWSCHARLESTON	LINDA KLINK 412-921-8650	KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER	ADDRESS
[illegible]		FRANK WUOKWYCH 412-921-8818	340 COUNTY RD NO.5
		CARRIER/WAYBILL NUMBER	CITY, STATE
		FED EX 8216 5043 9300	WEST BROOK ME 04098

STANDARD TAT ☑
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2001	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOCS	TCL SVOC/PEST/PCB	TAL METALS	CYANIDE	EXPLOSIVES	APP.IX VOCS	APPIX SVOCS/PEST/PCBS	HERBICIDES	ORGANOPHOS PEST	COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	P	G	P	G	G	G	G	G
PRESERVATIVE USED							HCL		HNO3	NaOH					
6-5	1020	17-B-14-05	Soil	G	6	X	X	X	X	X					
	1050	17-B-18-00			6	X	X	X	X	X					
	1100	17-B-18-01			6	X	X	X	X	X					
	1112	17-B-18-03			6	X	X	X	X	X					
	1124	17-B-18-05			6	X	X	X	X	X					
	1250	17-B-15-00			6	X	X	X	X	X					
	0000	17-B-15-00-D			6	X	X	X	X	X					DUPLICATE
	1310	17-B-15-01			6	X	X	X	X	X					
	1324	17-B-15-03			6	X	X	X	X	X					
	1337	17-B-15-05			6	X	X	X	X	X					
	1400	17-B-16-00			12	X	X	X	X	X					DO MS/MSD
	0000	17-B-16-00-D			6	X	X	X	X	X					DUPLICATE
	1433	17-B-16-01			6	X	X	X	X	X					

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY [illegible]	6-5-01	1930	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

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TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 17-060501 PAGE 3 OF 3

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO-137 10528	NWS CHARLESTON	LINDA KLINK 412-921-8650	KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER	ADDRESS
FNT W		FRANK WUOK WYCH 412-921-8868	340 COUNTY RD NO. 5
Scott W. Reid		CARRIER/WAYBILL NUMBER	CITY, STATE
		FED EX 8216 5043 9300	WEST BROOK, ME 04098

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2001	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOCS	TCL SVOCS TPEST TPCB	TAL METALS	CYANIDE	EXPLOSIVES	APP. IX VOCS	APP. IX SVOCS TPEST PCBs	HERBICIDES	ORGANOPHOS PEST	COMMENTS
		CONTAINER TYPE PLASTIC (P) or GLASS (G)				G	G	P	G	P	G	G	G	G	
		PRESERVATIVE USED						HCL		HNO3	NaOH				
6-5	1445	17-B-16-03	SOIL	G	6	X	X	X	X	X					
	1500	17-B-16-05	↓	↓	9			X	X	X	X	X	X	X	
	1550	17-R-060501-01	4Q	G	10	X	X	X	X	X					SPLIT SPOON
	1430	16-F-060501-01	↓	↓	8	X	X	X	X						
	1450	16-F-060501-02	↓	↓	8	X	X	X	X						
	1605	17-B-13-00	SOIL	G	6	X	X	X	X	X					
	1615	17-B-13-01	↓	↓	6	X	X	X	X	X					
	1624	17-B-13-03	↓	↓	6	X	X	X	X	X					
	1637	17-B-13-05	↓	↓	6	X	X	X	X	X					
	1700	17-B-10-00	↓	↓	6	X	X	X	X	X					
	1712	17-B-10-01	↓	↓	8			X	X	X	X	X	X	X	
	1723	17-B-10-03	↓	↓	6	X	X	X	X	X					
	1735	17-B-10-05	↓	↓	6	X	X	X	X	X					

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY FNT W	8-5-01	1930	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

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TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 17-060601 | PAGE 1 OF 3

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO-137/0528	NWS CHARLESTON	LINDA KLINK 412-921-8650	KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER	ADDRESS
Frank W. Scott Reid		FRANK WUDKWYCH 412-921-8868	340 COUNTY RD.
		CARRIER/WAYBILL NUMBER	CITY, STATE
		FEDEX 8216 5043 9311	WESTBROOK ME 04098

STANDARD TAT ☑
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day.

DATE YEAR 2001	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOCs	TCL SVOCs/PEST/PCBs	TAL METALS	CYANIDE	APP. IX SVOCs/PEST/PCBs	APP. IX VOCs	EXPLOSIVES	HERBICIDES	ORGANOPHOS PEST	COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G	P	G	P	G	G	G	G
PRESERVATIVE USED									HCL		HNO3	NaOH			
6-6	0800	17-T-060601-02	AQ	G	2	X									TRIPBLANK
	0830	17-B-09-00	Soil	G	12 (8)	X	X	X	X			X			DOMS/MSD
	0000	17-B-09-00-D			6	X	X	X	X			X			DUP
	0851	17-B-09-01			6	X	X	X	X			X			
	0905	17-B-09-03			6	X	X	X	X			X			
	0915	17-B-09-05			6	X	X	X	X			X			
	0930	17-B-08-00			6	X	X	X	X			X			
	0940	17-B-08-01			8			X	X	X	X	X	X	X	
	0948	17-B-08-03			6	X	X	X	X			X			
	1000	17-B-08-05			6	X	X	X	X			X			
	1015	17-B-06-00			6	X	X	X	X			X			
	1030	17-B-06-01			6	X	X	X	X			X			
	1040	17-B-06-03			6	X	X	X	X			X			

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY Frank W.	6-6-01	1930	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

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FORM NO. TtNUS-001

TRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 17-060601 PAGE 2 OF 2

PROJECT NO: CTO-137/0528	SITE NAME: NWSCHARLESTON	PROJECT MANAGER AND PHONE NUMBER: LINDA KLINK 412-921-8650	LABORATORY NAME AND CONTACT: KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE): FNW, Scott W. Yuo, JMJ		FIELD OPERATIONS LEADER AND PHONE NUMBER: FRANK WUOKWYCH 412-921-8868	ADDRESS: 340 COUNTY RD.
		CARRIER/WAYBILL NUMBER: FED EX 8216 5043 9311	CITY, STATE: WESTBROOK ME 04098

STANDARD TAT ☑
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2001	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOCs	TCL SVOCs/PEST/PCBs	TAL METALS	CYANIDE	APP. IX SVOCs/PEST/PCBs	APP. IX VOCs	EXPLOSIVES	HERBICIDES	ORGANOPHOS PEST	COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	P/G	P/G	G	G	G	G	G	
PRESERVATIVE USED								HCL		HNO3	NaOH				
6-6	1050	17-B-06-~~03~~ 05	SOIL	G	6	X	X	X	X			X			
	1110	17-B-05-00			6	X	X	X	X			X			
	1120	17-B-05-01			6	X	X	X	X			X			
	1132	17-B-05-03			6	X	X	X	X			X			
	1145	17-B-05-05			6	X	X	X	X			X			
	1300	17-B-04-00			6	X	X	X	X			X			
	1317	17-B-04-01			6	X	X	X	X			X			
	1330	17-B-04-03			6	X	X	X	X			X			
	1345	17-B-04-05			6	X	X	X	X			X			
	0000	17-B-04-05-D			6	X	X	X	X			X			DUP
	1350	17-R-060601-02	AQ	G	10	X	X	X	X			X			
	1420	17-B-03-00	SOIL	G	6	X	X	X	X			X			
	1441	17-B-03-01	SOIL	G	6	X	X	X	X			X			

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY: FNW	6-6-01	1930	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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PRE-COMPOSITE [illegible]

3/99 FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 17-060601 | PAGE 3 OF 3

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO-137/0528	NWS CHARLESTON	LINDA KUNK 412-921-8650	KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER	ADDRESS
FM W		FRANK WUDKWYCH 412-921-8868	340 COUNTY RD
Scott W. Reid		CARRIER/WAYBILL NUMBER	CITY, STATE
		FED EX 8216 5043 9311	WESTBROOK ME 04098

STANDARD TAT ☑
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2001	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOCs	TCL SVOC/PEST/PCBs	TAL METALS	CYANIDE	APP. IX SVOCs/PEST/PCBs	APP. IX VOCs	EXPLOSIVES	HERBICIDES	ORGANOPHOS PEST	COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	P	G	G	G	G	G	G	
PRESERVATIVE USED									HCL		HNO3	NaOH			
6-6	1505	17-B-03-03	Soil	G	6	x	x	x	x			x			
	1520	17-B-03-05			6	x	x	x	x			x			
	1540	17-B-07-00			6	x	x	x	x			x			
	1554	17-B-07-01			6	x	x	x	x			x			
	1603	17-B-07-03			6	x	x	x	x			x			
	1615	17-B-07-05			6	x	x	x	x			x			
	0000	17-B-07-05-D			6	x	x	x	x			x			DUP
	1635	17-B-11-00			6	x	x	x	x			x			
	1650	17-B-11-01			19			x	x	x	x	x	x	x	RUN MS/MSD
	0000	17-B-11-01-D			8			x	x	x	x	x	x	x	DUP
	1705	17-B-11-03			6	x	x	x	x			x			
	1721	17-B-11-05			6	x	x	x	x			x			

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY FM W	6-6-01	1930	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

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FORM NO. TtNUS-001

TRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 17-060701 PAGE 1 OF 2

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO-137/0528	NWS CHARLESTON	LINDA KLINK 412-921-8850	KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER	ADDRESS
		FRANK WUOKWYCH 412-921-8868	340 COUNTY RD
		CARRIER/WAYBILL NUMBER	CITY, STATE
		FED EX 8216-5043-9322	WESTBROOK ME 04098

STANDARD TAT ☑
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2001	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOCs	TCL SVOCs/PEST/PCB	TAL METALS	CYANIDE	EXPLOSIVES	APP. IX VOCs	APP. IX SVOCs/PEST PCB	HERBICIDES	ORGANOPHOS PEST	COMMENTS
		CONTAINER TYPE PLASTIC (P) or GLASS (G)				G	G	P/G	P/G	G	G	G	G	G	
		PRESERVATIVE USED						HCL		HNO3/NaOH					
6-7	0730	17-T-060701-03	AQ	G	2	X									TRIP BLANK
	0750	17-B-12-00	SOIL	G	6	X	X	X	X	X					
	0800	17-B-12-01			8			X	X	X	X	X	X	X	
	0810	17-B-12-03			6	X	X	X	X	X					
	0823	17-B-12-05			6	X	X	X	X	X					
	0920	17-B-02-00			6	X	X	X	X	X					
	0000	17-B-02-00-D			6	X	X	X	X	X					DUP
	0933	17-B-02-01			6	X	X	X	X	X					
	0943	17-B-02-03			6	X	X	X	X	X					
	0950	17-B-02-05			6	X	X	X	X	X					
	0957	17-B-01-00			8			X	X	X	X	X	X	X	
	1005	17-B-01-01			6	X	X	X	X	X					
	1012	17-B-01-03			6	X	X	X	X	X					

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6-7-01	1900	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 17-060701 | PAGE 2 OF 2

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO-137/0528	NWS CHARLESTON	LINDA KLINK 412-921-8650	KATAHDIN ANDREA COLOY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER	ADDRESS
		FRANK WUDKWYCH 412-921-8868	340 COUNTY RD
		CARRIER/WAYBILL NUMBER	CITY, STATE
		FED EX 8216-5043-9322	WESTBROOK ME 04098

STANDARD TAT ☑
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2001	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOCs	TCL SVOCs/PEST/PCB	TAL METALS	CYANIDE	EXPLOSIVES	APP. IX VOCs	APP. IX SVOCs/PEST/PCBs	HERBICIDES	ORGANO PHOS PEST	COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	P/G	P/G	G	G	G	G	G	
PRESERVATIVE USED							HCL		HNO3	NaOH					
6-7	1021	17-B-01-05	SOIL	G	6	X	X	X	X	X					
↓	1540	17-R-060701-03	AQ	G	10	X	X	X	X	X					

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
	6-7-01	1900			
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

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FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 16-061101 PAGE 1 OF 2

PROJECT NO: CTO-137/0528	SITE NAME: NWS CHARLESTON	PROJECT MANAGER AND PHONE NUMBER: LINDA KLINK 412-921-8650	LABORATORY NAME AND CONTACT: KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER AND PHONE NUMBER: FRANK WVORKWICH 412-921-8868	ADDRESS: 340 COUNTY RD
		CARRIER/WAYBILL NUMBER: FED EX 8216 5043 8360	CITY, STATE: WESTBROOK ME 04098

STANDARD TAT ☑
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2001	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOCs	TCL SVOCs/PEST/PCBs	TAL METALS	CYANIDE	EXPLOSIVES	APP. IX VOCs	APP. IX SVOCs/PEST PCBs	HERBICIDES	ORAMPHOS. PEST	COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G/P	G/P	G	G	G	G	G	
PRESERVATIVE USED						HCL		HNO3/NaOH							
6-11	0900	16-T-061101-04	AQ	G	2	X									TRIPBLANK
	0920	16-B-01-01	SOIL	G	6	X	X	X	X	X					
	0928	16-B-01-03			6	X	X	X	X	X					
	0935	16-B-01-05			6	X	X	X	X	X					
	1405	16-B-03-01			15	X	X	X	X	X					00 MS/MSD
	0000	16-B-03-01-D			6	X	X	X	X	X					DUP
	1422	16-B-03-03			8			X	X	X	X	X	X	X	
	1424	16-B-03-05			6	X	X	X	X	X					
	1444	16-B-02-01			6	X	X	X	X	X					
	1514	16-B-02-05			6	X	X	X	X	X					
	1620	16-B-04-01			8			X	X	X	X	X	X	X	
	1630	16-B-04-03			6	X	X	X	X	X					
	0000	16-B-04-03-D			6	X	X	X	X	X					DUP

1. RELINQUISHED BY: [signature]	DATE: 6-11-01	TIME: 19:30	1. RECEIVED BY	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

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FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 16-061101 | PAGE 2 OF 2

PROJECT NO: CTO-137/0528	SITE NAME: NWS CHARLESTON	PROJECT MANAGER AND PHONE NUMBER: LINDA KLINK 412-921-8650	LABORATORY NAME AND CONTACT: KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: FRANK WUDKWYCH 412-921-8868	ADDRESS: 340 COUNTY RD
		CARRIER/WAYBILL NUMBER: FED EX 8216 5043 8360	CITY, STATE: WESTBROOK ME 04098

STANDARD TAT ☑
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2001	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOCs	TCL SVOCs/PEST/PCBs	TAL METALS	CYANIDE	EXPLOSIVES					COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	P	P	G					
PRESERVATIVE USED							HCL		HNO3/NaOH						
6-11	1633	16-B-04-05	Soil	G	6	X	X	X	X	X					
↓	1750	16-R-061101-04	AQ	G	10	X	X	X	X	X					

1. RELINQUISHED BY	DATE 6-11-01	TIME 1930	1. RECEIVED BY	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

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FORM NO. TINUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 16-062101 | PAGE 1 OF 1

PROJECT NO: CTO-137/0528	SITE NAME: NWS CHARLESTON	PROJECT MANAGER AND PHONE NUMBER: LINDA KLINK 412-921-8868 8650	LABORATORY NAME AND CONTACT: KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE): Fd W		FIELD OPERATIONS LEADER AND PHONE NUMBER: FRANK WUDKWYCH 412-921-8868	ADDRESS: 95 HUTCHINS DR.
		CARRIER/WAYBILL NUMBER: FED EX 821650435728	CITY, STATE: PORTLAND ME 04102

STANDARD TAT ☑
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2001	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOCs	TCL SVOCs	TCL PEST/PCB	EXPLOSIVES	TAL METALS	CYANIDE	TCLP VOCs	TCLP INORGANICS + ORGANICS	COMMENTS
		CONTAINER TYPE PLASTIC (P) or GLASS (G)				G	G	G	G	P	P	G		
		PRESERVATIVE USED								HNO3	NaOH			
6-21	1610	16-0-062101-01	SOIL	C	2							X	X	
	1600	17-0-062101-02	↓	↓	2							X	X	
	1550	17-0-062101-03	↓	↓	2							X	X	
	1455	16-0-062101-04	↓	↓	2							X	X	
	1620	16-0-062101-05	AQ	↓	10	X	X	X	X	X	X			
	1630	17-0-062101-06	↓	↓	10	X	X	X	X	X	X			
	1730	16-0-062101-07	↓	↓	10	X	X	X	X	X	X			

1. RELINQUISHED BY: Fd W	DATE 6-22-01	TIME 1100	1. RECEIVED BY	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

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FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 17-101001 | PAGE 1 OF 1

PROJECT NO: CTO-137/0528	SITE NAME: NWS CHARLESTON	PROJECT MANAGER AND PHONE NUMBER: LINDA KLINK 412-921-8650	LABORATORY NAME AND CONTACT: KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE): FRW		FIELD OPERATIONS LEADER AND PHONE NUMBER: FRANK WUOKWYCH 412-921-8868	ADDRESS: 340 COUNTY RD
		CARRIER/WAYBILL NUMBER: FED EX 8216 5043 8407	CITY, STATE: WESTBROOK ME

STANDARD TAT ☑
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE 2001 YEAR	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC	TCL SVOC	PEST/PCBS	TAL METALS	CYANIDE	EXPLOSIVES			COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G	G	G	G			
PRESERVATIVE USED						–	–	–	–	–	–			
10-10	1335	17-B-12-01	SOIL	G	1						X			
↓	1415	17-B-01-00	↓	↓	1						X			
10-11	1440	16-S-02-00	↓	↓	13	X	X	X	X	X	X			
10-11	1500	16-S-01-00	↓	↓	6	X	X	X	X	X	X			
10-11	0800	24-T-101101	AQ	G	3	X								TRIP BLANK

1. RELINQUISHED BY: FRW	DATE 10-11-01	TIME 1930	1. RECEIVED BY: [signature]	DATE 10/12/01	TIME 9:30
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

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TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 16-101601 PAGE 1 OF

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO - 137/0528	NWS CHARLESTON	LINDA KLINK 412-921-8650	KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER	ADDRESS
Fd W		FRANK WVDKINVCH 412-921-8868	340 COUNTY RD
		CARRIER/WAYBILL NUMBER	CITY, STATE
		FED EX 8243 8234 8640	WESTBROOK, ME

STANDARD TAT ☑
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2001	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC	TCL SVOC	TCL PEST/PCB	EXPLOSIVES	TAL METALS	CYANIDE	APP. IX VOCS	APP. IX SVOCS	PEST/PCBS ORGANOCHLORINE HERB ORGANOPHOS PEST	COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G	G	P	P	G	G	G	
PRESERVATIVE USED						HCL	-	-	-	HNO3	NaOH	HCL	-	-	-
10/16	0800	16-T-101601-06	AQ	G	2	X									TRIP BLANK
	0913	16-G-015-1001	AQ	G	10	X	X	X	X	X	X				SAL = 0%
	0920	17-G-015-1001	↓	↓	10	X	X	X	X	X	X				SAL = 0%
	1230	16-W-01-1001	↓	↓	34	X	X	X	X	X	X				SAL = 1.3% MS/MSD
	1300	16-D-01-1001	Soil	↓	21	X	X	X	X	X	X				MS/MSD
	0000	16-W-01-1001-D	AQ	↓	10	X	X	X	X	X	X				DUP.
	0000	16-D-01-1001-D	Soil	↓	6	X	X	X	X	X	X				DUP.
	1330	16-W-02-1001	AQ	↓	14				X	X	X	X	X	X / X	SAL. = 1.3%
↓	1400	16-D-02-1001	Soil	↓	6				X	X	X	X	X	X / X	

1. RELINQUISHED BY Fd W	DATE 10-16-01	TIME 1930	1. RECEIVED BY Amelia R Amie	DATE 10/17/01	TIME 10:04
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

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FORM NO. TtNUS 001

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TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 17-101701 | PAGE 1 OF 1

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO-137/0528	WWS CHARLESTON	LINDA KLINK 412-921-8650	KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER	ADDRESS
[signature]		FRANK WUOKWYCH 412-921-8868	340 COUNTY RD NO. 5
		CARRIER/WAYBILL NUMBER	CITY, STATE
		FED EX 8243 8234 8651	WESTBROOK ME

STANDARD TAT ☑
RUSH TAT ☐ ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2001	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC	TCL SVOC PEST/PCBS	TAL METALS	CYANIDE	EXPLOSIVES	APP. IX VOCS	APP. IX SVOCS PEST/PCBS	ORGANOCHLOR. HERB	ORGANOPHOS. PEST	COMMENTS
		CONTAINER TYPE PLASTIC (P) or GLASS (G)				G	G	P	P	G	G	G	G		
		PRESERVATIVE USED				HCL	–	HNO_3	NaOH	–	HCL	–	–	–	
10-17	0800	17-T-101701-07	AQ	G	2	X									TRIP BLANK
	0925	17-G-045-1001			10	X	X	X	X	X					SAL = 0.0%
	0925	17-G-035-1001			14			X	X	X	X	X	X	X	SAL = 0.0%
	1510	17-W-01-1001			10	X	X	X	X	X					SAL = 1.3%
	1520	17-D-01-1001	SOIL		6	X	X	X	X	X					
	1655	17-G-025-1001	AQ		10	X	X	X	X	X					SAL = 0.0%

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
[signature]	10-17-01	1930	[signature]	10/18/01	9TG
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

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FORM NO. TINUS-001

10/19/01 10:19 FAX 2077754029 KATAHDIN ANALYTICAL 002

WK 5570 - WOR 55 11

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 16-101801 | PAGE 1 OF 1

PROJECT NO: CTO-137/0528	SITE NAME: NWS CHARLESTON	PROJECT MANAGER AND PHONE NUMBER: LINDA KLINK 412-921-8650	LABORATORY NAME AND CONTACT: KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER AND PHONE NUMBER: FRANK WOOKWYCH 412-921-8868	ADDRESS: 340 COUNTY RD. NO. 5
		CARRIER/WAYBILL NUMBER: FED EX 8243-8234-8662	CITY, STATE: WESTBROOK ME

STANDARD TAT ☑
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2001	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC	TCL SVOC PEST/PCB	TAL METALS	CYANIDE	EXPLOSIVES				COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	P	P	G				
PRESERVATIVE USED						HCL	-	HNO3	NaOH	-				
10-18	1300	16-T-101801-08	AQ	G	2	X								TRIP BLANK
	1400	16-W-03-1001	AQ		10	X	X	X	X	X				SAL = 1.4%
	1410	16-D-03-1001	SOIL		6	X	X	X	X	X				
	1420	16-W-04-1001	AQ		10	X	X	X	X	X				SAL = 1.4%
	1430	16-D-04-1001	SOIL		6	X	X	X	X	X				
	1455	16-W-06-1001	AQ		10	X	X	X	X	X				SAL = 1.3%
	1510	16-D-06-1001	SOIL		6	X	X	X	X	X				

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY [signature]	10-18-01	1900	1. RECEIVED BY FEDEX		
2. RELINQUISHED BY			2. RECEIVED BY [signature]	10/19/01	928
3. RELINQUISHED BY			3. RECEIVED BY		

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FORM NO TINUS-001

Cooler #1 & Coolers #3 WK 2365

TETRA TECH NUS, INC. — **CHAIN OF CUSTODY** — NUMBER 16-101901 — PAGE 1 OF 1

PROJECT NO: CTO-137/0528	SITE NAME: NWS CHARLESTON	PROJECT MANAGER AND PHONE NUMBER: LINDA KLINK 412-921-8650	LABORATORY NAME AND CONTACT: KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER AND PHONE NUMBER: FRANK WUDKWICH 412-921-8868	ADDRESS: 340 COUNTY RD NO. 5
		CARRIER/WAYBILL NUMBER: FED EX 8243 8234 8700	CITY, STATE: WEST BROOK ME

STANDARD TAT ☑
RUSH TAT ☐ ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2001	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC	TCL SVOC PEST	TCL PEST/PCB	TAL METALS	CYANIDE	EXPLOSIVES			COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G	P	P	G			
PRESERVATIVE USED						HCL	–	–	HNO3	NaOH	–			
10-19	0730	16-T-101901-09	AQ	G	2	X	—	—	—	—	—			TRIP BLANK
	0750	16-F-101901-03			8	X	X	X	X	X	—			
	0810	16-F-101901-04			8	X	X	X	X	X	—			
	0815	16-R-101901-05			6	X	X	—	X	X	—			
	0830	16-R-101901-06			6	X	X	—	X	X	—			
↓	1650	16-G-025 1001	↓	↓	10	X	X	X	X	X	X			SAL. = 1.6

1. RELINQUISHED BY [signature]	DATE 10-19-01	TIME 1855	1. RECEIVED BY FEDEX	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY [signature]	DATE 10/20/01	TIME 11:00
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

FORM NO. TINUS-001 3/99

10/23/01 14:58 FAX 2077754029 KATAHDIN ANALYTICAL 002/011

Cooler 1 WK35141, WK35143

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 16-102001 | PAGE 1

PROJECT NO: CTO-137/0528	SITE NAME: NWS CHARLESTON	PROJECT MANAGER AND PHONE NUMBER: LINDA KLINK 412-921-8650	LABORATORY NAME AND CONTACT: KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER AND PHONE NUMBER: FRANK WUDKWYCH 412-921-8868	ADDRESS: 340 COUNTY RD NO. 5
		CARRIER/WAYBILL NUMBER: FED EX 8216 5043 9403	CITY, STATE: WESTBROOK ME

STANDARD TAT ☑
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2001	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC	TCL SVOC	TCL PEST/PCB	TAL METALS	CYANIDE	EXPLOSIVES			COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G	P	P	G			
PRESERVATIVE USED						HCL	–	–	HNO3	NaOH	–			
10-19	1600	16-T-101901-5	AQ	G	2	X								TRIPBLANK
	1623	16-G-045-1001			24	X	X	X	X	X	X			SAL = 1.3%/MSL
	0000	16-G-045-1001-D			10	X	X	X	X	X	X			DUP
10-20	1715	16-G-055-1001			10	X	X	X	X	X	X			SAL = 1.2%
	1715	16-G-035-1001			10	X	X	X	X	X	X			SAL = 1.6%
10-21	1710	16-W-05-1001			10	X	X	X	X	X	X			SAL = 1.4%
	1715	16-O-05-1001	SOIL		6	X	X	X	X	X	X			
	1725	16-W-07-1001	AQ		10	X	X	X	X	X	X			SAL = 1.5%
	1735	16-O-07-1001	SOIL		6	X	X	X	X	X	X			

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY [signature]	10-22-01	1100	1. RECEIVED BY FEDEX		
2. RELINQUISHED BY			2. RECEIVED BY [signature]	10-23-01	0915
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

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FORM NO. TINUS-001

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TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 17-030702 | PAGE 1 OF 1

PROJECT NO: CTO-137/052B	SITE NAME: NWS CHARLESTON	PROJECT MANAGER AND PHONE NUMBER: LINDA KLINK 412-921-8650	LABORATORY NAME AND CONTACT: KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER AND PHONE NUMBER: FRANK WUDKWYCH 412-921-8868	ADDRESS: 340 COUNTY RD NO. 5
		CARRIER/WAYBILL NUMBER: FED EX 8216 5043 5794	CITY, STATE: WESTBROOK ME

STANDARD TAT ☐
RUSH TAT ☑
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☑ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: HCL

DATE YEAR 2002	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: TCL VOC								COMMENTS
3-7	0900	17-T-030702-10	AQ	G	2	X								TRIPBLANK
	1210	17-Q-01-0302			3	X								
	1302	17-Q-02-0302			3	X								
	1332	17-Q-03-0302			3	X								
	1412	17-Q-04-0302			3	X								
	1841	17-Q-075-0302			3	X								

1. RELINQUISHED BY: [signature]	DATE 3-7-02	TIME 1930	1. RECEIVED BY: [signature]	DATE 3/8/02	TIME 905
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

FORM NO TINUS-001 3/95

KATAHDIN ANALYTICAL 03/08/02 10:26 FAX 2077754029 002

WS0524

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 17-030802 | PAGE 1 OF 1

PROJECT NO: CTO-137/0528	SITE NAME: NWS CHARLESTON	PROJECT MANAGER AND PHONE NUMBER: LINDA KLINK 412-921-8650	LABORATORY NAME AND CONTACT: KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE): FRW		FIELD OPERATIONS LEADER AND PHONE NUMBER: FRANK WUDKWYCH 412-921-8868	ADDRESS: 340 COUNTY RD NO. 5
		CARRIER/WAYBILL NUMBER: FED EX 821650435809	CITY, STATE: WEST BROOK ME

STANDARD TAT ☐
RUSH TAT ☑
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☑ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: HCL

DATE YEAR 2002	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: TCL VOC								COMMENTS
3-8	0700	17-T-030802-11	AQ	G	2	X								TRIP BLANK
	0904	17-Q-07D0302			3	X								
	1050	17-Q-06D-0302			3	X								
	1110	17-Q-06S-0302			3	X								
	1342	17-Q-10S-0302			3	X								
	1430	17-Q-05-0302			3	X								
	1440	17-Q-10D-0302			3	X								
	1800	17-Q-08D-0302			3	X								
	1825	17-Q-08S-0302			3	X								

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY: FRW	3-8-02	1930	1. RECEIVED BY: [illegible]	3/9/02	1130
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

3/99
FORM NO. TINUS-001

WS0528

TETRA TECH NUS, INC.

CHAIN OF CUSTODY | NUMBER 17-030902 | PAGE 1 OF 1

PROJECT NO: CTO- 137/0528	SITE NAME: NWS CHARLESTON	PROJECT MANAGER AND PHONE NUMBER: LINDA KLINK 412-921-8650	LABORATORY NAME AND CONTACT: KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER AND PHONE NUMBER: FRANK WUDKWYCH 412-921-8868	ADDRESS: 340 COUNTY RD NO.5
		CARRIER/WAYBILL NUMBER: FED EX 82165043 5810	CITY, STATE: WESTBROOK ME

STANDARD TAT ☐
RUSH TAT ☑
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☑ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: HCL

DATE YEAR 2002	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: TCL VOCs							COMMENTS
3-9	0630	17-T-030902-12	AQ	G	2	X							TRIP BLANK
	0650	17-Q-090-0302	↓	↓	3	X							
	0705	17-Q-095-0302	↓	↓	3	X							

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY [signature]	3-9-02	1000	1. RECEIVED BY [signature]	3/11/02	900
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

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FORM NO. TINUS-001

005/007
KATAHDIN ANALYTICAL
03/11/02 10:28 FAX 2077754029

WTO955

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 17042603 PAGE 1 OF 1

PROJECT NO: CTO 137/0528	SITE NAME: NWS CHARLESTON	PROJECT MANAGER AND PHONE NUMBER: LINDA KLINK 412-921-8650	LABORATORY NAME AND CONTACT: KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE): FNW		FIELD OPERATIONS LEADER AND PHONE NUMBER: FRANK WUDKWYCH 412-921-8868	ADDRESS: 340 COUNTY RD. No. 5
		CARRIER/WAYBILL NUMBER: FED EX 8216 5043 5842	CITY, STATE: WESTBROOK, ME

STANDARD TAT ☑
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G)

PRESERVATIVE USED

DATE YEAR 2003	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: TCL VOCs								COMMENTS
4-26	0700	17-T-042603-1	AQ	G	2	X								TRIP BLANK
	0935	17-Q-11-0403			3	X								
	1010	17-Q-12-0403			3	X								
	1050	17-Q-13-0403			3	X								
	1140	17-Q-14-0403			3	X								
	1220	17-Q-15-0403			3	X								
	0000	17-Q-15-0403-D			3	X								
	1335	17-Q-17-0403			3	X								
	1405	17-Q-16-0403			3	X								
	1430	17-Q-18-0403			3	X								

1. RELINQUISHED BY: FNW	DATE: 4-26-03	TIME: 1600	1. RECEIVED BY: [signature]	DATE: 4-26-03	TIME: 1500
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

3/99
FORM NO. TtNUS-001

WT0960 + WT0966 + WT0962 + WT0963

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 17042703 | PAGE 1 OF 5

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO137/0528	NWSCHARLESTON	LINDA KLINK 412-921-8650	KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER	ADDRESS
[signature]		FRANK WUOKWYCH 412-921-8868	340 COUNTY RD. NO. 5
		CARRIER/WAYBILL NUMBER	CITY, STATE
		FED EX 8316 7332 6620	WESTBROOK, ME

STANDARD TAT ☑
RUSH TAT ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: HCL
TYPE OF ANALYSIS: TCL VOCs

DATE YEAR 2003	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOCs	COMMENTS
4-27	0700	17-T-042703-02	AQ	G	2	X	TRIP BLANK
	0810	17-Q-19-0403			3	X	
	0835	17-Q-20-0403			3	X	
	0915	17-Q-21-0403			9	X	MS/MSD
	0945	17-Q-22-0403			3	X	
	1020	17-Q-23-0403			3	X	
	1055	17-Q-24-0403			3	X	
	1125	17-Q-25D-0403			3	X	
	1155	17-Q-25S-0403			3	X	
	1305	17-Q-26-0403			3	X	
	0000	17-Q-26-0403-D			3	X	DUP
	1410	17-Q-27-0403			3	X	
	1435	17-Q-28-0403			3	X	

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY [signature]	4-28-03	1930	1. RECEIVED BY [signature]	4/28/03	0955
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

FORM NO. TTNUS-001 3/99

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 17042703 PAGE 2 OF 3

PROJECT NO: CTO 137/0528	SITE NAME: NWSCHARLESTON	PROJECT MANAGER AND PHONE NUMBER: LINDA KLINK 412-921-8630	LABORATORY NAME AND CONTACT: KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER AND PHONE NUMBER: FRANK WUDKWYCH 412-921-8868.	ADDRESS: 340 COUNTY RD. NO.5
		CARRIER/WAYBILL NUMBER: FED EX 8316 7332 6620	CITY, STATE: WESTBROOK, ME

STANDARD TAT ☑
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G
PRESERVATIVE USED: HCL -

DATE YEAR 2003	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOCs	TS							COMMENTS
4-27	1500	17-Q-29-0403	AQ	G	3	X								
	1525	17-Q-30-0403			3	X								~~DUP~~ FEW
	0000	17-Q-30-0403-D			3	X								DUP
	1555	17-Q-31-0403			3	X								
	1610	17-F-042703-01			3	X								
	1645	17-F-042703-02			3	X								
4-28	0800	17-B-23-00	SOIL		5	X	X							
	0805	17-B-23-01			5	X	X							
	0810	17-B-23-03			5	X	X							
	0825	17-B-22-00			5	X	X							
	0825	17-B-22-01			5	X	X							
	0000	17-B-22-01-D			5	X	X							DUP
	0835	17-B-22-03			5	X	X							

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY [signature]	4-28-03	1930	1. RECEIVED BY [signature]	4/29/03	0955
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

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3/99
FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 17042703 | PAGE 3 OF 5

PROJECT NO: CTO 137/0528	SITE NAME: NWXS CHARLESTON	PROJECT MANAGER AND PHONE NUMBER: LINDA KLINK 412-921-8650	LABORATORY NAME AND CONTACT: KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE): FWW		FIELD OPERATIONS LEADER AND PHONE NUMBER: FRANK WUOKWych 412-921-8868	ADDRESS: 340 COUNTY RD NO.5
		CARRIER/WAYBILL NUMBER: FED EX 8316 7332 6620	CITY, STATE: WEST BROOK ME

STANDARD TAT ☑ RUSH TAT ☐ ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): P G

PRESERVATIVE USED: – –

DATE YEAR 2003	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOCs	TS							COMMENTS
4-28	1015	17-B-27-00	SOIL	G	5	X	X							
	1020	17-B-27-01			5	X	X							
	1025	17-B-27-03			5	X	X							
	1035	17-B-21-00			5	X	X							
	1040	17-B-21-01			13	X	X							MS/MSD
	1050	17-B-21-03			5	X	X							
	1105	17-B-20-00			5	X	X							
	1110	17-B-20-01			5	X	X							
	1115	17-B-20-03			5	X	X							
	1135	17-B-24-00			5	X	X							
	0000	17-B-24-00-D			5	X	X							DUP
	1140	17-B-24-01			5	X	X							
	1145	17-B-24-03			5	X	X							

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY: FWW	4-28-03	1930	1. RECEIVED BY: [illegible]	4/29/03	0955
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

FORM NO. US-001 3/99

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 17042703 PAGE 4 OF 5

PROJECT NO: CTO 137/0528	SITE NAME: NWS CHARLESTON	PROJECT MANAGER AND PHONE NUMBER: LINDA KLINK 412-921-8650	LABORATORY NAME AND CONTACT: KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER AND PHONE NUMBER: FRANK WUDKEWYCH 412-921-8868	ADDRESS: 340 COUNTY RD. NO.5
		CARRIER/WAYBILL NUMBER: FED EX 8316 7332 6620	CITY, STATE: WESTBROOK ME

STANDARD TAT ☑
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): P G

PRESERVATIVE USED

TYPE OF ANALYSIS: TCL, VOCs, TS

DATE YEAR 2007	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL, VOCs	TS							COMMENTS
4-28	1200	17-B-28-00	SOIL	G	5	X	X							
	1205	17-B-28-01			5	X	X							
	1210	17-B-28-03			5	X	X							
	1330	17-B-26-00			5	X	X							
	1335	17-B-26-01			5	X	X							
	1340	17-B-26-03			5	X	X							
	0000	17-B-26-03-D			5	X	X							DUP
	1350	17-B-29-00			5	X	X							
	1355	17-B-29-01			5	X	X							
	1400	17-B-29-03			5	X	X							
	1410	17-B-25-00			5	X	X							
	1415	17-B-25-01			5	X	X							
	1420	17-B-25-03			13	X	X							MS/MSD

1. RELINQUISHED BY [signature]	DATE 4-28-07	TIME 1930	1. RECEIVED BY [signature]	DATE 4/29/07	TIME 0955
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

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FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 17042803 | PAGE 5 OF 5

PROJECT NO: CTO 137/0528	SITE NAME: NWS CHARLESTON	PROJECT MANAGER AND PHONE NUMBER: LINDA KLINK 412-921-8650	LABORATORY NAME AND CONTACT: KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER AND PHONE NUMBER: FRANK WUDKWYCH 412-921-8868	ADDRESS: 340 COUNTY RD. NO.5
		CARRIER/WAYBILL NUMBER: FED EX 8316 7332 6620	CITY, STATE: WESTBROOK, ME

STANDARD TAT ☑
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2003	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOCs	TCL SVOCs	TCL PEST/PCBs	EXPLOSIVES	TAL METALS	CYANIDE	TCLP ORGANICS	TCLP INORGANICS	COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G	G	P	P	G	G	
PRESERVATIVE USED						HCL	✓	✓	✓	HNO3	NaOH	—	—	
4-28	1510	17-R-042803-01	AQ	G	3	X								
	1515	17-O-042803-03	SOIL	G	2							X	X	
	1530	17-O-042803-01	AQ	G	11	X	X	X	X	X	X			
	1545	17-O-042803-02	AQ	G	11	X	X	X	X	X	X			
	1600	17-O-042803-04	SOIL	G	2							X	X	
	1720	17-R-042803-02	AQ	G	3	X								

1. RELINQUISHED BY [signature]	DATE 4-28-03	TIME 1930	1. RECEIVED BY [signature]	DATE 04/29/03	TIME 0955
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

FORM NO. TTNUS-001 3/99

WWO NOT [illegible]

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 170324041 PAGE 1 OF

PROJECT NO: CTO 137/0528	SITE NAME: NWSCHARLESTON	PROJECT MANAGER AND PHONE NUMBER: LINDA KLINK 412-921-8650	LABORATORY NAME AND CONTACT: KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER AND PHONE NUMBER: FRANK WUOKWYCH 412-921-8868	ADDRESS: 340 COUNTY RD. NO. 5
		CARRIER/WAYBILL NUMBER: FED EX 8412 2491 2582	CITY, STATE: WESTBROOK, ME

STANDARD TAT ☑
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2004	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOCs	TCL SVOCs	PEST / PCBs	TAL METALS	CYANIDE	EXPLOSIVES	TCLP ORGANICS	TCLP INORGANICS	COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G	P	P	G	G	G	
PRESERVATIVE USED						HCL	—	—	HNO3	NaOH	—	—	—	
3-24	0740	17-0-032404-2	AQ	G	11	X	X	X	X	X	X			
↓	0800	17-0-032404-3	↓	C	11	X	X	X	X	X	X			
↓	0815	17-0-032404-1	SOIL	C	2							X	X	

1. RELINQUISHED BY [signature]	DATE 3/24/04	TIME 1600	1. RECEIVED BY [signature]	DATE 3/25/04	TIME 0845
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

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FORM NO. TtNUS-001

3 [illegible]

225702

Katahdin Analytical Services
340 County Road No. 5
P.O. Box 720
Westbrook, ME 04092
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Page ____ of ____

Client: Katahdin
Contact: Andrea Colby
Phone #: ( )
Fax #: ( )
Address: As Above
City:
State:
Zip Code:
Purchase Order #:
Proj. Name / No.: WU0788
Katahdin Quote #:
Bill (if different than above):
Address:
Sampler (Print / Sign):
Copies To:

LAB USE ONLY
WORK ORDER #:
KATAHDIN PROJECT NUMBER
REMARKS: Subbed to Pace

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT
AIRBILL NO:
TEMP°C ____ ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Explosives 8330	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N
	170-032404-2	3/25 / 7:40	AQ	2	X										
	170-032404-3	↓ / 800	AQ	2	X										
		/													
		/													
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		/													
		/													

COMMENTS: EDD: KAS 050 QC-TXT 4.2°C

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
[illegible]	3/25/04 1400	Barbara Sumstar 3/26/04 10:10			
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

THE TERMS AND CONDITIONS ON THE REVERSE SIDE HEREOF SHALL GOVERN SERVICES, EXCEPT WHEN A SIGNED CONTRACTUAL AGREEMENT EXISTS.

ORIGINAL

KAS-COC1

COOKER 10 F a

TRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER WU0207 PAGE ___ OF ___

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT: 207 874 2400
0528	CHARLESTON NWS	LINDA KLINK 412 921 8650	KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER	ADDRESS
Fred W Ramser ROY BC		FRED W RAMSER 412-921-8838	340 COUNTRY RD #5
		CARRIER/WAYBILL NUMBER	CITY, STATE
		FED EX 8447 8135 5156	WESTBROOK, ME 04092

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOCs	TCL SVOC	TAL METALS	CYANIDE	PEST/PCBS				COMMENTS
					CONTAINER TYPE PLASTIC (P) or GLASS (G)	G	G	P	P	G				
					PRESERVATIVE USED	HCL 4°C	4°	HNO3	NaOH	4°				
1-13	0800	17-T-011305-01	AQ	FROM LAB	2	2								TRIP BLANK
1-13	0915	17-Q-47-0105	AQ	G	3	3								
1-13	1055	17-Q-48-0105	AQ	G	3	3								
1-13	1230	17-Q-49-0105	AQ	G	3	3								
1-13	1500	17-Q-50-0105	AQ	G	3	3								
1-13	1645	17-Q-51-0105	AQ	G	3	3								
1-13	1645	17-R-011305-01	AQ	G	9	3	2	1	1	2				
1-14	1200	17-F-011405-01	AQ	G	9	3	2	1	1	2				
1-14	1640	17-F-011405-02	AQ	G	9	3	2	1	1	2				

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY Fred W Ramser	1-14-05	1830	1. RECEIVED BY FED EX	1-14-05	
2. RELINQUISHED BY Fedex			2. RECEIVED BY Amy Broadbent	1-15-05	1130
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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FORM NO. TtNUS-001

8100018

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 233500 | PAGE ___ OF ___

PROJECT NO: 0528	SITE NAME: CHARLESTON NWS	PROJECT MANAGER AND PHONE NUMBER: LINDA KLINK 412 921 8650	LABORATORY NAME AND CONTACT: STL 708 534 5200
SAMPLERS (SIGNATURE): Fred W Ramser		FIELD OPERATIONS LEADER AND PHONE NUMBER: FRED W RAMSER 412-921-8838	ADDRESS: 2417 BOND ST
		CARRIER/WAYBILL NUMBER: FED EX 8412 2491 0125	CITY, STATE: UNIVERSITY PARK, IL 60466

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C

	DATE YEAR	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: EXPLOSIVES								COMMENTS
1	1/13 2005	1645	17-R-011305-01	AQ	G	2	2								

1. RELINQUISHED BY: Fred W Ramser	DATE 1-14-05	TIME 1830	1. RECEIVED BY: FED EX	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY: [illegible]	DATE 1/15/05	TIME 0900
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS: FROM KATAHDIN ANDREA COLBY 207 874 2400

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TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 4356 PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
0528	CHARLESTON NWS	LINDA KLINK	412-921-8650	KATAHDIN ANDREA COLBY 2078742400
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
Fred Ramser, Ben Cole		FRED W RAMSER	412-921-8838	304 COUNTRY Rd #5
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FEDEX 8412 2491 0103		WESTBROOK, ME 04092

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G P P G

PRESERVATIVE USED: HCL 4° 4° HNO3 NaOH 4°

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC's	TCL SVOC's	TAL METALS	CYANIDE	PEST/PCB's				COMMENTS
1/15	0735	17-Q-32-0105	—	—	—	AQ	G	9	3	2	1	1	2				
1/15	0000	17-Q-32-0105-D	—	—	—	AQ	G	9	3	2	1	1	2				
1/15	1235	17-Q-34-0105	—	—	—	AQ	G	9	3	2	1	1	2				
1/15	1505	17-Q-52-0105	—	—	—	AQ	G	3	3								
1/15	0915	17-Q-53-0105	—	—	—	AQ	G	27	9	6	3	3	6				MS/MSD
1/15	1340	17-Q-54-0105	—	—	—	AQ	G	3	3								
1/15	0000	17-Q-54-0105-D	—	—	—	AQ	G	3	3								
1/15	1630	17-Q-56-0105	—	—	—	AQ	G	3	3								
1/15	0000	17-Q-56-0105-D	—	—	—	AQ	G	3	3								
1/15	1715	17-Q-59-0105	—	—	—	AQ	G	3	3								
1/15	0800	17-T-011505-01	—	—	—	AQ	FROM LAB	2	2								
1/16	0930	17-Q-39-0105	—	—	—	AQ	G	9	3	2	1	1	2				
1/16	0000	17-Q-39-0105-D	—	—	—	AQ	G	9	3	2	1	1	2				

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY Fred Ramser	1-17-05	1430	1. RECEIVED BY FED EX	1-17-05	
2. RELINQUISHED BY			2. RECEIVED BY [signature]	1/18/05	0855
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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0000019

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 4355 | PAGE 2 OF 4

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
0528	CHARLESTON NWS	LINDA KLINK	412-921-8650	KATAHDIN ANDREA COLBY 2078742400
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
Fred W Ranser / B Cole		FRED W RANSER	412-921-8838	340 COUNTRY Rd #5
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FEDEX 8412 2491 0103		WESTBROOK, ME 04092

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC's	TCL SVOC's	TAL METALS	CYANIDE	PEST/PCB's				COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	P	P	G				
PRESERVATIVE USED									HCL 4°	4°	NaO3	NaOH	4°				
1/16	0920	17-Q-37-0105	—	—	—	AQ	G	9	3	2	1	1	2				
1/16	1105	17-Q-38-0105	—	—	—	AQ	G	3	3								
1/16	1245	17-Q-40-0105	—	—	—	AQ	G	9	3	2	1	1	2				
1/16	1220	17-Q-43-0105	—	—	—	AQ	G	9	3	2	1	1	2				
1/16	1400	17-Q-62-0105	—	—	—	AQ	G	3	3								
1/16	1445	17-Q-46-0105	—	—	—	AQ	G	9	3	2	1	1	2				
1/16	0800	TB-011605-01	—	—	—	AQ	FROM LAB	2	2								
1/16	1535	17-Q-57-0105	—	—	—	AQ	G	9	9								MS/MSD
1/16	1550	17-Q-63-0105	—	—	—	AQ	G	3	3								
1/16	1655	17-Q-58-0105	—	—	—	AQ	G	3	3								
1/16	1700	17-Q-64-0105	—	—	—	AQ	G	3	3								
1/17	0930	17-Q-36-0105	—	—	—	AQ	G	9	3	2	1	1	2				
1/17	1110	17-Q-41-0105	—	—	—	AQ	G	9	3	2	1	1	2				

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY Fred W Ranser	1-17-05	1930	1. RECEIVED BY FED Ex	1-17-05	
2. RELINQUISHED BY			2. RECEIVED BY [signature]	1/18/05	0855
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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FORM NO. TtNUS-001

000020

#1/19 ~~WV0217~~ WV0217, WV0220

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 4336 PAGE 3 OF

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
0528	CHARLESTON NWS	LINDA KLINK	412-921-8650	207874 2400 KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
Fred W Ramser, Brian Cole		FRED W. RAMSER	412-921-8838	340 COUNTRY Rd #5
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FEDEX 8412 2491 0103		WESTBROOK ME 04092

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC's	TCL SVOC's	TAL METALS	CYANIDE	PEST/PCB's				COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	P	P	G				
PRESERVATIVE USED									HCL 40	40	HNO3	NaOH 40					
1/17	1220	17-Q-35-0105	—	—	—	AQ	G	9	3	2	1	1	2				
1/17	1300	17-Q-44-0105	—	—	—	AQ	G	9	3	2	1	1	2				
1/17	1515	17-Q-61-0105	—	—	—	AQ	G	3	3								
1/17	1455	17-Q-33-0105	—	—	—	AQ	G	9	3	2	1	1	2				
1/17	1610	17-Q-60-0105	—	—	—	AQ	G	3	3								
1/17	1705	17-Q-42-0105	—	—	—	AQ	G	9	3	2	1	1	2				
1/17	1710	17-Q-55-0105	—	—	—	AQ	G	3	3								

1. RELINQUISHED BY Fred W Ramser	DATE 1-17-05	TIME 1930	1. RECEIVED BY FED EX	DATE 1-17-05	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY [signature]	DATE 1/18/05	TIME 0855
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

000021

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FORM NO. TtNUS-001

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 4337

PAGE 4 OF 4

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
0528	CHARLESTON NWS	LINDA KLINK	412 921 8650	KATAHDIN ANDREA COLBY 207 874 2400
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
Fred W Ranger		FRED W RANGER	412 921 8838	304 COUNTRY Rd #5
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FEDEX 8412 2491 0103		WESTBROOK, ME 04092

STANDARD TAT ☑
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TAL METALS	CYANIDE	ORGANOCHLOR HERB	ORGANOPHOS PEST	APP 9 VOC	APP 9 SVOC	APP 9 PEST/PCB'S	COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									P	P	G	G	G	G	G	
PRESERVATIVE USED									HNO3 4°	NaOH 4°	4°	4°	4°	4°	4°	
1/17	0705	17-Q-45-0105	—	—	—	AQ	G	13	1	1	2	2	3	2	2	

1. RELINQUISHED BY Fred W Ranger	DATE 1-17-05	TIME 1930	1. RECEIVED BY FED EX	DATE 1-17-05	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY [signature]	DATE 1/18/05	TIME 0815
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

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FORM NO. TtNUS-001

000022

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE 1 OF 2 233561

PROJECT NO: 0528	SITE NAME: CHARLESTON NWS	PROJECT MANAGER AND PHONE NUMBER: LINDA KLINK 4129218650	LABORATORY NAME AND CONTACT: STL 708 534 5200
SAMPLERS (SIGNATURE): Fred W Ramser, Ben Cole		FIELD OPERATIONS LEADER AND PHONE NUMBER: FRED W RAMSER 4129218838	ADDRESS: 2417 BOND ST
		CARRIER/WAYBILL NUMBER: FEDEX 8412 2491 0114	CITY, STATE: UNIVERSITY PARK, IL 60466

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°

	DATE YEAR 2005	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: EXPLOSIVES							COMMENTS
1	1/15	0935	17-Q-32-0105	AQ	G	2	2							
2	1/15	0000	17-Q-32-0105-D	AQ	G	2	2							
3	1/15	1235	17-Q-34-0105	AQ	G	2	2							
4	1/15	0915	17-Q-53-0105	AQ	G	6	6							MS/MSD
5	1/16	0930	17-Q-39-0105	AQ	G	2	2							
6	1/16	0000	17-Q-39-0105-D	AQ	G	2	2							
7	1/16	0920	17-Q-37-0105	AQ	G	2	2							
8	1/16	1245	17-Q-40-0105	AQ	G	2	2							
9	1/16	1220	17-Q-43-0105	AQ	G	2	2							
10	1/16	1445	17-Q-46-0105	AQ	G	2	2							
11	1/17	0705	17-Q-45-0105	AQ	G	2	2							
12	1/17	0930	17-Q-36-0105	AQ	G	2	2							
13	1/17	1110	17-Q-41-0105	AQ	G	2	2							

1. RELINQUISHED BY: Fred W Ramser	DATE: 1-17-05	TIME: 1930	1. RECEIVED BY: FED Ex	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY: [illegible]	DATE: 1/18/05	TIME: 0940
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS: FROM KATAHDIN ANDREA COLBY 207 874 2400

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STL Chicago

3/99

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 4357 | PAGE 2 OF 2 ~~233564~~ 233351

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
0528	CHARLESTON NWS	LINDA KLINK	412-921-8650	STL 708 534 5200
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
Fred W Ramser, Brian Cole		FRED W RAMSER	412-921-8838	2417 BOND ST
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FEDEX 8412 2491 0114		UNIVERSITY PARK, IL, 60466

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 40
TYPE OF ANALYSIS: EXPLOSIVES

	DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS									COMMENTS
14	1/17	1220	17-Q-35-0105	—	—	—	AQ	G	2	2								
15	1/17	1300	17-Q-44-0105	—	—	—	AQ	G	2	2								
16	1/17	1455	17-Q-33-0105	—	—	—	AQ	G	2	2								
17	1/17	1705	17-Q-42-0105	—	—	—	AQ	G	2	2								

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY: Fred W Ramser	1-17-05	1930	1. RECEIVED BY: FED EX		
2. RELINQUISHED BY			2. RECEIVED BY: [illegible]	1/18/05	0940
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS: FROM KATAHDIN ANDREA COLBY 207 874 2400

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235503

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 4309 PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
0528	NWS Charleston	LINDA KLINK	412 921 8650	STL 708 534 5200
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
Brian Cole, Fred Ramser		FRED RAMSER	412 921 8838	2417 BOND STREET
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED EX 844781355031		UNIVERSITY PARK, IL 60466

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C

	DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: Explosives								COMMENTS
3	1/18	1330	17-R-011805-02	X	X	X	QC	G	2	2								
4	1/18	1500	17-O-011805-01	X	X	X	GW	C	2	2								
	1/18	1110	16-S-03-00	X	0	1	SO	G	1	1								
	1/18	1125	16-S-04-00	X	0	1	SO	G	1	1								
	1/18	1250	17-B-30-02	X	2	4	SO	G	1	1								
	1/18	0000	17-B-31-02-D	X	2	4	SO	G	1	1								
	1/18	1330	17-B-31-02	X	2	4	SO	G	1	1								
	1/18	1500	17-B-32-03	X	3	5	SO	G	1	1								
	1/18	1540	17-B-33-03	X	3	5	SO	G	1	1								
	1/18	1700	17-B-34-06	X	6	8	SO	G	3	3								MS/MSD

1. RELINQUISHED BY: Fred Ramser	DATE 1-18-05	TIME 1900	1. RECEIVED BY FED EX	DATE 01/18/05	TIME 1900
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE 1/19/05	TIME 1000
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

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FORM NO. TtNUS-001

STL Chicago

WV0245

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 4347 | PAGE 1 OF 2

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
0528	NWS Charleston	LINDA KLINK	412 921 8650	KATAHDIN Andre Colby 207 8742400
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
Ben Cole / Fred Ramser		FRED RAMSER	412 921 8838	304 COUNTY ROAD #5
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED EX		WESTBROOKE, ME 04092

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G P P G
PRESERVATIVE USED: HCl 4°C HNO_3 NaOH 4°C

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOCs	TCL SVOCs	TAL Metals	Cyanide	Pest/PCBs	App 9 VOCs 8C			COMMENTS
1/18	1330	17-R-011805-02	X	X	X	QC	G	9	3	2	1	1	2				
1/18	1500	17-O-0118-05-01	X	X	X	GW	C	9	3	2	1	1	2				
1/18	0800	17-T-011805-01	X	X	X	QC	G	2	2	X	X	X	X				

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY Fred Ramser	1-18-05	1900	1. RECEIVED BY FED EX	01/18/05	1900
2. RELINQUISHED BY			2. RECEIVED BY [signature]	1/19/05	0840
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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FORM NO. TtNUS-001

CCUUU

WV0244

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 4310 PAGE 2 OF

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
0528	NWS Charleston	LINDA KLINK	412 921 8650	KATAHDIN Andrea Colby 207 874 2400
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
Ben Cole, Fred Ramser		FRED RAMSER	412 921 8838	304 COUNTY ROAD #5
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED EX		WESTBROOKE, ME 04092

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC	TCLSVOC; PEST/PCB/TOC	TAL Metals; CN-	App 9 VOC	OP-PEST	HERBICIDE	TCLP Organic	TCLP Inorganic	COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									P	G	G	G	G	G	G	G	
PRESERVATIVE USED									4°C	4°C	4°C	4°C	4°C	4°C	4°C	4°C	
1/18	1110	16-S-03-00	X	0	1	SO	G	6	4	1	1	X	X	X	X	X	
1/18	1125	16-S-04-00	X	0	1	SO	G	6	4	1	1	X	X	X	X	X	
1/18	1600	17-0-011805-02	X	X	X	SO	C	2	X	X	X	X	X	X	L	L	
1/18	1250	17-B-30-02	X	2	4	SO	G	6	4	1	1	X	X	X	X	X	
1/18	0000	17-B-31-02-D	X	2	4	SO	G	6	4	1	1	X	X	X	X	X	
1/18	1330	17-B-31-02	X	2	4	SO	G	6	4	1	1	X	X	X	X	X	
1/18	1500	17-B-32-03	X	3	5	SO	G	8	X	1	1	4	1	1	X	X	
1/18	1540	17-B-33-03	X	3	5	SO	G	6	4	1	1	X	X	X	X	X	
1/18	1700	17-B-34-06	X	6	8	SO	G	18	~~24~~	3	3	X	X	X	X	X	MS/MSD

1. RELINQUISHED BY Fred Ramser	DATE 1-18-05	TIME 1900	1. RECEIVED BY FED EX	DATE 01/18/05	TIME 1900
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY [signature]	DATE 1/19/05	TIME 0840
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

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000011

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER WV0697 4339 PAGE 1 OF 1 3-4

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
JOB #0528	CHARLESTON NWS	LINDA KLINK	412-921-8650	KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
Fred Ramser for Brian Cole		FRED RAMSER	412-921-8838	340 COUNTRY RD. #5
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED EX #8447 8135 5053		WESTBROOK, ME 04092

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC	TCL SVOC	TAL METALS	CN	PEST/PCBs				COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	PE	PE	G				
PRESERVATIVE USED									HCL 4°	4°	HNO_3 4°	NaOH	4°				
2/14	1645	17-G-035-0205	—	—	—	GW	G	9	3	2	1	1	2				
2/14	0000	17-G-035-0205-D	—	—	—	GW	G	9	3	2	1	1	2				
2/15	1030	17-G-215-0205	—	—	—	GW	G	27	9	6	3	3	6				RUN MS/MSD
2/14	0900	17-T-021405-01	—	—	—	AQ	FROM LAB	2	2								TRIP BLANK

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY Fred Ramser	2-15-05	1800	1. RECEIVED BY FED EX	2-15-05	1800
2. RELINQUISHED BY			2. RECEIVED BY [signature]	2/16/05	0930
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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FORM NO. TtNUS-001

000020

TtRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 4338 1 PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO 137 JOB 0528	CHARLESTON NWS	LINDA KLINK	412-921-8650	STL
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
Fred W Ramser for Brian Cole		FRED W RAMSER	412-921-8838	2417 BOND ST.
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED EX AIRBILL# 84478135 5064		UNIVERSITY PARK, IL 60466

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C
TYPE OF ANALYSIS: EXPLOSIVES

	DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	EXPLOSIVES	COMMENTS
1	2/14	1645	17-G-035-0205	—	—	—	GW	G	2	✓	
2	2/14	0000	17-G-035-0205-D	—	—	—	GW	G	2	✓	
3	2/15	1030	17-G-21S-0205	—	—	—	GW	G	6	✓	RUN MS/MSD

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY Fred W Ramser	2-15-05	1800	1. RECEIVED BY FED EX	2-15-05	1800
2. RELINQUISHED BY			2. RECEIVED BY	2/16/05	0900
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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FORM NO. TtNUS-001

STL Chicago

WV079 1

J-6

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 4340 | PAGE 1 OF 2

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
0528	Charleston NWS	Linda Klink	412/921-8650	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		Fred W. Ramser	412/921-8838	340 Country Rd. #5
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED Ex 8447 8135 6976		West Brook, ME 04092

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC's	TCL SVOC's	TAL METAL	CN	PEST/PCB's	~~EXPLOSIVES~~			COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	P	P	G				
PRESERVATIVE USED									HCL	NONE	HNO3	NaOH	NONE				
2/23	0900	17-T-0223-05-01	—	—	—	QC	FROM LAB	2	✓								TRIP BLANK
2/23	1100	17-G-22S-0205	—	—	—	GW	G	9	3	2	1	1	2				
2/23	0000	17-G-22S-0205-D	—	—	—	GW	G	9	3	2	1	1	2				
2/23	1610	16-G-03S-0205	—	—	—	GW	G	9	3	2	1	1	2				
2/23	1630	16-G-05S-0205	—	—	—	GW	G	9	3	2	1	1	2				

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY Fred W Ramser	2-23-05	1900	1. RECEIVED BY FED Ex	2-23-05	1900
2. RELINQUISHED BY			2. RECEIVED BY [signature]	2/24/05	0910
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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120000021

WW04

5-6

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 4359 PAGE 2 OF

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
0528	Charleston NWS	Linda Klink	412/921-8650	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
[signature]		Fred W. Ramser	412/921-8838	340 Country Rd #5
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED Ex 8447 8135 6976		Westbrook, ME 04092

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: APP IX VOC	APP IX SVOC	APP IX PEST/PCB, ORGANOCHLOR HERB	ORGANOPHOS PEST	TAL METALS	CN	COMMENTS
							CONTAINER TYPE PLASTIC (P) or GLASS (G)		G	G	G	G	G	P	P
							PRESERVATIVE USED		HCL	NONE	NONE	NONE	NONE	HNO3	NaOH
2/23	1120	17-G-11S-0205	—	—	—	GW	G	13	3	2	2	2	2	1	1

1. RELINQUISHED BY Fred W Ramser	DATE 2-23-05	TIME 1900	1. RECEIVED BY FED Ex	DATE 2-23-05	TIME 1900
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY [signature]	DATE 2/24/05	TIME 0910
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME
COMMENTS					

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FORM NO. TtNUS-001

000002

Katahdin ANALYTICAL SERVICES
340 County Road No. 5
P.O. Box 720
Westbrook, ME 04092
Tel: (207) 874-2400
Fax: (207) 775-4029

234480

CHAIN of CUSTODY

~~234523~~

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Client: Katahdin	Contact: Andrea Colby	Phone #: ( )	Fax #: ( )
Address: as above	City	State	Zip Code
Purchase Order #	Proj. Name / No.: WVcBdc / TetraTech Charleston	Katahdin Quote #	
Bill (if different than above)	Address		
Sampler (Print / Sign)		Copies To:	

LAB USE ONLY — WORK ORDER #: — KATAHDIN PROJECT NUMBER

REMARKS: To STL-Chicago

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO:

TEMP°C ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Organophos. Pest	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N
17-6-115-0205	2/23/05 / 1120	AQ	2	X										
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COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
[signature]	2/24/05 1700	[signature]	2/25/05 0945		
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

THE TERMS AND CONDITIONS ON THE REVERSE SIDE HEREOF SHALL GOVERN SERVICES, EXCEPT WHEN A SIGNED CONTRACTUAL AGREEMENT EXISTS

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 4360 254480 PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
0528	Charleston NWS	Linda Klink	412/921-8650	STL
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		Fred W. Ramser	412/921-8838	2417 Bond St.
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED Ex 8447 8135 6987		University Park, IL 60466

STANDARD TAT ☒
RUSH TAT ☐ ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C

	DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: Explosives	COMMENTS
1	2/23	1100	17-G-22S-0205	—	—	—	GW	G	2	2	
2	2/23	0000	17-G-22S-0205-D	—	—	—	GW	G	2	2	
3	2/23	1120	17-G-11S-0205	—	—	—	GW	G	2	2	
4	2/23	1610	16-G-03S-0205	—	—	—	GW	G	2	2	
5	2/23	1630	16-G-05S-0205	—	—	—	GW	G	2	2	

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY: Fred Ramser	2/23/05	1900	1. RECEIVED BY: FED Ex	2/23/05	1900
2. RELINQUISHED BY			2. RECEIVED BY: STL	2/24/05	0930
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS: 2.6°C

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STL Chicago

WV0835, WV0836

1-4

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 4311 | PAGE 1 OF 1

PROJECT NO: 0528	FACILITY: Charleston NWS	PROJECT MANAGER Linda Klink	PHONE NUMBER 412/921-8650	LABORATORY NAME AND CONTACT: Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER Fred W. Ramsey	PHONE NUMBER 412/921-8838	ADDRESS 340 Country Rd #5
		CARRIER/WAYBILL NUMBER Fed Ex 8447 8135 5075		CITY, STATE West Brook, ME 04092

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC's	TCL SVOC	TAL Metal	CN	Pest/PCB				COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	P	P	G				
PRESERVATIVE USED									HCl	none	HNO_3	NaOH	none				
2/24	0900	17-T-022405-02	—	—	—	QC	FROM LAB	2	2								TRIP BLANK
2/24	1030	17-G-06D-0205	—	—	—	GW	G	9	3	2	1	1	2				
	1115	17-G-23S-0205	—	—	—	GW	G	9	3	2	1	1	2				
	1625	17-G-19S-0205	—	—	—	GW	G	9	3	2	1	1	2				
2/24	1630	17-G-01S-0205	—	—	—	GW	G	9	3	2	1	1	2				
2/25	0900	17-T-022505-03	—	—	—	GW	G	2	2								TRIP BLANK
	1035	17-G-12S-0205	—	—	—	GW	G	9	3	2	1	1	2				
	0000	17-G-12S-0205-D	—	—	—	GW	G	9	3	2	1	1	2				
	1030	17-G-05S-0205	—	—	—	GW	G	9	3	2	1	1	2				
	0000	17-G-05S-0205-D	—	—	—	GW	G	9	3	2	1	1	2				
	1605	16-G-04S-0205	—	—	—	GW	G	9	3	2	1	1	2				
	1620	16-G-02S-0205	—	—	—	GW	G	9	3	2	1	1	2				

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY Fred Ramsey	2-25-05	1900	1. RECEIVED BY FED EX	2-25-05	1900
2. RELINQUISHED BY			2. RECEIVED BY [signature]	2/26/05	1000
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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FORM NO. TtNUS-001

00000023

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 4348 PAGE 1 OF 234578

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
0528	Charleston NWS	Linda Klink	412/921-8650	STL 708-534-5200
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		Fred W. Ramsey	412/921-8838	2417 Bond St
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex 84478135 5086		University Park, IL 60466

STANDARD TAT ☒
RUSH TAT ☐ ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C

	DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: Explosives	COMMENTS
1	2/24	1030	17-6-06D-0205	—	—	—	GW	G	2	2	
2		1115	17-G-06235-0205	—	—	—	GW	G	2	2	
3		1625	17-G-19S-0205	—	—	—	GW	G	2	2	
4		1630	17-G-01S-0205	—	—	—	GW	G	2	2	
5	2/25	1035	17-6-12S-0205	—	—	—	GW	G	2	2	
6		1035	17-G-12S-0205-D	—	—	—	GW	G	2	2	
7		1030	17-6-05S-0205	—	—	—	GW	G	2	2	
8		0000	17-G-05S-0205-D	—	—	—	GW	G	2	2	
9		1620	16-G-02S-0205	—	—	—	GW	G	2	2	
10	2/25	1605	16-G-04S-0205	—	—	—	GW	G	2	2	

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	2-25-05	1900	1. RECEIVED BY Fed Ex	2-25-05	1900
2. RELINQUISHED BY			2. RECEIVED BY	2-26-05	1000
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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FORM NO. TINUS-001

STL Chicago

WW0869

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 4335 | PAGE 1 OF 2

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
0528	CHARLESTON NWS	LINDA KLINK	412/921-8650	KATAHDIN ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		FRED W. RANSER	412-921-8838	340 COUNTRY RD #5
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FEDEX 8447 8135 5112		WEST BROOK, ME 04092

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G)
PRESERVATIVE USED

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOCS	TCL SVOCS	CN	PEST/PCBS	TAL METALS				COMMENTS
2/26	0900	17-T-022605-04	—	—	—	QC	FROM LAB	2	2								TRIP BLANK
2/26	1050	17-G-17S-0205	—	—	—	GW	G	9	3	2	1	2	1				
2/26	1540	17-G-17I-0205	—	—	—	GW	G	9	3	2	1	2	1				
2/26	1555	17-G-18D-0205	—	—	—	GW	G	9	3	2	1	2	1				
2/27	0900	17-T-022705-05	—	—	—	QC	FROM LAB	2	2								TRIP BLANK
2/27	1120	17-G-02S-0205	—	—	—	GW	G	9	3	2	1	2	1				
2/27	1125	17-G-04S-0205	—	—	—	GW	G	9	3	2	1	2	1				
~~2/26~~	~~1035~~	~~17-G-18S-0205~~	~~—~~	~~—~~	~~—~~	~~GW~~	~~G~~	~~9~~	~~3~~	~~2~~	~~1~~	~~2~~	~~1~~				~~BC~~
2/27	1515	17-G-13S-0205	—	—	—	GW	G	9	3	2	1	2	1				
2/27	1525	17-G-20S-0205	—	—	—	GW	G	9	3	2	1	2	1				
2/28	0900	17-T-022805-06	—	—	—	QC	From Lab	2	2								TRIP BLANK
2/28	1140	17-G-07S-0205	—	—	—	GW	G	27	9	6	3	6	3				MS/MSD
~~2/28~~	~~1200~~	~~17-G-12D-0205~~	~~—~~	~~—~~	~~—~~	~~GW~~	~~G~~										~~BC~~

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY Fred Ranser	2-28-05	1900	1. RECEIVED BY FED EX	2-28-05	1900
2. RELINQUISHED BY			2. RECEIVED BY [signature]	3/1/05	1140
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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FORM NO. TtNUS-001

00008

TtRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER WV0810 4334 PAGE 2 OF 2

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
0528	CHARLESTON NWS	LINDA KLINK	412921 8650	KATAHDIN / ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		BRENDA RAMSER	4129218838	340 COUNTRY RD #5
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED EX 8447 8135 5112		WESTBROOK ME 04092

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G)
PRESERVATIVE USED

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: APP IX VOC	APP IX SVOC	APP IX PEST/PCBS	CN	TAL METALS	ORGANOCHLOR HERB			COMMENTS
3/26	1035	17-G-18S-0205	—	—	—	GW	G	11	3	2	2	1	1	2			
3/28	1200	17-G-12D-0205	—	—	—	GW	G	11	3	2	2	1	1	2			

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	2-28-05	1900	1. RECEIVED BY FED EX	2-28-05	1900
2. RELINQUISHED BY			2. RECEIVED BY	3/1/05	1140
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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FORM NO. TtNUS-001

000029

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
0528	CHARLESTON NWS	LINDA KLINE	412 921 8650	STL
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER: FRED W RAMSER	PHONE NUMBER: 412 921 8838	ADDRESS: 2417 BOND ST.
		CARRIER/WAYBILL NUMBER: FED EX 8447 8135 5123		CITY, STATE: UNIVERSITY PARK IL 60466

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G
PRESERVATIVE USED: NONE NONE

	DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: EXPLOSIVES	ORGANOCHLOR PEST							COMMENTS
3	2/26	1035	17-G-18S-0205	—	—	—	GW	G	4	2	2							
4	2/26	1050	17-G-17S-0205	—	—	—	GW	G	2	2								
5	2/26	1540	17-G-17I-0205	—	—	—	GW	G	2	2								
6	2/26	1555	17-G-18D-0205	—	—	—	GW	G	2	2								
7	2/27	1120	17-G-02S-0205	—	—	—	GW	G	2	2								
8	2/27	1125	17-G-04S-0205	—	—	—	GW	G	2	2								
9	2/27	1515	17-G-13S-0205	—	—	—	GW	G	2	2								
	2/27	1525	17-G-20S-0205	—	—	—	GW	G	2	2								
10	2/28	1140	17-G-07S-0205	—	—	—	GW	G	6	6								MS/MSD
11	2/28	1200	17-G-12D-0205	—	—	—	GW	G	4	2	2							
12	2/28	0000	17-G-12D-0205-D	—	—	—	GW	G	~~4~~ 2	~~2~~	2							

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY: Fred W Ramser	2-28-05	1900	1. RECEIVED BY: FED EX	2-28-05	1900
2. RELINQUISHED BY			2. RECEIVED BY: [illegible]	3-1-05	0930
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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STL Chicago

Katahdin ANALYTICAL SERVICES
340 County Road No. 5
P.O. Box 720
Westbrook, ME 04092
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

234578

Page ____ of ____

Client	Contact	Phone #	Fax #
Katahdin	Andrea Colby	( )	( )

Address	City	State	Zip Code

Purchase Order #	Proj. Name / No.	Katahdin Quote #

Bill (if different than above)	Address

Sampler (Print / Sign)	Copies To:

LAB USE ONLY WORK ORDER #:

KATAHDIN PROJECT NUMBER _____

REMARKS: _____

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO: _____

TEMP°C _____ ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Explosives 8330	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Fil ☐Y
B	17-6-205-0205	2/20/05 1525	AQ	2											
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		/													

COMMENTS

* - missing bottles

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
[signature]	3/1/05 1200	[signature]		3/2/05 1000	
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

THE TERMS AND CONDITIONS ON THE REVERSE SIDE HEREOF SHALL GOVERN SERVICES, EXCEPT WHEN A SIGNED CONTRACTUAL AGREEMENT EXISTS.

STL Chicago
KAS-COC1

ORIGINAL

TETRA TECH NUS, INC.

CHAIN OF CUSTODY NUMBER WV0877 4333

PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
0528	Charleston NWS	Linda Klink	412/921-8650	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER: Fred W. Ramser	PHONE NUMBER: 412/921-8838	ADDRESS: 340 Country Rd #5
		CARRIER/WAYBILL NUMBER: Fed Ex 8412-2490-9945		CITY, STATE: West Brook, ME 04092

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G P G P

PRESERVATIVE USED: HCl none NaOH none HNO_3

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC	TCL SVOC	Cyanide	Pest/PCB	TAL Metals				COMMENTS
1 Mar 05	1110	17-F-0305-03	—	—	—	QA/QC	G	9	3	2	1	2	1				
↓	1335	17-F-0305-04	—	—	—	QA/QC	G	9	3	2	1	2	1				
↓	1000	17-T-030105-07	—	—	—	QC	From Lab	2	2								Trip Blank

SES

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
	1 Mar 05	1540	Fed Ex		
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE 3/2/05	TIME 0850
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

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000030

WW 1097

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 4358 PAGE 1 OF 1

PROJECT NO: 0528	FACILITY: Charleston NWS	PROJECT MANAGER Linda Klink	PHONE NUMBER 412/921-8650	LABORATORY NAME AND CONTACT: Katahdin / Andrea Colby
SAMPLERS (SIGNATURE) [signature]		FIELD OPERATIONS LEADER Fred W. Ramser	PHONE NUMBER 412/921-8838	ADDRESS 340 Country Rd. #5
		CARRIER/WAYBILL NUMBER FED EX 8455 4237 8460		CITY, STATE Westbrook, ME 04092

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G, PG, P, G, P
PRESERVATIVE USED: none, HCl, NaOH, none, HNO3

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TCL SVOC	TCL VOC	Cyanide	Pest / PCB	TAL Metals				COMMENTS
8 Mar 05	1540	17-G-16I-0305	—	—	—	GW	G	9	2	3	1	2	1				
	1030	17-G-17D-0305	—	—	—	GW	G	9	2	3	1	2	1				
	0800	17-T-030805-08	—	—	—	QC	from Lab	2	~~2~~ 2	2	—	—	—				
	1035	17-G-16S-0305	—	—	—	GW	G	9	2	3	1	2	1				
	1535	17-G-16D-0305	—	—	—	GW	G	9	2	3	1	2	1				
9 Mar 05	1105	17-G-15D-0305	—	—	—	GW	G	9	2	3	1	2	1				
	1325	17-G-15S-0305	—	—	—	GW	G	9	2	3	1	2	1				
	1110	17-G-14D-0305	—	—	—	GW	G	9	2	3	1	2	1				
	1330	17-G-14S-0305	—	—	—	GW	G	9	2	3	1	2	1				
	0800	17-T-030805-09	—	—	—	QC	from lab	2	—	2	—	—	—				

1. RELINQUISHED BY [signature]	DATE 9 Mar 05	TIME 1900	1. RECEIVED BY Fed Ex	DATE 3/9/05	TIME 1900
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY [signature]	DATE 3/10/05	TIME 1300
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

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FORM NO. TINUS-001

000014

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 4332 | PAGE 1 OF 1

234856

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
0528	Charleston NWS	Linda Klink	412/921-8650	STL

SAMPLERS (SIGNATURE)	FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
[signature]	Fred W. Ramser	412/921-8838	2417 Bond St

CARRIER/WAYBILL NUMBER	CITY, STATE
FED EX 8412 2491 4234	University Park, IL 60466

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: None

	DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: Explosives	COMMENTS
1	8 Mar 05	1540	17-G-16I-0305	—	—	—	GW	G	2	2	
2		1030	17-G-17D-0305	—	—	—	GW	G	2	2	
3		1035	17-G-17S-0305	—	—	—	GW	G	2	2	
4		1535	17-G-16D-0305	—	—	—	GW	G	2	2	
5	9 Mar 05	1105	17-G-15D-0305	—	—	—	GW	G	2	2	
6		1325	17-G-15S-0305	—	—	—	GW	G	2	2	
7		1110	17-G-14D-0305	—	—	—	GW	G	2	2	
8		1330	17-G-14S-0305	—	—	—	GW	G	2	2	

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY [signature]	9 Mar 05	1900	1. RECEIVED BY FED EX	3/9/05	1900
2. RELINQUISHED BY			2. RECEIVED BY [signature]	3/10/05	0845
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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FORM NO. TtNUS-001

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TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 4312 234856 PAGE 1 OF 1

PROJECT NO: 0528	FACILITY: Charleston NWS	PROJECT MANAGER Linda Klink	PHONE NUMBER 412/921-8650	LABORATORY NAME AND CONTACT: STL
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER Fred W. Ramser	PHONE NUMBER 412/921-8838	ADDRESS 2417 Bond St
		CARRIER/WAYBILL NUMBER Fed Ex / 8447-8135-6954		CITY, STATE University Park, IL 60466

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: none
TYPE OF ANALYSIS: Explosives

	DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	Explosives	COMMENTS
9	10 Mar 05	1520	16-G-015-0305	—	—	—	GW	G	2	2	
10		1600	17-0-01-0305	—	—	—	IDW	G	2	2	
11	11 Mar 05	1245	17-0-07-0305	—	—	—	IDW	C	2	2	
12		1155	17-0-10-0305	—	—	—	IDW	C	2	2	
13		1117	17-0-05-0305	—	—	—	IDW	C	2	2	
14		1345	17-0-09-0305	—	—	—	IDW	C	2	2	

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY [signature]	11 Mar 05	1800	1. RECEIVED BY Fed Ex	3/11/05	1800
2. RELINQUISHED BY			2. RECEIVED BY [signature]	3/12/05	0900
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 4313 PAGE 1 OF 2

WV1081

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
0528	Charleston NWS	Linda Klink	412/921-8650	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		Fred W. Ramser	412/921-8838	340 Country Road #5
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 8447-8135-6943		West Brook, ME 04092

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G P G P
PRESERVATIVE USED: HCL none NaOH none HNO3

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOCs	TCL SVOCs	Cyanide	Pest/PCBs	TAL Metals				COMMENTS
10Mar 05	1520	16-G-01S-0305	—	—	—	GW	G	9	3	2	1	2	1				
	1600	17-0-01-0305	—	—	—	IDW	G	9	3	2	1	2	1				
	0900	17-T-031005-10	—	—	—	QA	from lab	2	2	—	—	—	—				
11Mar 05	0800	17-T-031105-11	—	—	—	QA	from lab	2	2	—	—	—	—				
	1245	17-0-07-0305	—	—	—	IDW	C	9	3	2	1	2	1				
	1155	17-0-10-0305	—	—	—	IDW	C	9	3	2	1	2	1				
	1117	17-0-05-0305	—	—	—	IDW	C	9	3	2	1	2	1				
	1345	17-0-09-0305	—	—	—	IDW	C	9	3	2	1	2	1				

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	11Mar05	1800	1. RECEIVED BY Fed Ex	3/11/05	1800
2. RELINQUISHED BY			2. RECEIVED BY	3/12/05	1130
3. RELINQUISHED BY			3. RECEIVED BY		

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FORM NO. TtNUS-001

900000

TETRA TECH NUS, INC. — CHAIN OF CUSTODY — NUMBER 4314 — PAGE 2 OF

PROJECT NO: 0528	FACILITY: Charleston NWS	PROJECT MANAGER: Linda Klink	PHONE NUMBER: 412/921-8650	LABORATORY NAME AND CONTACT: Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER: Fred W. Ramser	PHONE NUMBER: 412/921-8838	ADDRESS: 340 Country Road #5
		CARRIER/WAYBILL NUMBER: Fed Ex / 8447-8135-6943		CITY, STATE: West Brook, ME 04092

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G
PRESERVATIVE USED: 2 oz none 95mL none

TYPE OF ANALYSIS: TCLP Organics 1311 then 1260B, 8270C, 8081A, 8151A; TCLP Inorganics 1311 then 6010B, 7000A

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TCLP Organics		TCLP Inorganics						COMMENTS
10 Mar 05	1643	17-0-03-0305	—	—	—	IDW	G	2	1		1						
	1650	17-0-02-0305	—	—	—	IDW	C	2	1		1						
11 Mar 05	1045	17-0-04-0305	—	—	—	IDW	C	2	1		1						
	1210	17-0-06-0305	—	—	—	IDW	C	2	1		1						
	1310	17-0-08-0305	—	—	—	IDW	C	2	1		1						

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	11 Mar 05	1800	1. RECEIVED BY Fed Ex	3/11/05	1800
2. RELINQUISHED BY			2. RECEIVED BY		1030
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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0000009

APPENDIX F

HUMAN HEALTH RISK ASSESSMENT SUPPORT

SWMU 16

RISK ASSESSMENT CALCULATIONS
AND
RAGS-PART D TABLES

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population(1)	Receptor Age	Exposure Route	Onsite/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Surface Soil	Surface Soil(2)	Entire Site	Site Worker	Adult	Ingestion Dermal	Onsite Onsite	None None	Potential risks are assumed to be less than the occupational worker. Risks for this receptor will be inferred using the calculated risks for the future occupational worker.
		Air	Vapors and Particulates in Air - Entire Site	Site Worker	Adult	Inhalation	Onsite	None	Potential risks are assumed to be less than the occupational worker. Risks for this receptor will be inferred using the calculated risks for the future occupational worker.
		Surface Soil	Entire Site	Trespasser	Adolescent	Ingestion Dermal	Onsite Onsite	Quant(3) Quant	Although access to the site is currently restricted., this scenario is evaluted to account for the possibility that trespassers may enter the site.
		Air	Vapors and Particulates in Air - Entire Site	Trespasser	Adolescent	Inhalation	Onsite	Quant	Although access to the site is currently restricted., this scenario is evaluted to account for the possibility that trespassers may enter the site.
	Groundwater	Groundwater/Air	Surficial Aquifer/Vapors	Site Worker	Adult	Ingestion Dermal Inhalation	Onsite Onsite Onsite	None None None	Direct contact with groundwater does not occur under current land use. Shallow groundwater is not expected to be used as a source of potable water.
	Surface Water	Surface Water	Onsite Ditches/Streams	Site Worker	Adult	Ingestion Dermal	Onsite Onsite	None None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
				Trespasser	Adolescent	Ingestion Dermal	Onsite Onsite	Quant Quant	Although access to the site is currently restricted., this scenario is evaluted to account for the possibility that trespassers may enter the site.
		Air	Vapors from Onsite Ditches/Streams	Site Workers and Trespassers	Adult and Adolescent	Inhalation	Onsite	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
	Sediment	Sediment	Onsite Ditches/Streams	Site Workers	Adult	Ingestion Dermal	Onsite Onsite	None None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
				Trespasser	Adolescent	Ingestion Dermal	Onsite Onsite	Quant Quant	Although access to the site is currently restricted., this scenario is evaluted to account for the possibility that trespassers may enter the site.

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population(1)	Receptor Age	Exposure Route	Onsite/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Surface Soil(1) and Subsurface Soil	Soil	Entire Site	Excavation/Construction Workers	Adult	Ingestion	On-site	Quant	Excavation/construction or intrusive activities may occur at the site in the future.
						Dermal	On-site	Quant	
		Air	Vapors and Particulates in Air - Entire Site			Inhalation	On-site	Quant	Inhalation of vapors or particulates emitted from soil in may occur during future excavation activities.
	Surface Soil	Soil/Air	Entire Site	Occupational Workers	Adult	Ingestion	On-site	Quant	Although the scenario is unlikely, a commercial/industrial scenario is included to aid in future risk management decisions. Risks to site workers are conservatively inferred from the risks estimated for this receptor.
						Dermal	On-site	Quant	
						Inhalation	On-site	Quant	
				Residents	Adult and Child	Ingestion	On-site	None	Future residential use of SWMU 16 is very unlikely.
						Dermal	On-site	None	
						Inhalation	On-site	None	
	Groundwater	Groundwater/Air	Surficial Aquifer	Excavation/Construction Workers	Adult	Ingestion	On-site	None	Minimal exposure by ingestion is anticipated.
						Dermal	On-site	Quant	Direct contact with groundwater and inhlation of vapors may occur if excavation/construction activities occur on the site in the future.
						Inhalation	On-site	Quant	
				Occupational Workers	Adult	Ingestion	On-site	None	Direct contact with groundwater does not occur under current land use. Shallow groundwater is not expected to be used as a source of potable water.
						Dermal	On-site	None	
						Inhalation	On-site	None	
				Residents	Adult and Child	Ingestion	On-site	None	Direct contact with groundwater does not occur under current land use. Future residential use of SWMU 16 is very unlikely.
						Dermal	On-site	None	
						Inhalation	On-site	None	
	Surface Water	Surface Water	Onsite Ditches/Streams	Excavation/Construction and Occupational Workers	Adult	Ingestion	Onsite	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
						Dermal	Onsite	None	
				Residents	Adult and Child	Ingestion	Onsite	None	Future residential use of SWMU 16 is very unlikely.
						Dermal	Onsite	None	
						Inhalation	Onsite	None	
		Air	Vapors from Onsite Ditches/Streams	Excavation/Constuction and Occupational Workers	Adult	Inhalation	Onsite	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
	Sediment	Sediment	Onsite Ditches/Streams	Excavation/Construction and Occupational Workers	Adult	Ingestion	Onsite	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
						Dermal	Onsite	None	
				Residents	Adult and Child	Ingestion	Onsite	None	Future residential use of SWMU 16 is very unlikely.
						Dermal	Onsite	None	
						Inhalation	Onsite	None	

Footnotes:

1 Receptor groups were previously identified in the Generic RFI/CMS Workplan (ABB Environmental, Services, Services, Inc., January 1995).

2 Surface soil is defined as soil collected from 0 to 1 feet below ground surface (bgs).

3 Evaluared quantitatively in the HHRA.

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Volatile Organics (mg/kg)																
67-64-1	Acetone	1.3	J	1.7	J	mg/kg	16-S-04-00	2/4	0.0017 - 0.12	1.7	NA	1400 N	6.6 NA	SSL-MIGR SSL-INH	No	BSL
Semivolatile Organics (mg/kg)																
100-52-7	Benzaldehyde	0.45		0.46		mg/kg	16-S-03-00	2/4	0.4 - 7.6	0.46	NA	610 N	0.86 NA	SSL-MIGR SSL-INH	No	BSL
117-81-7	Bis(2-Ethylhexyl)phthalate	0.24	J	6100		mg/kg	16-S-02-00-D	3/4	0.4	6100	NA	35 C	180 NA	SSL-MIGR SSL-INH	Yes	ASL
85-68-7	Butyl Benzyl Phthalate	9.4		16		mg/kg	16-S-02-00-D	1/4	0.4 - 0.43	16	NA	1200 N	840 NA	SSL-MIGR SSL-INH	No	BSL
84-74-2	Di-n-butyl phthalate	14		26		mg/kg	16-S-02-00-D	1/4	0.4 - 0.43	26	NA	610 N	250 NA	SSL-MIGR SSL-INH	No	BSL
117-84-0	Di-n-octyl phthalate	34	J	70	J	mg/kg	16-S-02-00-D	1/4	0.4 - 0.43	70	NA	240 N	240000 NA	SSL-MIGR SSL-INH	No	BSL
84-66-2	Diethyl Phthalate	0.87	J	1.9	J	mg/kg	16-S-02-00-D	1/4	0.4 - 0.43	1.9	NA	4900 N	23 NA	SSL-MIGR SSL-INH	No	BSL
Pesticides/PCBs (mg/kg)																
72-54-8	4,4'-DDD	0.0014	J	0.0014	J	mg/kg	16-S-03-00	1/4	0.0039 - 0.77	0.0014	0.1	2.4 C	0.71 NA	SSL-MIGR SSL-INH	No	BSL
72-55-9	4,4'-DDE	0.0031	J	0.0046		mg/kg	16-S-04-00	2/4	0.0039 - 0.77	0.0046	0.021	1.7 C	2.2 NA	SSL-MIGR SSL-INH	No	BSL
50-29-3	4,4'-DDT	0.0048		0.0048		mg/kg	16-S-04-00	1/4	0.0039 - 0.77	0.0048	0.059	1.7 C	1.3 750	SSL-MIGR SSL-INH	No	BSL
11097-69-1	Aroclor-1254	40		59		mg/kg	16-S-02-00	1/4	0.02 - 0.022	59	NA	0.22 C	NA NA	SSL-MIGR SSL-INH	Yes	ASL
Inorganics (mg/kg)																
7429-90-5	Aluminum	3030		14200		mg/kg	16-S-01-00	4/4	---	14200	16900	7600 N	8.3 6860000	SSL-MIGR SSL-INH	No	BKG
7440-36-0	Antimony	98.3		122		mg/kg	16-S-02-00-D	1/4	0.18 - 0.41	122	0.33	3.1 N	0.27 NA	SSL-MIGR SSL-INH	Yes	ASL
7440-38-2	Arsenic	1.1		3.9		mg/kg	16-S-01-00	4/4	10.7	3.9	9.45	0.39 C	0.29 745	SSL-MIGR SSL-INH	No	BKG
7440-39-3	Barium	13.5		207		mg/kg	16-S-02-00-D	4/4	---	207	64.5	540 N	82 686000	SSL-MIGR SSL-INH	Yes	ASL
7440-43-9	Cadmium	0.16		60.7		mg/kg	16-S-02-00	3/4	0.32	60.7	0.12	3.7 N	0.38 1780	SSL-MIGR SSL-INH	Yes	ASL
7440-70-2	Calcium	274		1440		mg/kg	16-S-02-00	4/4	---	1440	6120	NA N	NA NA	SSL-MIGR SSL-INH	No	NUT, BKG
7440-47-3	Chromium	11		667		mg/kg	16-S-02-00-D	4/4	---	667	42.9	210 C	2.1 267	SSL-MIGR SSL-INH	Yes	ASL
7440-48-4	Cobalt	0.52		1.1		mg/kg	16-S-01-00	3/4	0.76 - 0.82	1.1	2.71	140 N	0.17 1140	SSL-MIGR SSL-INH	No	BKG
7440-50-8	Copper	2.4		58.1		mg/kg	16-S-02-00-D	4/4	---	58.1	3.23	310 N	560 NA	SSL-MIGR SSL-INH	No	BSL
7439-89-6	Iron	1520	J	15800	J	mg/kg	16-S-01-00	4/4	---	15800	67900	2300 N	NA NA	SSL-MIGR SSL-INH	No	BKG
7439-92-1	Lead	7.8		12400		mg/kg	16-S-02-00-D	4/4	---	12400	15.5	400	NA NA	SSL-MIGR SSL-INH	Yes	ASL
7439-95-4	Magnesium	626		1230		mg/kg	16-S-01-00	4/4	---	1230	746	NA N	NA NA	SSL-MIGR SSL-INH	No	NUT

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
7439-96-5	Manganese	9.4		41.4	J	mg/kg	16-S-04-00	4/4	---	41.4	25.1	180 N	110 68600	SSL-MIGR SSL-INH	No	BSL
7439-97-6	Mercury	0.02		0.11		mg/kg	16-S-02-00-D	4/4	---	0.11	0.21	2.3 N	0.1 2.9	SSL-MIGR SSL-INH	No	BKG
7440-02-0	Nickel	1.6		4.7		mg/kg	16-S-04-00	4/4	---	4.7	12.1	160 N	14 NA	SSL-MIGR SSL-INH	No	BSL,BKG
7440-09-7	Potassium	236		641		mg/kg	16-S-01-00	4/4	---	641	225	NA N	NA NA	SSL-MIGR SSL-INH	No	NUT
7782-49-2	Selenium	0.67		0.69		mg/kg	16-S-04-00	2/4	0.49 - 12.9	0.69	2.84	39 N	0.26 NA	SSL-MIGR SSL-INH	No	BKG
7440-23-5	Sodium	1590		4160		mg/kg	16-S-01-00	4/4	---	4160	370	NA N	NA NA	SSL-MIGR SSL-INH	No	NUT
7440-62-2	Vanadium	3.8		34.1		mg/kg	16-S-01-00	4/4	---	34.1	66.3	7.8 N	260 NA	SSL-MIGR SSL-INH	No	BKG
7440-66-6	Zinc	5.4		157		mg/kg	16-S-02-00	4/4	---	157	20.5	2,300 N	680 NA	SSL-MIGR SSL-INH	No	BSL

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 If the maximum inorganic concentration is greater than the Charleston NWS background concentration, (Baseline Background Study. Naval Weapons Station, Charleston, SC. TtNUS, March 2002), that inorganic is not selected as a COPC .
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).

Surrogate Chemicals

The PRG for chromium represents a 1:6 ratio of Cr VI:Cr III (USEPA Region 9, October 2004).

Associated Samples:

16-S-01-00
16-S-02-00
16-S-02-00-D
16-S-03-00
16-S-04-00

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BKG = Within background levels
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient
NTX = No Toxicity Information

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
N = Noncarcinogen
NA = Not Applicable.
SSL-INH = Soil Screening Level for transfers from soil to air (Inhalation) calculated online at http://risk.lsd.ornl.gov/calc_start.shtml by the USEPA's Soil Screenng Guidance (USEPA, July 1996).
SSL-MIGR = Soil Screening Level for transfers from soil to groundwater for a Dilution and Attenuation Factor of 1 calculated online at http://risk.lsd.ornl.gov/calc_start.shtml (USEPA July 1996)

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Suburface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Volatile Organics (mg/kg)																	
78-93-3	2-Butanone	0.004	J	0.004	J	mg/kg	16-B-03-01-D	1/11	0.005 - 1.2	0.004	NA	2200	N	4.4 24000	SSL-MIGR SSL-INH	No	BSL
67-64-1	Acetone	0.1	J	0.12	J	mg/kg	16-B-04-03-D	2/11	0.042 - 6	0.12	NA	1400	N	6.6 NA	SSL-MIGR SSL-INH	No	BSL
75-15-0	Carbon Disulfide	0.001	J	0.05		mg/kg	16-B-02-05	4/11	0.005 - 0.95	0.05	NA	36	N	1.5 720	SSL-MIGR SSL-INH	No	BSL
75-71-8	Dichlorodifluoromethane	0.002	J	0.002	J	mg/kg	16-B-04-05	1/11	0.005 - 0.95	0.002	NA	9.4	N	28 250	SSL-MIGR SSL-INH	No	BSL
79-20-9	Methyl Acetate	0.33		2.3	J	mg/kg	16-B-01-05	4/9	0.005 - 0.034	2.3	NA	2200	N	7.4 NA	SSL-MIGR SSL-INH	No	BSL
Semivolatile Organics (mg/kg)																	
91-57-6	2-Methylnaphthalene	0.2	J	0.3	J	mg/kg	16-B-02-05	2/11	0.04 - 1.5	0.3	NA	5.6	N	NA NA	SSL-MIGR SSL-INH	No	BSL
83-32-9	Acenaphthene	0.3	J	1.2		mg/kg	16-B-02-05	2/11	0.04 - 1.5	1.2	NA	370	N	31 NA	SSL-MIGR SSL-INH	No	BSL
120-12-7	Anthracene	0.08	J	0.4	J	mg/kg	16-B-02-05	3/11	0.04 - 1.5	0.4	0.253	2200	N	650 NA	SSL-MIGR SSL-INH	No	BSL
56-55-3	Benzo(a)anthracene	0.02	J	0.4	J	mg/kg	16-B-02-05	9/11	0.04 - 1.5	0.4	0.43	0.62	C	0.16 NA	SSL-MIGR SSL-INH	Yes	ASL
50-32-8	Benzo(a)pyrene	0.05	J	0.5	J	mg/kg	16-B-03-03	7/11	0.04 - 1.5	0.5	0.48	0.062	C	0.41 NA	SSL-MIGR SSL-INH	Yes	ASL
205-99-2	Benzo(b)fluoranthene	0.06	J	0.7	J	mg/kg	16-B-03-03	8/11	0.04 - 1.4	0.7	0.6	0.62	C	0.49 NA	SSL-MIGR SSL-INH	Yes	ASL
191-24-2	Benzo(g,h,i)perylene	0.03	J	0.3	J	mg/kg	16-B-03-03	6/11	0.04 - 1.5	0.3	0.31	230	N	NA NA	SSL-MIGR SSL-INH	No	BSL
207-08-9	Benzo(k)fluoranthene	0.04	J	0.3	J	mg/kg	16-B-03-03	3/11	0.04 - 1.5	0.3	0.27	6.2	C	0.49 NA	SSL-MIGR SSL-INH	No	BSL
117-81-7	Bis(2-Ethylhexyl)phthalate	0.5	J	0.9	J	mg/kg	16-B-03-03	4/11	0.04 - 1.5	0.9	NA	35	C	180 NA	SSL-MIGR SSL-INH	No	BSL
86-74-8	Carbazole	0.07	J	0.2	J	mg/kg	16-B-02-05	2/9	0.04 - 1.5	0.2	0.11	24	C	0.03 NA	SSL-MIGR SSL-INH	Yes	ASL
218-01-9	Chrysene	0.07	J	0.5	J	mg/kg	16-B-03-03	6/11	0.04 - 1.5	0.5	0.47	62	C	0.16 7500	SSL-MIGR SSL-INH	Yes	ASL
84-74-2	Di-n-butyl phthalate	0.2	J	0.2	J	mg/kg	16-B-02-01	2/11	0.04 - 1.5	0.2	NA	610	N	250 NA	SSL-MIGR SSL-INH	No	BSL
117-84-0	Di-n-octyl phthalate	0.2	J	0.2	J	mg/kg	16-B-01-05	1/11	0.04 - 1.4	0.2	NA	240	N	240000 NA	SSL-MIGR SSL-INH	No	BSL
132-64-9	Dibenzofuran	0.1	J	0.5	J	mg/kg	16-B-02-05	2/11	0.04 - 1.5	0.5	NA	15	N	2.4 NA	SSL-MIGR SSL-INH	No	BSL
206-44-0	Fluoranthene	0.08	J	2		mg/kg	16-B-02-05	8/11	0.04 - 1.5	2	1.3	230	N	310 NA	SSL-MIGR SSL-INH	No	BSL
86-73-7	Fluorene	0.2	J	0.7	J	mg/kg	16-B-02-05	2/11	0.04 - 1.5	0.7	0.055	270	N	41 NA	SSL-MIGR SSL-INH	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.04	J	0.3	J	mg/kg	16-B-03-03	6/11	0.04 - 1.5	0.3	0.31	0.62	C	1.4 NA	SSL-MIGR SSL-INH	No	BSL
91-20-3	Naphthalene	0.46		0.7	J	mg/kg	16-B-02-05	2/11	0.04 - 1.5	0.7	NA	5.6	N	3.1 170	SSL-MIGR SSL-INH	No	BSL
85-01-8	Phenanthrene	0.05	J	2.7		mg/kg	16-B-02-05	5/11	0.04 - 1.5	2.7	0.75	230	N	NA NA	SSL-MIGR SSL-INH	No	BSL

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Suburface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
129-00-0	Pyrene	0.08	J	1.3		mg/kg	16-B-02-05	9/11	0.4 - 0.46	1.3	0.85	230	N	230 NA	SSL-MIGR SSL-INH	No	BSL
Pesticides/PCBs (mg/kg)																	
72-54-8	4,4'-DDD	0.00042	J	0.38		mg/kg	16-B-03-05	5/11	0.004 - 0.015	0.38	0.1	2.4	C	0.71 NA	SSL-MIGR SSL-INH	No	BSL
72-55-9	4,4'-DDE	0.00014	J	0.029	J	mg/kg	16-B-03-03	6/11	0.004 - 0.08	0.029	0.021	1.7	C	2.2 NA	SSL-MIGR SSL-INH	No	BSL
50-29-3	4,4'-DDT	0.00017	J	0.22		mg/kg	16-B-03-03	5/11	0.004 - 0.015	0.22	0.591	1.7	C	1.3 750	SSL-MIGR SSL-INH	No	BSL
5103-71-9	Alpha-Chlordane	0.0015	J	0.0015	J	mg/kg	16-B-02-05	1/11	0.002 - 0.045	0.0015	1.88	1.6	C	0.48 72	SSL-MIGR SSL-INH	No	BSL
11097-69-1	Aroclor-1254	0.066	J	1		mg/kg	16-B-02-01	2/11	0.021 - 0.076	1	NA	0.22	C	NA NA	SSL-MIGR SSL-INH	Yes	ASL
11096-82-5	Aroclor-1260	0.036	J	0.32		mg/kg	16-B-03-03	2/11	0.021 - 0.076	0.32	NA	0.22	C	NA NA	SSL-MIGR SSL-INH	Yes	ASL
959-98-8	Endosulfan I	0.012	J	0.012	J	mg/kg	16-B-03-03	1/11	0.002 - 0.041	0.012	NA	37	N	0.98 NA	SSL-MIGR SSL-INH	No	BSL
33213-65-9	Endosulfan II	0.0025	J	0.0025	J	mg/kg	16-B-03-03	1/11	0.002 - 0.08	0.0025	NA	37	N	0.98 NA	SSL-MIGR SSL-INH	No	BSL
1031-07-8	Endosulfan Sulfate	0.0018	J	0.0033	J	mg/kg	16-B-03-03	3/11	0.002 - 0.08	0.0033	NA	37	N	NA NA	SSL-MIGR SSL-INH	No	BSL
7421-93-4	Endrin Aldehyde	0.004	J	0.004	J	mg/kg	16-B-01-05	1/11	0.002 - 0.08	0.004	NA	1.8	N	NA NA	SSL-MIGR SSL-INH	No	BSL
53494-70-5	Endrin Ketone	0.0011	J	0.0039	J	mg/kg	16-B-03-03	3/11	0.002 - 0.08	0.0039	NA	1.8	N	NA NA	SSL-MIGR SSL-INH	No	BSL
5103-74-2	Gamma-Chlordane	0.00014	J	0.011	J	mg/kg	16-B-03-03	2/11	0.002 - 0.041	0.011	0.0145	1.6	C	0.48 72	SSL-MIGR SSL-INH	No	BSL
76-44-8	Heptachlor	0.00058	J	0.00058	J	mg/kg	16-B-04-05	1/11	0.002 - 0.045	0.00058	NA	0.11	C	1.1 4.2	SSL-MIGR SSL-INH	No	BSL
1024-57-3	Heptachlor Epoxide	0.0015	J	0.012	J	mg/kg	16-B-03-03	2/11	0.002 - 0.045	0.012	NA	0.053	C	0.033 4.8	SSL-MIGR SSL-INH	No	BSL
72-43-5	Methoxychlor	0.0029	J	0.0029	J	mg/kg	16-B-02-01	1/11	0.0039 - 0.41	0.0029	NA	31	N	7.8 NA	SSL-MIGR SSL-INH	No	BSL
319-84-6	alpha-BHC	0.0007	J	0.0033	J	mg/kg	16-B-03-05	2/11	0.002 - 0.045	0.0033	NA	0.09	C	0.000036 0.76	SSL-MIGR SSL-INH	Yes	ASL
58-89-9	gamma-BHC (Lindane)	0.002	J	0.002	J	mg/kg	16-B-04-03-D	1/11	0.002 - 0.045	0.002	NA	0.44	C	0.00047 NA	SSL-MIGR SSL-INH	Yes	ASL
Inorganics (mg/kg)																	
7429-90-5	Aluminum	8820		55800	J	mg/kg	16-B-01-03	11/11	---	55800	16900	7600	N	8.3 6860000	SSL-MIGR SSL-INH	Yes	ASL
7440-36-0	Antimony	2.2		11		mg/kg	16-B-04-05	2/11	0.28 - 4.6	11	0.33	3.1	N	0.27 NA	SSL-MIGR SSL-INH	Yes	ASL
7440-38-2	Arsenic	4.8		34	J	mg/kg	16-B-01-05	10/11	1.8	34	9.45	0.39	C	0.29 745	SSL-MIGR SSL-INH	Yes	ASL
7440-39-3	Barium	20.4		580		mg/kg	16-B-04-05	11/11	---	580	64.5	540	N	82 686000	SSL-MIGR SSL-INH	Yes	ASL
7440-41-7	Beryllium	0.32		2.4	J	mg/kg	16-B-01-03	9/11	0.26 - 1	2.4	0.58	.15	N	32 1330	SSL-MIGR SSL-INH	No	BSL
7440-43-9	Cadmium	1.1		17.3		mg/kg	16-B-04-05	2/11	0.02 - 0.57	17.3	0.12	3.7	N	0.38 1780	SSL-MIGR SSL-INH	Yes	ASL

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Suburface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
7440-70-2	Calcium	632		15900		mg/kg	16-B-02-01	11/11	---	15900	NA	NA	NA NA	SSL-MIGR SSL-INH	No	NUT, BKG
7440-47-3	Chromium	23.2		132		mg/kg	16-B-03-03	11/11	---	132	42.9	210 C	2.1 267	SSL-MIGR SSL-INH	Yes	ASL
7440-48-4	Cobalt	1.8		17		mg/kg	16-B-03-03	11/11	---	17	2.71	140 N	0.17 1140	SSL-MIGR SSL-INH	Yes	ASL
7440-50-8	Copper	2		992		mg/kg	16-B-04-05	11/11	1.6	992	3.23	310 N	560 NA	SSL-MIGR SSL-INH	Yes	ASL
7439-89-6	Iron	10900		76000		mg/kg	16-B-04-05	11/11	---	76000	67900	2300 N	NA NA	SSL-MIGR SSL-INH	Yes	ASL
7439-92-1	Lead	6.4		398		mg/kg	16-B-04-05	11/11	---	398	15.5	400	NA NA	SSL-MIGR SSL-INH	No	BSL
7439-95-4	Magnesium	1540		9640	J	mg/kg	16-B-01-05	11/11	---	9640	746	NA	NA NA	SSL-MIGR SSL-INH	No	NUT
7439-96-5	Manganese	19.1		494		mg/kg	16-B-03-03	11/11	---	494	25.1	180 N	110 68600	SSL-MIGR SSL-INH	Yes	ASL
7439-97-6	Mercury	0.02		0.32		mg/kg	16-B-04-05	11/11	---	0.32	0.21	2.3 N	0.1 2.9	SSL-MIGR SSL-INH	Yes	ASL
7440-02-0	Nickel	3.6		114		mg/kg	16-B-03-03	11/11	---	114	12.1	160 N	14 NA	SSL-MIGR SSL-INH	Yes	ASL
7440-09-7	Potassium	530		5060	J	mg/kg	16-B-01-05	11/11	---	5060	225	NA	NA NA	SSL-MIGR SSL-INH	No	NUT
7440-22-4	Silver	14.8		14.8		mg/kg	16-B-04-05	1/11	0.08 - 0.63	14.8	3.2	39 N	1.6 NA	SSL-MIGR SSL-INH	Yes	ASL
7440-23-5	Sodium	1010		15700	J	mg/kg	16-B-01-05	11/11	---	15700	370	NA	NA NA	SSL-MIGR SSL-INH	No	NUT
7440-28-0	Thallium	0.68		2.6		mg/kg	16-B-02-05	6/11	0.37 - 2.25	2.6	1.63	0.52 N	0.056 NA	SSL-MIGR SSL-INH	Yes	ASL
7440-62-2	Vanadium	15.4		108	J	mg/kg	16-B-01-03	11/11	---	108	66.3	7.8 N	260 NA	SSL-MIGR SSL-INH	Yes	ASL
7440-66-6	Zinc	10.5		15700		mg/kg	16-B-04-05	11/11	---	15700	20.5	2,300 N	680 NA	SSL-MIGR SSL-INH	Yes	ASL

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Suburface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 If the maximum inorganic concentration is greater than the Charleston NWS background concentration, (Baseline Background Study. Naval Weapons Station, Charleston, SC. TtNUS, March 2002), that inorganic is not selected as a COPC .
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).

Surrogate Chemicals

Naphthalene is used as a surrogate for 2-methylnaphthalene
Pyrene is used as a surrogate for benzo(ghi)perylene, and phenanthrene.
Endosulfan is used as surrogate for endosfan I, endosulfan II, and endosulfan sulfate
Endrin is used as a surrogate for endrin aldehyde and endrin ketone.
Chlordane is used a surrogate for gamma-chlordane.
The PRG for chromium represents a 1:6 ratio of Cr VI:Cr III (USEPA Region 9, October 2004).

Associated Samples:

16-B-01-01	16-B-03-03
16-B-01-03	16-B-03-05
16-B-01-05	16-B-04-01
16-B-02-01	16-B-04-03
16-B-02-05	16-B-04-03-D
16-B-03-01	16-B-04-05
16-B-03-01-D	

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BKG = Within background levels
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient
NTX = No Toxicity Information

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
N = Noncarcinogen
NA = Not Applicable.
SSL-INH = Soil Screening Level for transfers from soil to air (Inhalation) calculated online at http://risk.lsd.ornl.gov/calc_start.shtml by the USEPA's Soil Screenng Guidance (USEPA, July 1996).
SSL-MIGR = Soil Screening Level for transfers from soil to groundwater for a Dilution and Attenuation Factor of 1 calculated online at http://risk.lsd.ornl.gov/calc_start.shtml (USEPA July 1996)

TABLE 2.3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Volatile Organics (ug/L)																	
79-01-6	TRICHLOROETHENE(7)	32		32		ug/L	16-G-02S-0205	1/5	0.4 - 5	32	NA	1.4	C	5	FED-MCL	Yes	ASL
Semivolatile Organics (ug/L)																	
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	11		11		ug/L	16-G-04S-0205	1/5	10	11	NA	4.8	C	6	FED-MCL	Yes	ASL
84-74-2	DI-N-BUTYL PHTHALATE	3	J	3	J	ug/L	16-G-05S-0205	1/5	10	3	NA	360	N	NA	FED-MCL	No	BSL
Inorganics (ug/L)																	
7429-90-5	ALUMINUM	657		657		ug/L	16-G-01S-0305	1/5	36.6 - 127	657	1150000	3600	N	50	FED-SMCL	No	BKG
7440-39-3	BARIUM	30.9		294		ug/L	16-G-01S-0305	5/5	---	294	300	260	N	2000	FED-MCL	No	BKG
7440-41-7	BERYLLIUM	0.45		0.47		ug/L	16-G-03S-0205	2/5	0.4 - 1.8	0.47	2.3	7.3	N	4	FED-MCL	No	BSL,BKG
7440-70-2	CALCIUM	23600		228000		ug/L	16-G-02S-0205	5/5	---	228000	583000	NA	N	NA	FED-MCL	No	NUT. BKG
7440-48-4	COBALT	17.9		17.9		ug/L	16-G-01S-0305	1/5	4.3	17.9	16	73	N	NA	FED-MCL	No	BSL
7440-50-8	COPPER	2.8		2.8		ug/L	16-G-01S-0305	1/5	2.52	2.8	7	150	N	1300	FED-AL	No	BSL,BKG
7439-89-6	IRON	376		376		ug/L	16-G-01S-0305	1/5	7.73 - 36.2	376	521000	1100	N	300	FED-SMCL	No	BKG
7439-95-4	MAGNESIUM	15800		588000		ug/L	16-G-03S-0205	5/5	---	588000	11700	NA	N	NA	FED-MCL	No	NUT
7439-96-5	MANGANESE	130		722		ug/L	16-G-03S-0205	5/5	---	722	2580	88	N	50	FED-SMCL	No	BKG
7440-09-7	POTASSIUM	4820		178000		ug/L	16-G-02S-0205	5/5	---	178000	5200	NA	N	NA	FED-MCL	No	NUT
7440-23-5	SODIUM	56000		4720000		ug/L	16-G-02S-0205	5/5	---	4720000	208000	NA		NA	FED-MCL	No	NUT
7440-66-6	ZINC	22		22		ug/L	16-G-01S-0305	1/5	1.42 - 3.1	22	153	1100	N	5000	FED-SMCL	No	BSL,BKG
57-12-5	CYANIDE	3.8	J	3.8	J	ug/L	16-G-03S-0205	1/5	10	3.8	NA	73	N	200	FED-MCL	No	BSL

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 If the maximum inorganic concentration is greater than the Charleston NWS background concentration, (Baseline Background Study. Naval Weapons Station, Charleston, SC. TtNUS, March 2002), that inorganic is not selected as a COPC .
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 The "CAL- Modified PRG" is used as the screening value for trichloroethene (USEPA, Region 9, October 2004).

Associated Samples:

16-G-01S-0305,20050310
16-G-02S-0205,20050225
16-G-03S-0205,20050223
16-G-04S-0205,20050225
16-G-05S-0205,20050223

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BKG = Within background levels
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient
NTX = No Toxicity Information

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
N = Noncarcinogen
NA = Not Applicable.
FED-MCL = Federal Maximum Contaminant Level (USEPA, Winter 2004)
FED-SMCL = Federal Secondary Maximum Contaminant Level (USEPA, Winter 2004)
FED-AL = Federal Action Level (USEPA, Winter 2004)

TABLE 2.4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE WATER
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Volatile Organics (ug/L)																	
78-83-1	ISOBUTANOL	6	J	6	J	ug/L	16-W-02-1001	1/1	---	6	NA	180	N	NA	FED-AWQC	No	BSL
127-18-4	TETRACHLOROETHENE	0.7	J	0.7	J	ug/L	16-W-07-1001	1/7	5	0.7	NA	0.1	C	0.69	FED-AWQC	Yes	ASL
Explosives (ug/L)																	
118-96-7	2,4,6-TRINITROTOLUENE	0.21		0.21		ug/L	16-W-07-1001	1/7	0.2	0.21	NA	1.8	N	NA	FED-AWQC	No	BSL
121-14-2	2,4-DINITROTOLUENE	0.66	J	0.66	J	ug/L	16-W-01-1001	1/7	0.2 - 10	0.66	NA	7.3	N	0.11	FED-AWQC	Yes	ASL
606-20-2	2,6-DINITROTOLUENE	0.41	J	0.41	J	ug/L	16-W-01-1001	1/7	0.2 - 10	0.41	NA	3.6	N	NA	FED-AWQC	No	BSL
Inorganics (ug/L)																	
7429-90-5	ALUMINUM	524		11000		ug/L	16-W-05-1001	6/7	173	11000	3520	3600	N	NA	FED-AWQC	Yes	ASL
7440-36-0	ANTIMONY	11.2		11.8		ug/L	16-W-04-1001	2/7	3.65	11.8	ND	1.5	N	5.6	FED-AWQC	Yes	ASL
7440-38-2	ARSENIC	3.9		4.5		ug/L	16-W-01-1001-D	1/7	2.53 - 8.5	4.5	6.8	0.045	C	0.018	FED-AWQC	No	BKG
7440-39-3	BARIUM	17.6		63.4		ug/L	16-W-05-1001	7/7	---	63.4	46.6	260	N	1000	FED-AWQC	No	BSL
7440-70-2	CALCIUM	142000		186000		ug/L	16-W-02-1001	7/7	---	186000	226000	NA	N	NA	FED-AWQC	No	NUT
7440-50-8	COPPER	11.7		12.8		ug/L	16-W-02-1001	2/7	0.84 - 6.4	12.8	ND	150	N	1000	FED-AWQC	No	BSL
7439-89-6	IRON	704		9980		ug/L	16-W-05-1001	6/7	49.38	9980	2480	1100	N	300	FED-AWQC	Yes	ASL
7439-92-1	LEAD	2.1		15.5		ug/L	16-W-05-1001	4/7	1.48 - 6.4	15.5	ND	15	N	NA	FED-AWQC	Yes	ASL
7439-95-4	MAGNESIUM	419000		512000		ug/L	16-W-02-1001	7/7	---	512000	610000	NA	N	NA	FED-AWQC	No	NUT
7439-96-5	MANGANESE	1.5		388		ug/L	16-W-07-1001	7/7	---	388	106	88	N	50	FED-AWQC	Yes	ASL
7439-97-6	MERCURY	0.05		0.09		ug/L	16-W-05-1001	2/7	0.03 - 0.06	0.09	ND	1.1	N	NA	FED-AWQC	No	BSL
7440-09-7	POTASSIUM	138000		160000		ug/L	16-W-01-1001	7/7	---	160000	354000	NA	N	NA	FED-AWQC	No	NUT
7440-22-4	SILVER	1.2		1.2		ug/L	16-W-01-1001	1/7	1.03 - 4.15	1.2	ND	18	N	NA	FED-AWQC	No	BSL
7440-23-5	SODIUM	3250000		4270000		ug/L	16-W-01-1001	7/7	---	4270000	4300000	NA	N	NA	FED-AWQC	No	NUT
7440-62-2	VANADIUM	2.1		24.2		ug/L	16-W-05-1001	6/7	4.66	24.2	11	3.6	N	NA	FED-AWQC	Yes	ASL
7440-66-6	ZINC	2		71		ug/L	16-W-02-1001	5/7	7.2 - 14.9	71	ND	1100	N	7400	FED-AWQC	No	BSL

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 If the maximum inorganic concentration is greater than the concentration at the upgradient location, 23SW/SD08, that inorganic is not selected as a COPC .
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).

Associated Samples:

16-W-01-1001	16-W-04-1001
16-W-01-1001-D	16-W-05-1001
16-W-02-1001	16-W-06-1001
16-W-03-1001	16-W-07-1001

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BKG = Within background levels
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient
NTX = No Toxicity Information

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
N = Noncarcinogen
NA = Not Applicable.
FED-AWQC = Nationl Recommended Water Quality Criteria for Priority Toxic Pollutants, Human Health for Consumption of Water and Organisms (USEPA, 2004).

TABLE 2.5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SEDIMENT
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Volatile Organics (mg/kg)																	
75-15-0	CARBON DISULFIDE	0.002	J	0.017	J	mg/kg	16-D-03-1001	5/7	0.020 - 0.028	0.017	NA	36	N	NA	NA	No	BSL
Semivolatile Organics (mg/kg)																	
120-12-7	ANTHRACENE	0.068	J	0.068	J	mg/kg	16-D-03-1001	1/7	0.43 - 1.4	0.068	NA	2200	N	NA	NA	No	BSL
56-55-3	BENZO(A)ANTHRACENE	0.044	J	0.2	J	mg/kg	16-D-03-1001	4/7	0.43 - 1.4	0.2	NA	0.62	C	NA	NA	No	BSL
50-32-8	BENZO(A)PYRENE	0.019	J	0.16	J	mg/kg	16-D-03-1001	3/7	0.43 - 1.4	0.16	NA	0.062	C	NA	NA	Yes	ASL
205-99-2	BENZO(B)FLUORANTHENE	0.021	J	1.1	J	mg/kg	16-D-02-1001	4/7	0.43 - 1.4	1.1	NA	0.62	C	NA	NA	Yes	ASL
191-24-2	BENZO(G,H,I)PERYLENE	0.13	J	0.13	J	mg/kg	16-D-03-1001	1/7	0.43 - 1.4	0.13	NA	230	N	NA	NA	No	BSL
218-01-9	CHRYSENE	0.19	J	0.71	J	mg/kg	16-D-02-1001	2/7	0.43 - 1.4	0.71	NA	62	C	NA	NA	No	BSL
206-44-0	FLUORANTHENE	0.042	J	0.35	J	mg/kg	16-D-03-1001	4/7	0.43 - 1.4	0.35	NA	230	N	NA	NA	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.12	J	0.12	J	mg/kg	16-D-03-1001	1/7	0.43 - 1.4	0.12	NA	0.62	C	NA	NA	No	BSL
85-01-8	PHENANTHRENE	0.19	J	0.19	J	mg/kg	16-D-03-1001	1/7	0.43 - 1.4	0.19	NA	230	N	NA	NA	No	BSL
129-00-0	PYRENE	0.081	J	0.94	J	mg/kg	16-D-02-1001	3/7	0.43 - 1.4	0.94	NA	230	N	NA	NA	No	BSL
Pesticides/PCBs (mg/kg)																	
72-54-8	4,4'-DDD	0.0014	J	0.0053	J	mg/kg	16-D-06-1001	3/7	0.01 - 0.017	0.0053	NA	2.4	C	NA	NA	No	BSL
72-55-9	4,4'-DDE	0.0022	J	0.0042	J	mg/kg	16-D-03-1001	6/7	0.014	0.0042	NA	1.7	C	NA	NA	No	BSL
50-29-3	4,4'-DDT	0.001	J	0.0044	J	mg/kg	16-D-06-1001	4/7	0.01 - 0.017	0.0044	NA	1.7	C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	0.0037	J	0.0037	J	mg/kg	16-D-02-1001	1/7	0.0022 - 0.0086	0.0037	NA	1.6	C	NA	NA	No	BSL
11097-69-1	AROCLOR-1254	0.16	J	0.16	J	mg/kg	16-D-02-1001	1/7	0.022 - 0.086	0.16	NA	0.22	C	NA	NA	No	BSL
11096-82-5	AROCLOR-1260	0.026	J	0.026	J	mg/kg	16-D-02-1001	1/7	0.022 - 0.086	0.026	NA	0.22	C	NA	NA	No	BSL
5103-74-2	GAMMA-CHLORDANE	0.0033	J	0.0033	J	mg/kg	16-D-02-1001	1/7	0.0022 - 0.0086	0.0033	NA	1.6	C	NA	NA	No	BSL
319-84-6	ALPHA-BHC	0.007	J	0.014	J	mg/kg	16-D-03-1001	3/7	0.0022 - 0.0086	0.014	NA	0.09	C	NA	NA	No	BSL
58-89-9	GAMMA-BHC (LINDANE)	0.005	J	0.0064	J	mg/kg	16-D-03-1001	3/7	0.0022 - 0.0086	0.0064	NA	0.44	C	NA	NA	No	BSL
Inorganics (mg/kg)																	
7429-90-5	ALUMINUM	3640		45100	J	mg/kg	16-D-05-1001	7/7	---	45100	52800	7600	N	NA	NA	No	BKG
7440-38-2	ARSENIC	14.6	J	20.6	J	mg/kg	16-D-05-1001	6/7	1.2 - 1.6	20.6	36.6	0.39	C	NA	NA	No	BKG
7440-39-3	BARIUM	5.7		49.6	J	mg/kg	16-D-05-1001	7/7	---	49.6	72.4	540	N	NA	NA	No	BSL,BKG
7440-41-7	BERYLLIUM	0.18		1.8	J	mg/kg	16-D-03-1001	7/7	0.13	1.8	3.2	15	N	NA	NA	No	BSL,BKG
7440-70-2	CALCIUM	714		3240	J	mg/kg	16-D-03-1001	7/7	---	3240	14760	NA	N	NA	NA	No	NUT, BKG
7440-47-3	CHROMIUM	6.9		71.6	J	mg/kg	16-D-04-1001	7/7	5.6	71.6	113.6	210	C	NA	NA	No	BSL,BKG
7440-48-4	COBALT	0.69		14.1	J	mg/kg	16-D-06-1001	7/7	0.47	14.1	22.6	140	N	NA	NA	No	BSL,BKG
7440-50-8	COPPER	1.2		100	J	mg/kg	16-D-02-1001	7/7	---	100	57.4	310	N	NA	NA	No	BSL
7439-89-6	IRON	3720		51400	J	mg/kg	16-D-05-1001	7/7	---	51400	69200	2300	N	NA	NA	No	BKG
7439-92-1	LEAD	5.4		46.5	J	mg/kg	16-D-02-1001	7/7	---	46.5	53.6	400		NA	NA	No	BSL,BKG
7439-95-4	MAGNESIUM	486		7960	J	mg/kg	16-D-03-1001	7/7	---	7960	13100	NA	N	NA	NA	No	NUT
7439-96-5	MANGANESE	12.8		234	J	mg/kg	16-D-05-1001	7/7	---	234	704	180	N	NA	NA	No	BKG
7439-97-6	MERCURY	0.29	J	0.29	J	mg/kg	16-D-05-1001	1/7	0.01 - 0.16	0.29	0.28	2.3	N	NA	NA	No	BSL
7440-02-0	NICKEL	19.2	J	29.1	J	mg/kg	16-D-02-1001	4/7	1.5 - 16.6	29.1	32	160	N	NA	NA	No	BSL,BKG
7440-09-7	POTASSIUM	284		3980	J	mg/kg	16-D-03-1001	7/7	---	3980	6960	NA	N	NA	NA	No	NUT
7782-49-2	SELENIUM	1		2.6	J	mg/kg	16-D-05-1001	4/7	0.35 - 1.45	2.6	9.2	39	N	NA	NA	No	BSL,BKG
7440-23-5	SODIUM	1480		18500	J	mg/kg	16-D-03-1001	7/7	---	18500	15200	NA	N	NA	NA	No	NUT
7440-62-2	VANADIUM	7.1		79.4	J	mg/kg	16-D-04-1001	7/7	---	79.4	127.4	7.8	N	NA	NA	No	BKG
7440-66-6	ZINC	8.4		158	J	mg/kg	16-D-02-1001	7/7	---	158	162.2	2300	N	NA	NA	No	BSL,BKG

TABLE 2.5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SEDIMENT
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 If the maximum inorganic concentration is greater than the concentration at the upgradient location, 23SW/SD08, that inorganic is not selected as a COPC .
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).

Surrogate Chemicals

Pyrene is used as a surrogate for benzo(ghi)perylene, and phenanthrene.
Chlordane is used a surrogatge for alpha- and gamma-chlordane.
The PRG for chromium represents a 1:6 ratio of Cr VI:Cr III (USEPA Region 9, October 2004).

Associated Samples:

16-D-01-1001	16-D-04-1001
16-D-01-1001-D	16-D-05-1001
16-D-02-1001	16-D-06-1001
16-D-03-1001	16-D-07-1001

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BKG = Within background levels
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
N = Noncarcinogen
NA = Not Applicable.

TABLE 3.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: SWMU 16

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Bis(2-Ethylhexyl)phthalate	mg/kg	1200	NA	4950		mg/kg	4950	Maximum	N < 10 (1)	4950	Maximum	N < 10 (1)
Aroclor-1254	mg/kg	12	NA	50		mg/kg	50	Maximum	N < 10	50	Maximum	N < 10
Antimony	mg/kg	27.6	NA	110		mg/kg	110	Maximum	N < 10	110	Maximum	N < 10
Barium	mg/kg	58.9	NA	179		mg/kg	179	Maximum	N < 10	179	Maximum	N < 10
Cadmium	mg/kg	13.2	NA	52.4		mg/kg	52.4	Maximum	N < 10	52.4	Maximum	N < 10
Chromium	mg/kg	154	NA	573		mg/kg	573	Maximum	N < 10	573	Maximum	N < 10
Lead	mg/kg	2760	NA	12400		mg/kg	2760	Average	(2)	2760	Average	(2)

(1) Dataset consists of less than 10 samples. Therefore, the maximum concentration is used as the EPC.
2 - The EPC for lead is the arithmetic average, as recommended by USEPA guidance (USEPA, August 2005).

TABLE 3.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SUBSURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: SWMU 16

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)anthracene	mg/kg	0.2	0.3	0.4	J	mg/kg	0.4	Gamma 95% UCL	Gamma(1)	0.4	Gamma 95% UCL	Gamma(1)
Benzo(a)pyrene	mg/kg	0.3	0.4	0.5	J	mg/kg	0.5	Gamma 95% UCL	Gamma(1)	0.5	Gamma 95% UCL	Gamma(1)
Benzo(b)fluoranthene	mg/kg	0.2	0.4	0.7	J	mg/kg	0.5	H-UCL	ProUCL (2)	0.5	H-UCL	ProUCL (2)
Carbazole	mg/kg	0.4	0.5	0.2	J	mg/kg	0.2	Maximum	N < 10 (3)	0.2	Maximum	N < 10 (3)
Chrysene	mg/kg	0.3	0.5	0.5	J	mg/kg	0.5	Student-t	ProUCL (4)	0.5	Student-t	ProUCL (4)
Aroclor-1254	mg/kg	0.11	0.27	1		mg/kg	1	Maximum	FOD(5)	1	Maximum	FOD(5)
Aroclor-1260	mg/kg	0.05	0.099	0.32		mg/kg	0.32	Maximum	FOD(5)	0.32	Maximum	FOD(5)
alpha-BHC	mg/kg	0.006	0.01	0.0033	J	mg/kg	0.0033	Maximum	(6)	0.0033	Maximum	(6)
gamma-BHC (Lindane)	mg/kg	0.006	0.01	0.002	J	mg/kg	0.002	Maximum	(6)	0.002	Maximum	(6)
Aluminum	mg/kg	28100	36400	55800	J	mg/kg	36400	Student-t	ProUCL (4)	36400	Student-t	ProUCL (4)
Antimony	mg/kg	1.7	3.5	11		mg/kg	11	Maximum	FOD(5)	11	Maximum	FOD(5)
Arsenic	mg/kg	15	20.5	34	J	mg/kg	20.5	Student-t	ProUCL (4)	20.5	Student-t	ProUCL (4)
Barium	mg/kg	93.1	182	580		mg/kg	580	95 % UCL-CMU	ProUCL (7)	580	95 % UCL-CMU	ProUCL (7)
Cadmium	mg/kg	1.7	4.6	17.3		mg/kg	17.3	Maximum	FOD(5)	17.3	Maximum	FOD(5)
Chromium	mg/kg	53.4	71.1	132		mg/kg	79.4	H-UCL	ProUCL (2)	79.4	H-UCL	ProUCL (2)
Cobalt	mg/kg	7.5	10.2	17		mg/kg	10.2	Student-t	ProUCL (4)	10.2	Student-t	ProUCL (4)
Copper	mg/kg	192	401	992		mg/kg	992	Maximum	(6)	992	Maximum	(6)
Iron	mg/kg	41200	53300	76000		mg/kg	53300	Student-t	ProUCL (4)	53300	Student-t	ProUCL (4)
Manganese	mg/kg	223	311	494		mg/kg	311	Student-t	ProUCL (4)	311	Student-t	ProUCL (4)
Mercury	mg/kg	0.11	0.15	0.32		mg/kg	0.2	H-UCL	ProUCL (2)	0.2	H-UCL	ProUCL (2)
Nickel	mg/kg	30.4	48	114		mg/kg	86	H-UCL	ProUCL (2)	86	H-UCL	ProUCL (2)
Silver	mg/kg	1.5	3.9	14.8		mg/kg	14.8	Maximum	FOD(5)	14.8	Maximum	FOD(5)
Thallium	mg/kg	1.2	1.6	2.6		mg/kg	1.6	Student-t	ProUCL (4)	1.6	Student-t	ProUCL (4)
Vanadium	mg/kg	54.5	70	108	J	mg/kg	70	Student-t	ProUCL (4)	70	Student-t	ProUCL (4)
Zinc	mg/kg	1530	4100	15700		mg/kg	15600	99 % UCL-CMU	ProUCL (7)	15600	99 % UCL-CMU	ProUCL (7)

Definitions:

95 % UCL-CMU = 95% Chebyshev (Mean, Std) UCL (distribution undefined).

99 % UCL-CMU = 99% Chebyshev (Mean, Std) UCL (distribution undefined).

Footnotes:

1 - USEPA's ProUCL software indicates that the data fit a gamma distribution.

2 - ProUCL indicates data are log-normally distributed.

3 - Dataset consists of less than 10 samples. Therefore, the maximum concentration is used as the EPC.

4 - ProUCL indicates data are normally distributed.

5 - Less than 50 percent positive detections. Maximum concentration is used as the EPC.

6 - UCL is greater than the maximum concentration. Therefore, the maximum concentration is used as the EPC.

7 - EPC statistic is recommended by USEPA's ProUCL software.

TABLE 3.3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - GROUNDWATER
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: SWMU 16

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
TRICHLOROETHENE(7)	ug/l	7.9	NA	32		ug/l	32	Maximum	N < 10 (1)	32	Maximum	N < 10 (1)
BIS(2-ETHYLHEXYL)PHTHALATE	ug/L	6.2	NA	11		ug/L	11	Maximum	N < 10	11	Maximum	N < 10

(1) Dataset consists of less than 10 samples. Therefore, the maximum concentration is used as the EPC.

TABLE 3.4
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE WATER
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: SWMU 16

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Tetrachloroethene	ug/L	2	NA	0.7	J	ug/L	0.7	Maximum	N < 10 (1)	0.7	Maximum	N < 10 (1)
2,4-Dinitrotoluene	ug/L	3	NA	0.4	J	ug/L	0.4	Maximum	N < 10	0.4	Maximum	N < 10
Aluminum	ug/L	2930	NA	11000		ug/L	11000	Maximum	N < 10	11000	Maximum	N < 10
Antimony	ug/L	4.6	NA	11.8		ug/L	11.8	Maximum	N < 10	11.8	Maximum	N < 10
Iron	ug/L	2690	NA	9980		ug/L	9980	Maximum	N < 10	9980	Maximum	N < 10
Lead	ug/L	4.4	NA	15.5		ug/L	4.4	Maximum	N < 10	4.4	Maximum	N < 10
Manganese	ug/L	113	NA	388		ug/L	388	Maximum	N < 10	388	Maximum	N < 10
Vanadium	ug/L	8.2	NA	24.2		ug/L	24.2	Maximum	N < 10	24.2	Maximum	N < 10

(1) Dataset consists of less than 10 samples. Therefore, the maximum concentration is used as the EPC.

TABLE 3.5
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SEDIMENT
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: *Current/Future*
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: SWMU 16

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)pyrene	mg/kg	0.4	NA	0.16	J	mg/kg	0.16	Maximum	N < 10 (1)	0.16	Maximum	N < 10 (1)
Benzo(b)fluoranthene	mg/kg	0.5	NA	1.1	J	mg/kg	1.1	Maximum	N < 10	1.1	Maximum	N < 10

(1) Dataset consists of less than 10 samples. Therefore, the maximum concentration is used as the EPC.

TABLE 5.1
NON-CANCER TOXICITY DATA – ORAL/DERMAL
SWMUS 16 & 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal[1]	Absorbed RfD for Dermal[2]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s)
Volatile Organic Compounds										
1,1,2,2-Tetrachloroethane	Chronic	6.0E-02	mg/kg/day	1	6.0E-02	mg/kg/day	Liver	NA	NCEA	4/2005
1,1,2-Trichloroethane	Chronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Blood	1000/1	IRIS	8/2005
1,1-Dichloroethene	Chronic	5.0E-02	mg/kg/day	1	5.0E-02	mg/kg/day	Liver	100/1	IRIS	8/2005
1,2-Dichloroethane	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	NA	NA	NCEA	4/2005
1,2-Dichloropropane	NA	NA	NA	NA	NA	NA	NA	NA	IRIS	8/2005
Acetone	Chronic	9.0E-01	mg/kg/day	1	9.0E-01	mg/kg/day	Kidney	1000/1	IRIS	8/2005
Benzene	Chronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Blood	300/1	IRIS	8/2005
Bromodichloromethane	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Kidney	1000/1	IRIS	8/2005
Carbon Tetrachloride	Chronic	7.0E-04	mg/kg/day	1	7.0E-04	mg/kg/day	Liver	1000/1	IRIS	8/2005
Chloroform	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Liver	1000/1	IRIS	8/2005
Chloromethane	NA	NA	NA	NA	NA	NA	NA	NA	IRIS	8/2005
cis-1,2-Dichloroethene	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Blood	NA	EPA III	4/2005
Dichlorodifluoromethane	Chronic	2.0E-01	mg/kg/day	1	2.0E-01	mg/kg/day	Body Weight	100/1	IRIS	8/2005
Methylene Chloride	Chronic	6.0E-02	mg/kg/day	1	6.0E-02	mg/kg/day	Liver	100/1	IRIS	8/2005
Tetrachloroethene	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Liver	1000/1	IRIS	8/2005
Toluene	Chronic	2.0E-01	mg/kg/day	1	2.0E-01	mg/kg/day	Kidney, Liver	1000/1	IRIS	8/2005
Total-1,2-Dichloroethene	Chronic	9.0E-03	mg/kg/day	1	9.0E-03	mg/kg/day			HEAST	7/1997
trans-1,2-Dichloroethene	Chronic	2.0E-01	mg/kg/day	1	2.0E-01	mg/kg/day	Blood	1000/1	IRIS	8/2005
Trichloroethene	Chronic	5.0E-01	mg/kg/day	1	5.0E-01	mg/kg/day	CNS	NA	CAL EPA	8/2005
Vinyl Chloride	Chronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Liver	30/1	IRIS	8/2005
Semivolatile Organic Compounds										
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Body Weight	3000/1	IRIS	8/2005
Bis(2-ethylhexyl)phthalate	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Liver	1000/1	IRIS	8/2005
Pesticides/PCBs										
Pentachlorophenol	Chronic	3.0E-02	mg/kg/day	1	3.0E-02	mg/kg/day	Liver, Kidney	100/1	IRIS	8/2005
Aroclor-1248	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	Chronic	2.0E-05	mg/kg/day	1	2.0E-05	mg/kg/day	Immunological	300/1	IRIS	8/2005
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-BHC	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA
beta-BHC	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC (LINDANE)	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Liver, Kidney	1000/1	IRIS	8/2005
Energetics										
2,4,6-Trinitrotoluene	Chronic	5.0E-04	mg/kg/day	1	5.0E-04	mg/kg/day	Liver	1000/1	IRIS	8/2005
2,4-Dinitrotoluene	Chronic	2.0E-03	mg/kg/day	1	2.0E-03	mg/kg/day	CNS, Liver	100/1	HEAST	7/1997
RDX	Chronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Prostate	100/1	IRIS	8/2005
Inorganics										
Aluminum	Chronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	CNS	100	NCEA	4/2005
Antimony	Chronic	4.0E-04	mg/kg/day	0.15	6.0E-05	mg/kg/day	Blood	1000/1	IRIS	8/2005
Arsenic	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Skin, CVS	3/1	IRIS	8/2005
Barium	Chronic	7.0E-02	mg/kg/day	0.07	4.9E-03	mg/kg/day	Kidney	3/1	IRIS	8/2005
Beryllium	Chronic	2.0E-03	mg/kg/day	0.007	1.4E-05	mg/kg/day	GS	300/1	IRIS	8/2005
Cadmium[3]	Chronic	5.0E-04	mg/kg/day	0.05	2.5E-05	mg/kg/day	Kidney	10/1	IRIS	8/2005
Chromium VI	Chronic	3.0E-03	mg/kg/day	0.025	7.5E-05	mg/kg/day	Fetotoxicity/GS/Bone	300/3	IRIS	8/2005

TABLE 5.1
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
SWMUS 16 & 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal[1]	Absorbed RfD for Dermal[2]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s)
Cobalt	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	NA	NA	EPA 3	4/2005
Copper	Chronic	4.0E-02	mg/kg/day	1	4.0E-02	mg/kg/day	GS	NA	HEAST	7/1997
Iron	Chronic	3.0E-01	mg/kg/day	1	3.0E-01	mg/kg/day	NA	1	NCEA	4/2005
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Soil)	Chronic	7.0E-02	mg/kg/day	0.04	2.8E-03	mg/kg/day	CNS	1/1	IRIS	8/2005
Manganese (Water)	Chronic	2.4E-02	mg/kg/day	0.04	9.6E-04	mg/kg/day	CNS	3/1	IRIS	8/2005
Mercury[4]	Chronic	3.0E-04	mg/kg/day	0.07	2.1E-05	mg/kg/day	CNS	1000/1	IRIS	8/2005
Nickel	Chronic	2.0E-02	mg/kg/day	0.04	8.0E-04	mg/kg/day	Body Weight	300/1	IRIS	8/2005
Silver	Chronic	5.0E-03	mg/kg/day	1	5.0E-03	mg/kg/day	Skin	3/1	IRIS	8/2005
Vanadium	Chronic	1.0E-03	mg/kg/day	0.026	2.6E-05	mg/kg/day	Kidney	300	NCEA	4/2005
Zinc	Chronic	3.0E-01	mg/kg/day	1	3.0E-01	mg/kg/day	Blood	3/1	IRIS	8/2005
Cyanide	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Weight Loss, Thyroid	100/5	IRIS	8/2005

Notes:
1 - USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
2 - Adjusted dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.
3 - Water value for cadmium is listed.
4 - Values are for mercuric chloride.

Definitions:
CNS = Central Nervous System
CVS = Cardiovascular system
GS = Gastrointestinal System
EPA 3 = USEPA Region 3 RBC Table, April, 2005.
EPA 9 = USEPA Region 9 PRG Table, October 19, 2004.
HEAST= Health Effects Assessment Summary Tables
IRIS = Integrated Risk Information System
NA = Not Applicable
NCEA = USEPA National Center for Environmental Assessment
NOEL = No Observed Effect Level

TABLE 5.2
NON-CANCER TOXICITY DATA – INHALATION
SWMUS 16 & 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD[1]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s)
Volatile Organic Compounds									
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	Chronic	2.0E-01	mg/m^3	5.7E-02	(mg/kg/day)	Liver	30/1	IRIS	8/2005
1,2-Dichloroethane	Chronic	2.5E+00	mg/m^3	7.0E-01	(mg/kg/day)		NA	NCEA	10/19/2004
1,2-Dichloropropane	Chronic	4.0E-03	mg/m^3	1.1E-03	(mg/kg/day)	Nasal	300/1	IRIS	8/2005
Acetone	Chronic	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	Chronic	3.0E-02	mg/m^3	8.6E-03	(mg/kg/day)	Blood	300/1	IRIS	8/2005
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	Chronic	1.8E-01	mg/m^3	5.0E-02	(mg/kg/day)	Liver	NA	NCEA	10/19/2004
Chloroform	Chronic	4.9E-02	mg/m^3	1.4E-02	(mg/kg/day)	Liver	NA	NCEA	10/19/2004
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	Chronic	9.0E-02	mg/m^3	2.6E-02	(mg/kg/day)	Neurological	1000/1	IRIS	8/2005
Dichlorodifluoromethane	Chronic	2.0E-01	mg/m^3	5.7E-02	(mg/kg/day)	Liver	10000	HEAST	8/2005
Methylene Chloride	Chronic	1.1E+00	mg/m^3	3.0E-01	(mg/kg/day)	Liver	NA	EPA 3	4/2005
Tetrachloroethene	Chronic	4.9E-01	mg/m^3	1.4E-01	(mg/kg/day)	Liver	NA	NCEA	10/19/2004
Toluene	Chronic	4.0E-01	mg/m^3	1.1E-01	(mg/kg/day)	CNS	300/1	IRIS	8/2005
Total-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trans-1,2-Dichloroethene	NA	7.0E-02	mg/m^3	2.0E-02	(mg/kg/day)	Blood, Liver	NA	NA	NA
Trichloroethene	Chronic	6.0E-01	mg/m^3	1.7E-01	(mg/kg/day)	CNS	NA	EPA 9	10/2004
Vinyl Chloride	Chronic	1.0E-01	mg/m^3	2.9E-02	(mg/kg/day)	Liver	30/1	IRIS	8/2005
Semivolatile Organic Compounds									
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	Chronic	0.003	mg/m^3	8.6E-04	(mg/kg/day)	Nasal	3000/1	IRIS	8/2005
Pesticides/PCBs									
PCBs	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA
beta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC (LINDANE)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Energetics									
2,4,6-Trinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA
RDX	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 5.2
NON-CANCER TOXICITY DATA -- INHALATION
SWMUS 16 & 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD[1]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s)
Metals									
Aluminum	Chronic	3.5E-03	mg/m^3	1.0E-03	(mg/kg/day)	CNS	300	NCEA	10/19/2004
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	Chronic	5.0E-04	mg/m^3	1.4E-04	(mg/kg/day)	Fetus	1000/1	HEAST	7/1997
Beryllium	Chronic	2.0E-05	mg/m^3	5.7E-06	(mg/kg/day)	Lungs	10/1	IRIS	8/2005
Cadmium	Chronic	2.0E-04	mg/m^3	5.7E-05	(mg/kg/day)	Kidney	NA	EPA 3	10/19/2004
Chromium III	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium VI	Chronic	1.0E-04	mg/m^3	2.9E-05	(mg/kg/day)	Lungs	300/1	IRIS	8/2005
Cobalt	Chronic	2.0E-05	mg/m^3	5.7E-06	(mg/kg/day)	NA	NA	EPA 3	10/19/2004
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lithium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	Chronic	5.0E-05	mg/m^3	1.4E-05	(mg/kg/day)	CNS	1000/1	IRIS	8/2005
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
1 - Extrapolated RfD = RfC *$20m^3$/day / 70 kg

Definitions:
NA = Not Applicable
CNS = Central Nervous System
EPA 3 = USEPA Region 3 RBC Table, April, 2005.
EPA 9 = USEPA Region 9 PRG Table, October 19, 2004.
HEAST= Health Effects Assessment Summary Tables
IRIS = Integrated Risk Information System
NCEA = USEPA National Center for Environmental Assessment

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
SWMUS 16 & 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal[1]	Absorbed Cancer Slope Factor for Dermal[2]		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds								
1,1,2,2-Tetrachloroethane	2.0E-01	(mg/kg/day)$^{-1}$	1	2.0E-01	(mg/kg/day)$^{-1}$	C	IRIS	8//2005
1,1,2-Trichloroethane	5.7E-02	(mg/kg/day)$^{-1}$	1	5.7E-02	(mg/kg/day)$^{-1}$	C	IRIS	8//2005
1,1-Dichloroethene	NA	NA	NA	NA	NA	C	IRIS	8//2005
1,2-Dichloroethane	9.1E-02	(mg/kg/day)$^{-1}$	1	9.1E-02	(mg/kg/day)$^{-1}$	B2	IRIS	8//2005
1,2-Dichloropropane	6.8E-02	(mg/kg/day)$^{-1}$	1	6.8E-02	(mg/kg/day)$^{-1}$	NA	HEAST	7/1997
Acetone	NA	NA	NA	NA	NA	D	IRIS	8//2005
Benzene	5.5E-02	(mg/kg/day)$^{-1}$	1	5.5E-02	(mg/kg/day)$^{-1}$	A	IRIS	8//2005
Bromodichloromethane	6.2E-02	(mg/kg/day)$^{-1}$	1	6.2E-02	(mg/kg/day)$^{-1}$	B2	IRIS	8//2005
Carbon Tetrachloride	1.3E-01	(mg/kg/day)$^{-1}$	1	1.3E-01	(mg/kg/day)$^{-1}$	B2	IRIS	8//2005
Chloroform	NA	NA	NA	NA	NA	B2	IRIS	8//2005
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	D	IRIS	8//2005
Chloromethane	NA	NA	NA	NA	NA	NA	IRIS	8//2005
Dichlorodifluoromethane	NA	NA	NA	NA	NA	D	IRIS	8//2005
Methylene Chloride	7.5E-03	(mg/kg/day)$^{-1}$	1	7.5E-03	(mg/kg/day)$^{-1}$	B2	IRIS	8//2005
Tetrachloroethene	5.4E-01	(mg/kg/day)$^{-1}$	1	5.4E-01	(mg/kg/day)$^{-1}$	NA	EPA 3	10/19/2004
Toluene	NA	NA	NA	NA	NA	D	IRIS	8//2005
Total-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA
Trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	1.3E-02	(mg/kg/day)$^{-1}$	1	1.3E-02	(mg/kg/day)$^{-1}$	C	EPA 9	10/2004
Vinyl Chloride (child)	1.5E+00	(mg/kg/day)$^{-1}$	1	1.5E+00	(mg/kg/day)$^{-1}$	A	IRIS	8//2005
Vinyl Chloride (adult)	7.2E-01	(mg/kg/day)$^{-1}$	1	7.2E-01	(mg/kg/day)$^{-1}$	A	IRIS	8//2005
Semivolatile Organic Compounds								
Benzo(a)anthracene	7.3E-01	(mg/kg/day)$^{-1}$	1	7.3E-01	(mg/kg/day)$^{-1}$	B2	EPA(1)	7/1993
Benzo(a)pyrene	7.3E+00	(mg/kg/day)$^{-1}$	1	7.3E+00	(mg/kg/day)$^{-1}$	B2	IRIS	8//2005
Benzo(b)fluoranthene	7.3E-01	(mg/kg/day)$^{-1}$	1	7.3E-01	(mg/kg/day)$^{-1}$	B2	EPA(1)	7/1993
Carbazole	2.0E-02	(mg/kg/day)$^{-1}$	1	2.0E-02	(mg/kg/day)$^{-1}$	NA	HEAST	7/1997
Chrysene	7.3E-03	(mg/kg/day)$^{-1}$	1	7.3E-03	(mg/kg/day)$^{-1}$	B2	EPA(1)	7/1993
Dibenzo(a,h)anthracene	7.3E+00	(mg/kg/day)$^{-1}$	1	7.3E+00	(mg/kg/day)$^{-1}$	B2	EPA(1)	7/1993
Naphthalene	NA	NA	NA	NA	NA	C	IRIS	8//2005
Bis(2-ethylhexyl)phthalate	1.4E-02	(mg/kg/day)$^{-1}$	1	1.4E-02	(mg/kg/day)$^{-1}$	B2	IRIS	8//2005
Pesticides/PCBs								
PCBs	2.0E+00	(mg/kg/day)$^{-1}$	1	2.0E+00	(mg/kg/day)$^{-1}$	B2	IRIS	8//2005
Pentachlorophenol	1.2E-01	(mg/kg/day)$^{-1}$	1	1.2E-01	(mg/kg/day)$^{-1}$	B2	IRIS	8//2005
alpha-BHC	6.3E+00	(mg/kg/day)$^{-1}$	1	6.3E+00	(mg/kg/day)$^{-1}$	B2	IRIS	8//2005
beta-BHC	1.8E+00	(mg/kg/day)$^{-1}$	1	1.8E+00	(mg/kg/day)$^{-1}$	C	IRIS	8//2005
gamma-BHC (LINDANE)	1.3E+00	(mg/kg/day)$^{-1}$	1	1.3E+00	(mg/kg/day)$^{-1}$	NA	HEAST	7/1997

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
SWMUS 16 & 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal[1]	Absorbed Cancer Slope Factor for Dermal[2]		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s)
Energetics								
2,4,6-Trinitrotoluene	3.0E-02	$(mg/kg/day)^{-1}$	1	3.0E-02	$(mg/kg/day)^{-1}$	C	IRIS	8//2005
2,4-Drinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA
RDX	1.1E-01	$(mg/kg/day)^{-1}$	1	1.1E-01	$(mg/kg/day)^{-1}$	C	IRIS	8//2005
Metals								
Arsenic	1.5E+00	$(mg/kg/day)^{-1}$	1	1.5E+00	$(mg/kg/day)^{-1}$	A	IRIS	8//2005

Notes:
1 - USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
2 - Adjusted cancer slope factor for dermal = Oral cancer slope factor x Oral Absorption Efficiency for Dermal.

EPA Group:
A - Human carcinogen.
B1 - Probable human carcinogen - indicates that limited human data are available.
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans .
C - Possible human carcinogen.
D - Not classifiable as a human carcinogen.
E - Evidence of noncarcinogenicity.

Definitions:

IRIS = Integrated Risk Information System.

HEAST= Health Effects Assessment Summary Tables.

EPA 3 = USEPA Region 3 RBC Table, April, 2005.

EPA 9 = USEPA Region 9 PRG Table, October 19, 2004.

EPA(1) = USEPA, PCBs: Cancer Dose-Response Assessment and Applications to Environmental Mixtures, September 1996, EPA/600/P-96/001F.

NA = Not Available.

TABLE 6.2
CANCER TOXICITY DATA – INHALATION
SWMUS 16 & 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor[1]		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds							
1,1,2,2-Tetrachloroethane	5.8E-02	$(mg/m^3)^{-1}$	2.0E-01	$(mg/kg/day)^{-1}$	C	IRIS	8//2005
1,1,2-Trichloroethane	1.6E-02	$(mg/m^3)^{-1}$	5.6E-02	$(mg/kg/day)^{-1}$	C	IRIS	8//2005
1,1-Dichloroethene	NA	NA	NA	NA	C	IRIS	8//2005
1,2-Dichloroethane	2.6E-02	$(mg/m^3)^{-1}$	9.1E-02	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
1,2-Dichloropropane	1.9E-05	$(mg/m^3)^{-1}$	6.8E-02	$(mg/kg/day)^{-1}$	NA	HEAST, EPA 9	10/2004
Acetone	NA	NA	NA	NA	NA	NA	NA
Benzene	7.8E-03	$(mg/m^3)^{-1}$	2.7E-02	$(mg/kg/day)^{-1}$	A	IRIS	8//2005
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	1.5E-02	$(mg/m^3)^{-1}$	5.3E-02	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
Chloroform	2.3E-02	$(mg/m^3)^{-1}$	8.1E-02	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
cis-1,2-Dichloroethene	NA	NA	NA	NA	D	IRIS	8//2005
Chloromethane	NA	NA	NA	NA	NA	IRIS	8//2005
Dichlorodifluoromethane	NA	NA	NA	NA	NA	IRIS	8//2005
Methylene Chloride	4.7E-04	$(mg/m^3)^{-1}$	1.6E-03	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
Tetrachloroethene	5.7E-03	$(mg/m^3)^{-1}$	2.0E-02	$(mg/kg/day)^{-1}$	NA	EPA 3	10/19/2004
Toluene	NA	NA	NA	NA	D	IRIS	8//2005
Total-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA
Trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	2.0E-03	$(mg/m^3)^{-1}$	7.0E-03	$(mg/kg/day)^{-1}$	C	EPA 9	10/2004
Vinyl Chloride (child)	8.8E-03	$(mg/m^3)^{-1}$	3.0E-02	$(mg/kg/day)^{-1}$	A	IRIS	8//2005
Vinyl Chloride (adult)	4.4E-03	$(mg/m^3)^{-1}$	1.5E-02	$(mg/kg/day)^{-1}$	A	IRIS	8//2005
Semivolatile Organic Compounds							
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	8.9E-01	$(mg/m^3)^{-1}$	3.1E+00	$(mg/kg/day)^{-1}$	B2	NCEA	10/19/2004
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	4.0E-03	$(mg/m^3)^{-1}$	1.4E-02	$(mg/kg/day)^{-1}$	B2	NCEA	10/19/2004
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	C	IRIS	8//2005
Pesticides/PCBs							
PCBs	5.7E-01	$(mg/m^3)^{-1}$	2.0E+00	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA
alpha-BHC	1.8E+00	$(mg/m^3)^{-1}$	6.3E+00	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
beta-BHC	5.1E-01	$(mg/m^3)^{-1}$	1.8E+00	$(mg/kg/day)^{-1}$	C	IRIS	8//2005

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
SWMUS 16 & 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor[1]		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
gamma-BHC (LINDANE)	NA	NA	NA	NA	NA	NA	NA
Energetics							
2,4,6-Trinitrotoluene	NA	NA	NA	NA	NA	NA	NA
2,4-Drinitrotoluene	NA	NA	NA	NA	NA	NA	NA
RDX	NA	NA	NA	NA	NA	NA	NA
Metals							
Arsenic	4.3E+00	$(mg/m^3)^{-1}$	1.5E+01	$(mg/kg/day)^{-1}$	A	IRIS	8//2005
Beryllium	2.4E+00	$(mg/m^3)^{-1}$	8.4E+00	$(mg/kg/day)^{-1}$	B1	IRIS	8//2005
Cadmium	1.8E+00	$(mg/m^3)^{-1}$	6.3E+00	$(mg/kg/day)^{-1}$	B1	IRIS	8//2005
Chromium VI	1.2E+01	$(mg/m^3)^{-1}$	4.2E+01	$(mg/kg/day)^{-1}$	A	IRIS	8//2005
Cobalt	2.8E+00	$(mg/m^3)^{-1}$	9.8E+00	$(mg/kg/day)^{-1}$	NA	EPA 3	10/19/2004

Notes:

1 - Inhalation CSF = Unit Risk * 70 kg / 20m^3/day.

Definitions:

IRIS = Integrated Risk Information System.

HEAST= Health Effects Assessment Summary Tables.

EPA 3 = USEPA Region 3 RBC Table, April, 2005.

EPA 9 = USEPA Region 9 PRG Table, October 19, 2004.

NCEA = USEPA National Center for Environmental Assessment

EPA Group:

A - Human carcinogen.

B1 - Probable human carcinogen - indicates that limited human data are available.

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans .

C - Possible human carcinogen.

D - Not classifiable as a human carcinogen.

E - Evidence of noncarcinogenicity.

TABLE 3.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: SWMU 16

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Bis(2-Ethylhexyl)phthalate	mg/kg	1200	NA	4950		mg/kg	4950	Maximum	N < 10 (1)	4950	Maximum	N < 10 (1)
Aroclor-1254	mg/kg	12	NA	50		mg/kg	50	Maximum	N < 10	50	Maximum	N < 10
Antimony	mg/kg	27.6	NA	110		mg/kg	110	Maximum	N < 10	110	Maximum	N < 10
Barium	mg/kg	56.9	NA	179		mg/kg	179	Maximum	N < 10	179	Maximum	N < 10
Cadmium	mg/kg	13.2	NA	52.4		mg/kg	52.4	Maximum	N < 10	52.4	Maximum	N < 10
Chromium	mg/kg	154	NA	573		mg/kg	573	Maximum	N < 10	573	Maximum	N < 10
Lead	mg/kg	2760	NA	12400		mg/kg	2760	Average	(2)	2760	Average	(2)

(1) Dataset consists of less than 10 samples. Therefore, the maximum concentration is used as the EPC.
2 - The EPC for lead is the arithmetic average, as recommended by USEPA guidance (USEPA, August 2005).

TABLE 3.2

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SUBSURFACE SOIL

SWMU 16 - OLD SOUTHSIDE LANDFILL

NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: SWMU 16

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)anthracene	mg/kg	0.2	0.3	0.4	J	mg/kg	0.4	Gamma 95% UCL	Gamma(1)	0.4	Gamma 95% UCL	Gamma(1)
Benzo(a)pyrene	mg/kg	0.3	0.4	0.5	J	mg/kg	0.5	Gamma 95% UCL	Gamma(1)	0.5	Gamma 95% UCL	Gamma(1)
Benzo(b)fluoranthene	mg/kg	0.2	0.4	0.7	J	mg/kg	0.5	H-UCL	ProUCL (2)	0.5	H-UCL	ProUCL (2)
Carbazole	mg/kg	0.4	0.5	0.2	J	mg/kg	0.2	Maximum	N < 10 (3)	0.2	Maximum	N < 10 (3)
Chrysene	mg/kg	0.3	0.5	0.5	J	mg/kg	0.5	Student-t	ProUCL (4)	0.5	Student-t	ProUCL (4)
Aroclor-1254	mg/kg	0.11	0.27	1		mg/kg	1	Maximum	FOD(5)	1	Maximum	FOD(5)
Aroclor-1260	mg/kg	0.05	0.099	0.32		mg/kg	0.32	Maximum	FOD(5)	0.32	Maximum	FOD(5)
alpha-BHC	mg/kg	0.006	0.01	0.0033	J	mg/kg	0.0033	Maximum	(6)	0.0033	Maximum	(6)
gamma-BHC (Lindane)	mg/kg	0.006	0.01	0.002	J	mg/kg	0.002	Maximum	(6)	0.002	Maximum	(6)
Aluminum	mg/kg	28100	36400	55800	J	mg/kg	36400	Student-t	ProUCL (4)	36400	Student-t	ProUCL (4)
Antimony	mg/kg	1.7	3.5	11		mg/kg	11	Maximum	FOD(5)	11	Maximum	FOD(5)
Arsenic	mg/kg	15	20.5	34	J	mg/kg	20.5	Student-t	ProUCL (4)	20.5	Student-t	ProUCL (4)
Barium	mg/kg	93.1	182	580		mg/kg	580	95 % UCL-CMU	ProUCL (7)	580	95 % UCL-CMU	ProUCL (7)
Cadmium	mg/kg	1.7	4.6	17.3		mg/kg	17.3	Maximum	FOD(5)	17.3	Maximum	FOD(5)
Chromium	mg/kg	53.4	71.1	132		mg/kg	79.4	H-UCL	ProUCL (2)	79.4	H-UCL	ProUCL (2)
Cobalt	mg/kg	7.5	10.2	17		mg/kg	10.2	Student-t	ProUCL (4)	10.2	Student-t	ProUCL (4)
Copper	mg/kg	192	401	992		mg/kg	992	Maximum	(6)	992	Maximum	(6)
Iron	mg/kg	41200	53300	76000		mg/kg	53300	Student-t	ProUCL (4)	53300	Student-t	ProUCL (4)
Manganese	mg/kg	223	311	494		mg/kg	311	Student-t	ProUCL (4)	311	Student-t	ProUCL (4)
Mercury	mg/kg	0.11	0.15	0.32		mg/kg	0.2	H-UCL	ProUCL (2)	0.2	H-UCL	ProUCL (2)
Nickel	mg/kg	30.4	48	114		mg/kg	86	H-UCL	ProUCL (2)	86	H-UCL	ProUCL (2)
Silver	mg/kg	1.5	3.9	14.8		mg/kg	14.8	Maximum	FOD(5)	14.8	Maximum	FOD(5)
Thallium	mg/kg	1.2	1.6	2.6		mg/kg	1.6	Student-t	ProUCL (4)	1.6	Student-t	ProUCL (4)
Vanadium	mg/kg	54.5	70	108	J	mg/kg	70	Student-t	ProUCL (4)	70	Student-t	ProUCL (4)
Zinc	mg/kg	1530	4100	15700		mg/kg	15600	99 % UCL-CMU	ProUCL (7)	15600	99 % UCL-CMU	ProUCL (7)

Definitions:

95 % UCL-CMU = 95% Chebyshev (Mean, Std) UCL (distribution undefined).

99 % UCL-CMU = 99% Chebyshev (Mean, Std) UCL (distribution undefined).

Footnotes:

1 - USEPA's ProUCL software indicates that the data fit a gamma distribution.

2 - ProUCL indicates data are log-normally distributed.

3 - Dataset consists of less than 10 samples. Therefore, the maximum concentration is used as the EPC.

4 - ProUCL indicates data are normally distributed.

5 - *Less than 50 percent positive detections. Maximum concentration* is used as the EPC.

6 - UCL is greater than the maximum concentration. Therefore, the maximum concentration is used as the EPC.

7 - EPC statistic is recommended by USEPA's ProUCL software.

TABLE 3.3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - GROUNDWATER
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: SWMU 16

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
TRICHLOROETHENE(7)	ug/l	7.9	NA	32		ug/l	32	Maximum	N < 10 (1)	32	Maximum	N < 10 (1)
BIS(2-ETHYLHEXYL)PHTHALATE	ug/L	6.2	NA	11		ug/L	11	Maximum	N < 10	11	Maximum	N < 10

(1) Dataset consists of less than 10 samples. Therefore, the maximum concentration is used as the EPC.

TABLE 3.4
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE WATER
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: SWMU 16

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Tetrachloroethene	ug/L	2	NA	0.7	J	ug/L	0.7	Maximum	N < 10 (1)	0.7	Maximum	N < 10 (1)
2,4-Dinitrotoluene	ug/L	3	NA	0.4	J	ug/L	0.4	Maximum	N < 10	0.4	Maximum	N < 10
Aluminum	ug/L	2930	NA	11000		ug/L	11000	Maximum	N < 10	11000	Maximum	N < 10
Antimony	ug/L	4.6	NA	11.8		ug/L	11.8	Maximum	N < 10	11.8	Maximum	N < 10
Iron	ug/L	2690	NA	9980		ug/L	9980	Maximum	N < 10	9980	Maximum	N < 10
Lead	ug/L	4.4	NA	15.5		ug/L	4.4	Maximum	N < 10	4.4	Maximum	N < 10
Manganese	ug/L	113	NA	388		ug/L	388	Maximum	N < 10	388	Maximum	N < 10
Vanadium	ug/L	8.2	NA	24.2		ug/L	24.2	Maximum	N < 10	24.2	Maximum	N < 10

(1) Dataset consists of less than 10 samples. Therefore, the maximum concentration is used as the EPC.

TABLE 3.5
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SEDIMENT
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: SWMU 16

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)pyrene	mg/kg	0.4	NA	0.16	J	mg/kg	0.16	Maximum	N < 10 (1)	0.16	Maximum	N < 10 (1)
Benzo(b)fluoranthene	mg/kg	0.5	NA	1.1	J	mg/kg	1.1	Maximum	N < 10	1.1	Maximum	N < 10

(1) Dataset consists of less than 10 samples. Therefore, the maximum concentration is used as the EPC.

TABLE 4.1
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	330	USEPA, December 2002	330	USEPA, December 2002	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	unitless	1	USEPA Region 4, May 2000	1	USEPA, May 1993	BW x AT
	EF	Exposure Frequency	days/year	30	Professional Judgement	30	Professional Judgement	U.S. EPA, December 1989
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,300	USEPA, July 2004	3,300	USEPA, July 2004	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.3	USEPA, July 2004	0.1	USEPA, July 2004	U.S. EPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA, July 2004	chemical specific	USEPA, July 2004	
	EF	Exposure Frequency	days/year	30	USEPA Region 4, May 2000	30	USEPA, May 1993	
	ED	Exposure Duration	years	1	USEPA Region 4, May 2000	1	USEPA, May 1993	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	

1 CDI = Chronic Daily Intake

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 5.54E-09
Noncancer Ingestion Intake - RME = 3.87E-07

Cancer Ingestion Intake - CTE = 5.54E-09
Noncancer Ingestion Intake - CTE = 3.87E-07

Cancer Dermal Intake - RME = 1.66E-08
Noncancer Dermal Intake - RME = 1.16E-06

Cancer Dermal Intake - CTE = 5.54E-09
Noncancer Dermal Intake - CTE = 3.87E-07

TABLE 7.1 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	1.9E-03	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	9.6E-02
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	1.9E-05	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	9.7E-01
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M	4.3E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.1E-01
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M	6.9E-05	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.5E-04
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	2.0E-05	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	4.1E-02
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M	2.2E-04	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	7.4E-02
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M	1.1E-03	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.3E+00
Dermal	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	5.8E-04	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	2.9E-02
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	8.1E-06	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	4.1E-01
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M		mg/kg-day	6.0E-05	mg/kg-day	NA	NA	
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M		mg/kg-day	1.4E-02	mg/kg-day	NA	NA	
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	6.1E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.4E-03
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M		mg/kg-day	7.5E-05	mg/kg-day	NA	NA	
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	(total)												4.4E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.7E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

SVOCs - 0.1 Cadmium - 0.001
PCBs - 0.14 Other Metals - not evaluated for dermal contact with soil.

TABLE 8.1 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	2.7E-05	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	3.8E-07
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	2.8E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	5.5E-07
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M	6.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M	9.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	2.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M	3.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M	1.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										9.4E-07
Dermal	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	8.2E-06	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	1.2E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-07
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	8.7E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.5E-07
										Total Risk Across All Exposure Routes/Pathways	1.3E-06

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

SVOCs - 0.1 Cadmium - 0.001
PCBs - 0.14 Other Metals - not evaluated for dermal contact with soil.

TABLE 7.1a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	1.9E-03	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	9.6E-02
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	1.9E-05	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	9.7E-01
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M	4.3E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.1E-01
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M	6.9E-05	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.5E-04
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	2.0E-05	mg/kg-day.	5.0E-04	mg/kg-day	NA	NA	4.1E-02
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M	2.2E-04	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	7.4E-02
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M	1.1E-03	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.3E+00
Dermal	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	1.9E-04	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	9.6E-03
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	2.7E-06	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	1.4E-01
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M		mg/kg-day	6.0E-05	mg/kg-day	NA	NA	
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M		mg/kg-day	1.4E-02	mg/kg-day	NA	NA	
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	2.0E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	8.1E-04
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M		mg/kg-day	7.5E-05	mg/kg-day	NA	NA	
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.5E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.4E+00

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

SVOCs - 0.1 Cadmium - 0.001
PCBs - 0.14 Other Metals - not evaluated for dermal contact with soil.

TABLE 8.1a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	2.7E-05	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	3.8E-07
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	2.8E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	5.5E-07
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M	6.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M	9.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	2.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M	3.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M	1.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										9.4E-07
Dermal	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	2.7E-06	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	3.8E-08
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	3.9E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	7.7E-08
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	2.9E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.2E-07
										Total Risk Across All Exposure Routes/Pathways	1.1E-06

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

SVOCs - 0.1 Cadmium - 0.001
PCBs - 0.14 Other Metals - not evaluated for dermal contact with soil.

TABLE 4.2
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF OCCUPATIONAL WORKERS TO SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Occupational Workers
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA Region 4, May 2000	50	USEPA, May 1993	Csoil x IR x Fi x EF x ED x CF
	FI	Fraction Ingested	unitless	1	USEPA Region 4, May 2000	1	USEPA, May 1993	BW x AT
	EF	Exposure Frequency	days/year	250	USEPA Region 4, May 2000	219	USEPA, May 1993	U.S. EPA, December 1989
	ED	Exposure Duration	years	25	USEPA Region 4, May 2000	9	USEPA, May 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000.	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA, December 1989	3,285	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,300	USEPA, July 2004	3,300	USEPA, July 2004	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA, July 2004	0.02	USEPA, July 2004	U.S. EPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA, July 2004	chemical specific	USEPA, July 2004	
	EF	Exposure Frequency	days/year	250	USEPA Region 4, May 2000	219	USEPA, May 1993	
	ED	Exposure Duration	years	25	USEPA Region 4, May 2000	9	USEPA, May 1993	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA, December 1989	3,285	USEPA, December 1989	

1 CDI = Chronic Daily Intake

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 3.49E-07
Noncancer Ingestion Intake - RME = 9.78E-07

Cancer Ingestion Intake - CTE = 5.51E-08
Noncancer Ingestion Intake - CTE = 4.29E-07

Cancer Dermal Intake - RME = 2.31E-06
Noncancer Dermal Intake - RME = 6.46E-06

Cancer Dermal Intake - CTE = 7.27E-08
Noncancer Dermal Intake - CTE = 5.66E-07

TABLE 7.2 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Occupational Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	4.8E-03	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	2.4E-01
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	4.9E-05	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	2.4E+00
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M	1.1E-04	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	2.7E-01
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M	1.8E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	8.8E-04
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	5.1E-05	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	1.0E-01
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M	5.6E-04	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	1.9E-01
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M	2.7E-03	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.2E+00
Dermal	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	3.2E-03	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	1.6E-01
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	4.5E-05	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	2.3E+00
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M		mg/kg-day	6.0E-05	mg/kg-day	NA	NA	
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M		mg/kg-day	1.4E-02	mg/kg-day	NA	NA	
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	3.4E-07	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.4E-02
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M		mg/kg-day	7.5E-05	mg/kg-day	NA	NA	
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.4E+00
												Total Hazard Index Across All Exposure Routes/Pathways	**5.7E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

SVOCs - 0.1 Cadmium - 0.001

PCBs - 0.14 Other Metals - not evaluated for dermal contact with soil.

TABLE 8.2 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Occupational Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	1.7E-03	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	2.4E-05
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	1.7E-05	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.5E-05
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M	3.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M	6.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	1.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M	2.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M	9.6E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										5.9E-05
Dermal	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	1.1E-03	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-05
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	1.6E-05	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.2E-05
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	1.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.8E-05
										Total Risk Across All Exposure Routes/Pathways	1.1E-04

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

SVOCs - 0.1 Cadmium - 0.001
PCBs - 0.14 Other Metals - not evaluated for dermal contact with soil.

TABLE 7.2a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Occupational Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	2.1E-03	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	1.1E-01
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	2.1E-05	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	1.1E+00
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M	4.7E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.2E-01
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M	7.7E-05	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.8E-04
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	2.2E-05	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	4.5E-02
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M	2.5E-04	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	8.2E-02
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M	1.2E-03	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.4E+00
Dermal	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	2.8E-04	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	1.4E-02
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	4.0E-06	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	2.0E-01
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M		mg/kg-day	6.0E-05	mg/kg-day	NA	NA	
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M		mg/kg-day	1.4E-02	mg/kg-day	NA	NA	
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	3.0E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.2E-03
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M		mg/kg-day	7.5E-05	mg/kg-day	NA	NA	
	Lead	2.76E+03	mg/kg	2.78E+03	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.1E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.6E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

SVOCs - 0.1 Cadmium - 0.001

PCBs - 0.14 Other Metals - not evaluated for dermal contact with soil.

TABLE 8.2a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Occupational Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	2.7E-04	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	3.8E-06
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	2.8E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	5.5E-06
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M	6.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M	9.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	2.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M	3.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M	1.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										9.3E-06
Dermal	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	3.6E-05	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	5.0E-07
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	5.1E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-06
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	3.8E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.5E-06
										Total Risk Across All Exposure Routes/Pathways	1.1E-05

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

SVOCs - 0.1 Cadmium - 0.001
PCBs - 0.14 Other Metals - not evaluated for dermal contact with soil.

TABLE 4.3
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF ADOLESCENT TRESPASSERS TO SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA Region 4, May 2000	50	USEPA, May 1993	Csoil x IR x Fi x EF x ED x CF
	FI	Fraction Ingested	unitless	1	USEPA Region 4, May 2000	1	USEPA, May 1993	BW x AT
	EF	Exposure Frequency	days/year	30	Professional Judgment	30	Professional Judgment	U.S. EPA, December 1989
	ED	Exposure Duration	years	10	USEPA Region 4, May 2000	5	Professional Judgment	
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	
	BW	Body Weight	kg	45	USEPA Region 4, May 2000	45	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,650	USEPA, December 1989	1,825	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,280	USEPA, August 1997	3,280	USEPA, August 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA, July 2004	0.04	USEPA, July 2004	U.S. EPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA, July 2004	chemical specific	USEPA, July 2004	
	EF	Exposure Frequency	days/year	30	Professional Judgment	30	Professional Judgment	
	ED	Exposure Duration	years	10	USEPA Region 4, May 2000	5	Professional Judgment	
	BW	Body Weight	kg	45	USEPA Region 4, May 2000	45	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,650	USEPA, December 1989	1,825	USEPA, December 1989	

1 CDI = Chronic Daily Intake

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 2.61E-08
Noncancer Ingestion Intake - RME = 1.83E-07

Cancer Ingestion Intake - CTE = 6.52E-09
Noncancer Ingestion Intake - CTE = 9.13E-08

Cancer Dermal Intake - RME = 1.71E-07
Noncancer Dermal Intake - RME = 1.20E-06

Cancer Dermal Intake - CTE = 1.71E-08
Noncancer Dermal Intake - CTE = 2.40E-07

TABLE 7.3 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	9.0E-04	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	4.5E-02
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	9.1E-06	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	4.6E-01
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M	2.0E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	5.0E-02
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M	3.3E-05	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.6E-04
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	9.6E-06	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	1.9E-02
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M	1.0E-04	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	3.5E-02
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M	5.0E-04	mg/kg-day		mg/kg-day	NA	NA	
	(total)												6.1E-01
Dermal	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	5.9E-04	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	3.0E-02
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	6.4E-06	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	4.2E-01
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M		mg/kg-day	6.0E-05	mg/kg-day	NA	NA	
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M		mg/kg-day	1.4E-02	mg/kg-day	NA	NA	
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	6.3E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.5E-03
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M		mg/kg-day	7.5E-05	mg/kg-day	NA	NA	
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	(total)												4.5E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.1E+00

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

SVOCs - 0.1 Cadmium - 0.001

PCBs - 0.14 Other Metals - not evaluated for dermal contact with soil.

TABLE 8.3 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	1.3E-04	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	1.8E-06
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	1.3E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-06
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M	2.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M	4.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	1.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M	1.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M	7.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.4E-06**
Dermal	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	8.5E-05	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-06
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	1.2E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.4E-06
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	9.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.6E-06**
										Total Risk Across All Exposure Routes/Pathways	**8.0E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

SVOCs - 0.1 Cadmium - 0.001
PCBs - 0.14 Other Metals - not evaluated for dermal contact with soil.

TABLE 7.3a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	4.5E-04	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	2.3E-02
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	4.6E-06	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	2.3E-01
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M	1.0E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	2.5E-02
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M	1.6E-05	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	8.2E-05
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	4.8E-06	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	9.6E-03
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M	5.2E-05	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	1.7E-02
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M	2.5E-04	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.0E-01
Dermal	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	1.2E-04	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	5.9E-03
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	1.7E-06	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	8.4E-02
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M		mg/kg-day	6.0E-05	mg/kg-day	NA	NA	
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M		mg/kg-day	1.4E-02	mg/kg-day	NA	NA	
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	1.3E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	5.0E-04
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M		mg/kg-day	7.5E-05	mg/kg-day	NA	NA	
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	(total)												9.0E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**3.9E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

SVOCs - 0.1 Cadmium - 0.001
PCBs - 0.14 Other Metals - not evaluated for dermal contact with soil.

TABLE 8.3a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	3.2E-05	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	4.5E-07
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	3.3E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	6.5E-07
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M	7.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M	1.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	3.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M	3.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M	1.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.1E-06
Dermal	Bis(2-Ethylhexyl)phthalate	4.95E+03	mg/kg	4.95E+03	mg/kg	M	8.5E-06	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Aroclor-1254	5.00E+01	mg/kg	5.00E+01	mg/kg	M	1.2E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.4E-07
	Antimony	1.10E+02	mg/kg	1.10E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Barium	1.79E+02	mg/kg	1.79E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	5.24E+01	mg/kg	5.24E+01	mg/kg	M	9.0E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chromium	5.73E+02	mg/kg	5.73E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Lead	2.76E+03	mg/kg	2.76E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.6E-07
										Total Risk Across All Exposure Routes/Pathways	1.5E-06

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

SVOCs - 0.1 Cadmium - 0.001
PCBs - 0.14 Other Metals - not evaluated for dermal contact with soil.

TABLE 4.4

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS BY INHALATION FROM SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Workers
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical concentration in soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Intake (mg/kg/day) =
	VF	Volatilization factor	m^3/kg	Chemical Specific	USEPA, December 2002	Chemical Specific	USEPA, December 2002	
	PEF	Particulate emission factor	m^3/kg	1.27E+06	USEPA, December 2002	1.27E+06	USEPA, December 2002	$\frac{CS \times IR \times \left[\frac{1}{VF} + \frac{1}{PEF}\right] \times ET \times EF \times ED}{BW \times AT}$
	IR	Inhalation Rate	m^3/hour	2.5	USEPA Region 4, May 2000	1.5	USEPA, August 1997	
	ET	Exposure Time	hours/day	8	USEPA Region 4, May 2000	8	USEPA Region 4, May 2000	
	EF	Exposure Frequency	days/year	30	Professional Judgement	30	Professional Judgement	
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED x (1/PEF)+(1/VF)) / (BW x AT)

Cancer Inhalation Intake(RME) = 3.35E-04
Noncancer Inhalation Intake(RME) = 2.35E-02

Cancer Inhalation Intake(CTE) = 2.01E-04
Noncancer Inhalation Intake(CTE) = 1.41E-02

TABLE 7.4. REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS BY INHALATION FROM SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Workers
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chromium	5.73E+02	mg/kg	4.53E-04	mg/m^3	R	1.1E-05	mg/kg-day	3.00E-05	mg/kg-day	1.00E-04	mg/m^3	3.5E-01
	(total)												3.5E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**3.5E-01**

8.4. REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS BY INHALATION FROM SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Workers
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chromium	5.73E+02	mg/kg	4.53E-04	mg/m^3	R	1.5E-07	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	6.4E-06
	(total)										6.4E-06
										Total Risk Across All Exposure Routes/Pathways	**6.4E-06**

TABLE 7.4a. CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS BY INHALATION FROM SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Workers
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chromium	5.73E+02	mg/kg	4.53E-04	mg/m^3	R	6.4E-06	mg/kg-day	3.00E-05	mg/kg-day	1.00E-04	mg/m^3	2.1E-01
	(total)												2.1E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**2.1E-01**

8.4a. CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS BY INHALATION FROM SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Workers
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chromium	5.73E+02	mg/kg	4.53E-04	mg/m^3	R	9.1E-08	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	3.8E-06
	(total)										3.8E-06
										Total Risk Across All Exposure Routes/Pathways	**3.8E-06**

TABLE 4.5

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF OCCUPATIONAL WORKERS BY INHALATION FROM SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Occupational Workers
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical concentration in soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Intake (mg/kg/day) = $\frac{CS \times IR \times \left[\frac{1}{VF} + \frac{1}{PEF}\right] \times ET \times EF \times ED}{BW \times AT}$
	VF	Volatilization factor	m^3/kg	Chemical Specific	FDEP, February 2005	Chemical Specific	FDEP, February 2005	
	PEF	Particulate emission factor	m^3/kg	1.36E+09	USEPA, December 2002	1.36E+09	USEPA, December 2002	
	IR	Inhalation Rate	m^3/hour	2.5	USEPA Region 4, May 2000	2.5	USEPA Region 4, May 2000	
	ET	Exposure Time	hours/day	8	USEPA Region 4, May 2000	8	USEPA Region 4, May 2000	
	EF	Exposure Frequency	days/year	250	USEPA Region 4, May 2000	219	USEPA, May 1993	
	ED	Exposure Duration	years	25	USEPA Region 4, May 2000	9	USEPA, May 1993	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9125	USEPA, December 1989	3285	USEPA, December 1989	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED x (1/PEF)+(1/VF)) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.99E-02
Noncancer Inhalation Intake(RME) = 1.96E-01

Cancer Inhalation Intake(CTE) = 2.20E-02
Noncancer Inhalation Intake(CTE) = 1.71E-01

TABLE 7.5. REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF OCCUPATIONAL WORKERS BY INHALATION FROM SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Occupational Workers
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chromium	5.73E+02	mg/kg	4.21E-07	mg/m^3	R	8.2E-08	mg/kg-day	3.00E-05	mg/kg-day	1.00E-04	mg/m^3	2.7E-03
	(total)												2.7E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**2.7E-03**

8.5. REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS
EXPOSURE OF OCCUPATIONAL WORKERS BY INHALATION FROM SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Occupational Workers
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chromium	5.73E+02	mg/kg	4.21E-07	mg/m^3	R	2.9E-08	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	1.2E-06
	(total)										1.2E-06
										Total Risk Across All Exposure Routes/Pathways	**1.2E-06**

TABLE 7.5a. CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF OCCUPATIONAL WORKERS BY INHALATION FROM SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Occupational Workers
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chromium	5.73E+02	mg/kg	4.21E-07	mg/m^3	R	7.2E-08	mg/kg-day	3.00E-05	mg/kg-day	1.00E-04	mg/m^3	2.4E-03
	(total)												2.4E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**2.4E-03**

8.5a. CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS
EXPOSURE OF OCCUPATIONAL WORKERS BY INHALATION FROM SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Occupational Workers
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chromium	5.73E+02	mg/kg	4.21E-07	mg/m^3	R	9.3E-09	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	3.9E-07
	(total)										3.9E-07
										Total Risk Across All Exposure Routes/Pathways	**3.9E-07**

TABLE 4.6

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADOLESCENT TRESPASSERS BY INHALATION FROM SURFACE SOIL
SWMU 16 -
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical concentration in soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Intake (mg/kg/day) =
	VF	Volatilization factor	m^3/kg	Chemical Specific	FDEP, February 2005	Chemical Specific	FDEP, February 2005	
	PEF	Particulate emission factor	m^3/kg	1.36E+09	USEPA, December 2002	1.36E+09	USEPA, December 2002	$\frac{CS \times IR \times \left[\frac{1}{VF} + \frac{1}{PEF}\right] \times ET \times EF \times ED}{BW \times AT}$
	IR	Inhalation Rate	$m^3/hour$	1.9	USEPA, August 1997	1.2	USEPA, August 1997	
	ET	Exposure Time	hours/day	1.5	USEPA, August 1997	1	USEPA, August 1997	
	EF	Exposure Frequency	days/year	30	Professional Judgment	30	Professional Judgment	
	ED	Exposure Duration	years	10	USEPA Region 4, May 2000	10	USEPA Region 4, May 2000	
	BW	Body Weight	kg	45	USEPA Region 4, May 2000	45	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3650	USEPA, December 1989	3650	USEPA, December 1989	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED x (1/PEF)+(1/VF)) / (BW x AT)

Cancer Inhalation Intake(RME) = 7.44E-04
Noncancer Inhalation Intake(RME) = 5.21E-03

Cancer Inhalation Intake(CTE) = 3.13E-04
Noncancer Inhalation Intake(CTE) = 2.19E-03

TABLE 7.6. REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS BY INHALATION FROM SURFACE SOIL
SWMU 16 -
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chromium	5.73E+02	mg/kg	4.21E-07	mg/m^3	R	2.2E-09	mg/kg-day	3.00E-05	mg/kg-day	1.00E-04	mg/m^3	7.3E-05
	(total)												7.3E-05
												Total Hazard Index Across All Exposure Routes/Pathways	**7.3E-05**

8.6. REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS BY INHALATION FROM SURFACE SOIL
SWMU 16 -
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chromium	5.73E+02	mg/kg	4.21E-07	mg/m^3	R	3.1E-10	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	(total)										1.3E-08
										Total Risk Across All Exposure Routes/Pathways	**1.3E-08**

TABLE 7.6a. CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS BY INHALATION FROM SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chromium	5.73E+02	mg/kg	4.21E-07	mg/m^3	R	9.2E-10	mg/kg-day	3.00E-05	mg/kg-day	1.00E-04	mg/m^3	3.1E-05
	(total)												3.1E-05
												Total Hazard Index Across All Exposure Routes/Pathways	**3.1E-05**

8.6a. CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS BY INHALATION FROM SURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chromium	5.73E+02	mg/kg	4.21E-07	mg/m^3	R	1.3E-10	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	5.5E-09
	(total)										5.5E-09
										Total Risk Across All Exposure Routes/Pathways	**5.5E-09**

TABLE 4.7
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	330	USEPA, December 2002	330	USEPA, December 2002	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	unitless	1	USEPA Region 4, May 2000	1	USEPA, May 1993	BW x AT
	EF	Exposure Frequency	days/year	30	Professional Judgement	30	Professional Judgement	U.S. EPA, December 1989
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,300	USEPA, July 2004	3,300	USEPA, July 2004	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.3	USEPA, July 2004	0.1	USEPA, July 2004	U.S. EPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA, July 2004	chemical specific	USEPA, July 2004	
	EF	Exposure Frequency	days/year	30	USEPA Region 4, May 2000	30	USEPA, May 1993	
	ED	Exposure Duration	years	1	USEPA Region 4, May 2000	1	USEPA, May 1993	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	

1 CDI = Chronic Daily Intake

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 5.54E-09
Noncancer Ingestion Intake - RME = 3.87E-07

Cancer Ingestion Intake - CTE = 5.54E-09
Noncancer Ingestion Intake - CTE = 3.87E-07

Cancer Dermal Intake - RME = 1.66E-08
Noncancer Dermal Intake - RME = 1.16E-06

Cancer Dermal Intake - CTE = 5.54E-09
Noncancer Dermal Intake - CTE = 3.87E-07

TABLE 7.7 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SUBSURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	4.00E-01	mg/kg	4.00E-01	mg/kg	M	1.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	1.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	1.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Carbazole	2.00E-01	mg/kg	2.00E-01	mg/kg	M	7.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	Chrysene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	1.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	1.00E+00	mg/kg	1.00E+00	mg/kg	M	3.9E-07	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	1.9E-02
	Aroclor-1260	3.20E-01	mg/kg	3.20E-01	mg/kg	M	1.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	alpha-BHC	3.30E-03	mg/kg	3.30E-03	mg/kg	M	1.3E-09	mg/kg-day		mg/kg-day	NA	NA	
	gamma-BHC (Lindane)	2.00E-03	mg/kg	2.00E-03	mg/kg	M	7.7E-10	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.6E-06
	Aluminum	3.64E+04	mg/kg	3.64E+04	mg/kg	M	1.4E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.4E-02
	Antimony	1.10E+01	mg/kg	1.10E+01	mg/kg	M	4.3E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.1E-02
	Arsenic	2.05E+01	mg/kg	2.05E+01	mg/kg	M	7.9E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.6E-02
	Barium	5.80E+02	mg/kg	5.80E+02	mg/kg	M	2.2E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.1E-03
	Cadmium	1.73E+01	mg/kg	1.73E+01	mg/kg	M	6.7E-06	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	1.3E-02
	Chromium	7.94E+01	mg/kg	7.94E+01	mg/kg	M	3.1E-05	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	1.0E-02
	Cobalt	1.02E+01	mg/kg	1.02E+01	mg/kg	M	4.0E-06	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	2.0E-04
	Copper	9.92E+02	mg/kg	9.92E+02	mg/kg	M	3.8E-04	mg/kg-day	4.0E-02	mg/kg-day	NA	NA	9.6E-03
	Iron	5.33E+04	mg/kg	5.33E+04	mg/kg	M	2.1E-02	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	6.9E-02
	Manganese	3.11E+02	mg/kg	3.11E+02	mg/kg	M	1.2E-04	mg/kg-day	7.0E-02	mg/kg-day	NA	NA	1.7E-03
	Mercury	2.00E-01	mg/kg	2.00E-01	mg/kg	M	7.7E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.6E-04
	Nickel	8.60E+01	mg/kg	8.60E+01	mg/kg	M	3.3E-05	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	1.7E-03
	Silver	1.48E+01	mg/kg	1.48E+01	mg/kg	M	5.7E-06	mg/kg-day	5.0E-03	mg/kg-day	NA	NA	1.1E-03
	Thallium	1.60E+00	mg/kg	1.60E+00	mg/kg	M	6.2E-07	mg/kg-day	7.0E-05	mg/kg-day	NA	NA	8.9E-03
	Vanadium	7.00E+01	mg/kg	7.00E+01	mg/kg	M	2.7E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.7E-02
	Zinc	1.56E+04	mg/kg	1.56E+04	mg/kg	M	6.0E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.0E-02
	(total)												2.3E-01

TABLE 7.7 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SUBSURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Benzo(a)anthracene	4.00E-01	mg/kg	4.00E-01	mg/kg	M	6.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	7.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	7.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	Carbazole	2.00E-01	mg/kg	2.00E-01	mg/kg	M	3.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	Chrysene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	7.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	1.00E+00	mg/kg	1.00E+00	mg/kg	M	1.6E-07	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	8.1E-03
	Aroclor-1260	3.20E-01	mg/kg	3.20E-01	mg/kg	M	5.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	alpha-BHC	3.30E-03	mg/kg	3.30E-03	mg/kg	M	3.8E-10	mg/kg-day		mg/kg-day	NA	NA	
	gamma-BHC (Lindane)	2.00E-03	mg/kg	2.00E-03	mg/kg	M	9.3E-11	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.1E-07
	Aluminum	3.64E+04	mg/kg	3.64E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Antimony	1.10E+01	mg/kg	1.10E+01	mg/kg	M		mg/kg-day	6.0E-05	mg/kg-day	NA	NA	
	Arsenic	2.05E+01	mg/kg	2.05E+01	mg/kg	M	7.1E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.4E-03
	Barium	5.80E+02	mg/kg	5.80E+02	mg/kg	M		mg/kg-day	1.4E-02	mg/kg-day	NA	NA	
	Cadmium	1.73E+01	mg/kg	1.73E+01	mg/kg	M	2.0E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	8.0E-04
	Chromium	7.94E+01	mg/kg	7.94E+01	mg/kg	M		mg/kg-day	7.5E-05	mg/kg-day	NA	NA	
	Cobalt	1.02E+01	mg/kg	1.02E+01	mg/kg	M		mg/kg-day	2.0E-02	mg/kg-day	NA	NA	
	Copper	9.92E+02	mg/kg	9.92E+02	mg/kg	M		mg/kg-day	4.0E-02	mg/kg-day	NA	NA	
	Iron	5.33E+04	mg/kg	5.33E+04	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Manganese	3.11E+02	mg/kg	3.11E+02	mg/kg	M		mg/kg-day	2.8E-03	mg/kg-day	NA	NA	
	Mercury	2.00E-01	mg/kg	2.00E-01	mg/kg	M		mg/kg-day	2.1E-05	mg/kg-day	NA	NA	
	Nickel	8.60E+01	mg/kg	8.60E+01	mg/kg	M		mg/kg-day	8.0E-04	mg/kg-day	NA	NA	
	Silver	1.48E+01	mg/kg	1.48E+01	mg/kg	M		mg/kg-day	2.0E-04	mg/kg-day	NA	NA	
	Thallium	1.60E+00	mg/kg	1.60E+00	mg/kg	M		mg/kg-day	7.0E-05	mg/kg-day	NA	NA	
	Vanadium	7.00E+01	mg/kg	7.00E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	Zinc	1.56E+04	mg/kg	1.56E+04	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	(total)												1.1E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**2.5E-01**

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03 gamma-BHC - Other Metals - not evaluated for dermal contact with soil.
PCBs - 0.14 Cadmium - 0.001 Other Pesticides - 0.1

TABLE 8.7 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SUBSURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	4.00E-01	mg/kg	4.00E-01	mg/kg	M	2.2E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	1.6E-09
	Benzo(a)pyrene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	2.8E-09	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	2.0E-08
	Benzo(b)fluoranthene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	2.8E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	2.0E-09
	Carbazole	2.00E-01	mg/kg	2.00E-01	mg/kg	M	1.1E-09	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	2.2E-11
	Chrysene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	2.8E-09	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	2.0E-11
	Aroclor-1254	1.00E+00	mg/kg	1.00E+00	mg/kg	M	5.5E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	1.1E-08
	Aroclor-1260	3.20E-01	mg/kg	3.20E-01	mg/kg	M	1.8E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	3.5E-09
	alpha-BHC	3.30E-03	mg/kg	3.30E-03	mg/kg	M	1.8E-11	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	1.2E-10
	gamma-BHC (Lindane)	2.00E-03	mg/kg	2.00E-03	mg/kg	M	1.1E-11	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	1.4E-11
	Aluminum	3.64E+04	mg/kg	3.64E+04	mg/kg	M	2.0E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Antimony	1.10E+01	mg/kg	1.10E+01	mg/kg	M	6.1E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	2.05E+01	mg/kg	2.05E+01	mg/kg	M	1.1E-07	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	1.7E-07
	Barium	5.80E+02	mg/kg	5.80E+02	mg/kg	M	3.2E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Cadmium	1.73E+01	mg/kg	1.73E+01	mg/kg	M	9.6E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Chromium	7.94E+01	mg/kg	7.94E+01	mg/kg	M	4.4E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Cobalt	1.02E+01	mg/kg	1.02E+01	mg/kg	M	5.6E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	Copper	9.92E+02	mg/kg	9.92E+02	mg/kg	M	5.5E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Iron	5.33E+04	mg/kg	5.33E+04	mg/kg	M	3.0E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Manganese	3.11E+02	mg/kg	3.11E+02	mg/kg	M	1.7E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Mercury	2.00E-01	mg/kg	2.00E-01	mg/kg	M	1.1E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	Nickel	8.60E+01	mg/kg	8.60E+01	mg/kg	M	4.8E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Silver	1.48E+01	mg/kg	1.48E+01	mg/kg	M	8.2E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	Thallium	1.60E+00	mg/kg	1.60E+00	mg/kg	M	8.9E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	Vanadium	7.00E+01	mg/kg	7.00E+01	mg/kg	M	3.9E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Zinc	1.56E+04	mg/kg	1.56E+04	mg/kg	M	8.6E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										2.1E-07

TABLE 8.7 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SUBSURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Benzo(a)anthracene	4.00E-01	mg/kg	4.00E-01	mg/kg	M	6.6E-10	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	6.3E-10
	Benzo(a)pyrene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	1.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	7.9E-09
	Benzo(b)fluoranthene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	1.1E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	7.9E-10
	Carbazole	2.00E-01	mg/kg	2.00E-01	mg/kg	M	4.3E-10	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	8.6E-12
	Chrysene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	1.1E-09	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	7.9E-12
	Aroclor-1254	1.00E+00	mg/kg	1.00E+00	mg/kg	M	2.3E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	4.6E-09
	Aroclor-1260	3.20E-01	mg/kg	3.20E-01	mg/kg	M	7.4E-10	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	1.5E-09
	alpha-BHC	3.30E-03	mg/kg	3.30E-03	mg/kg	M	5.5E-12	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	3.5E-11
	gamma-BHC (Lindane)	2.00E-03	mg/kg	2.00E-03	mg/kg	M	1.3E-12	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	1.7E-12
	Aluminum	3.64E+04	mg/kg	3.64E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Antimony	1.10E+01	mg/kg	1.10E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	2.05E+01	mg/kg	2.05E+01	mg/kg	M	1.0E-08	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	1.5E-08
	Barium	5.80E+02	mg/kg	5.80E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Cadmium	1.73E+01	mg/kg	1.73E+01	mg/kg	M	2.9E-10	mg/kg-day		(mg/kg-day)$^{-1}$	
	Chromium	7.94E+01	mg/kg	7.94E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Cobalt	1.02E+01	mg/kg	1.02E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Copper	9.92E+02	mg/kg	9.92E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Iron	5.33E+04	mg/kg	5.33E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Manganese	3.11E+02	mg/kg	3.11E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Mercury	2.00E-01	mg/kg	2.00E-01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Nickel	8.60E+01	mg/kg	8.60E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Silver	1.48E+01	mg/kg	1.46E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Thallium	1.60E+00	mg/kg	1.60E+00	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Vanadium	7.00E+01	mg/kg	7.00E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Zinc	1.56E+04	mg/kg	1.56E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										3.1E-08
										Total Risk Across All Exposure Routes/Pathways	2.4E-07

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03 gamma-BHC - Other Metals - not evaluated for dermal contact with soil.
PCBs - 0.14 Cadmium - 0.001 Other Pesticides - 0.1

TABLE 7.7a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SUBSURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	4.00E-01	mg/kg	4.00E-01	mg/kg	M	1.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	1.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	1.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Carbazole	2.00E-01	mg/kg	2.00E-01	mg/kg	M	7.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	Chrysene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	1.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	1.00E+00	mg/kg	1.00E+00	mg/kg	M	3.9E-07	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	1.9E-02
	Aroclor-1260	3.20E-01	mg/kg	3.20E-01	mg/kg	M	1.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	alpha-BHC	3.30E-03	mg/kg	3.30E-03	mg/kg	M	1.3E-09	mg/kg-day		mg/kg-day	NA	NA	
	gamma-BHC (Lindane)	2.00E-03	mg/kg	2.00E-03	mg/kg	M	7.7E-10	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.6E-06
	Aluminum	3.64E+04	mg/kg	3.64E+04	mg/kg	M	1.4E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.4E-02
	Antimony	1.10E+01	mg/kg	1.10E+01	mg/kg	M	4.3E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.1E-02
	Arsenic	2.05E+01	mg/kg	2.05E+01	mg/kg	M	7.9E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.6E-02
	Barium	5.80E+02	mg/kg	5.80E+02	mg/kg	M	2.2E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.1E-03
	Cadmium	1.73E+01	mg/kg	1.73E+01	mg/kg	M	6.7E-06	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	1.3E-02
	Chromium	7.94E+01	mg/kg	7.94E+01	mg/kg	M	3.1E-05	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	1.0E-02
	Cobalt	1.02E+01	mg/kg	1.02E+01	mg/kg	M	4.0E-06	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	2.0E-04
	Copper	9.92E+02	mg/kg	9.92E+02	mg/kg	M	3.8E-04	mg/kg-day	4.0E-02	mg/kg-day	NA	NA	9.6E-03
	Iron	5.33E+04	mg/kg	5.33E+04	mg/kg	M	2.1E-02	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	6.9E-02
	Manganese	3.11E+02	mg/kg	3.11E+02	mg/kg	M	1.2E-04	mg/kg-day	7.0E-02	mg/kg-day	NA	NA	1.7E-03
	Mercury	2.00E-01	mg/kg	2.00E-01	mg/kg	M	7.7E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.6E-04
	Nickel	8.60E+01	mg/kg	8.60E+01	mg/kg	M	3.3E-05	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	1.7E-03
	Silver	1.48E+01	mg/kg	1.48E+01	mg/kg	M	5.7E-06	mg/kg-day	5.0E-03	mg/kg-day	NA	NA	1.1E-03
	Thallium	1.60E+00	mg/kg	1.60E+00	mg/kg	M	6.2E-07	mg/kg-day	7.0E-05	mg/kg-day	NA	NA	8.9E-03
	Vanadium	7.00E+01	mg/kg	7.00E+01	mg/kg	M	2.7E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.7E-02
	Zinc	1.56E+04	mg/kg	1.56E+04	mg/kg	M	6.0E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.0E-02
	(total)												2.3E-01

TABLE 7.7a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SUBSURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Benzo(a)anthracene	4.00E-01	mg/kg	4.00E-01	mg/kg	M	2.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	2.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	2.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Carbazole	2.00E-01	mg/kg	2.00E-01	mg/kg	M	1.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	Chrysene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	2.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	1.00E+00	mg/kg	1.00E+00	mg/kg	M	5.4E-08	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	2.7E-03
	Aroclor-1260	3.20E-01	mg/kg	3.20E-01	mg/kg	M	1.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	alpha-BHC	3.30E-03	mg/kg	3.30E-03	mg/kg	M	1.3E-10	mg/kg-day		mg/kg-day	NA	NA	
	gamma-BHC (Lindane)	2.00E-03	mg/kg	2.00E-03	mg/kg	M	3.1E-11	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.0E-07
	Aluminum	3.64E+04	mg/kg	3.64E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Antimony	1.10E+01	mg/kg	1.10E+01	mg/kg	M		mg/kg-day	6.0E-05	mg/kg-day	NA	NA	
	Arsenic	2.05E+01	mg/kg	2.05E+01	mg/kg	M	2.4E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	7.9E-04
	Barium	5.80E+02	mg/kg	5.80E+02	mg/kg	M		mg/kg-day	1.4E-02	mg/kg-day	NA	NA	
	Cadmium	1.73E+01	mg/kg	1.73E+01	mg/kg	M	6.7E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.7E-04
	Chromium	7.94E+01	mg/kg	7.94E+01	mg/kg	M		mg/kg-day	7.5E-05	mg/kg-day	NA	NA	
	Cobalt	1.02E+01	mg/kg	1.02E+01	mg/kg	M		mg/kg-day	2.0E-02	mg/kg-day	NA	NA	
	Copper	9.92E+02	mg/kg	9.92E+02	mg/kg	M		mg/kg-day	4.0E-02	mg/kg-day	NA	NA	
	Iron	5.33E+04	mg/kg	5.33E+04	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Manganese	3.11E+02	mg/kg	3.11E+02	mg/kg	M		mg/kg-day	2.8E-03	mg/kg-day	NA	NA	
	Mercury	2.00E-01	mg/kg	2.00E-01	mg/kg	M		mg/kg-day	2.1E-05	mg/kg-day	NA	NA	
	Nickel	8.60E+01	mg/kg	8.60E+01	mg/kg	M		mg/kg-day	8.0E-04	mg/kg-day	NA	NA	
	Silver	1.48E+01	mg/kg	1.48E+01	mg/kg	M		mg/kg-day	2.0E-04	mg/kg-day	NA	NA	
	Thallium	1.60E+00	mg/kg	1.60E+00	mg/kg	M		mg/kg-day	7.0E-05	mg/kg-day	NA	NA	
	Vanadium	7.00E+01	mg/kg	7.00E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	Zinc	1.56E+04	mg/kg	1.56E+04	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	(total)												3.8E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**2.4E-01**

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13	Arsenic - 0.03	gamma-BHC - Other Metals - not evaluated for dermal contact with soil.
PCBs - 0.14	Cadmium - 0.001	Other Pesticides - 0.1

TABLE 8.7a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SUBSURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	4.00E-01	mg/kg	4.00E-01	mg/kg	M	2.2E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	1.6E-09
	Benzo(a)pyrene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	2.8E-09	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	2.0E-08
	Benzo(b)fluoranthene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	2.8E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	2.0E-09
	Carbazole	2.00E-01	mg/kg	2.00E-01	mg/kg	M	1.1E-09	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	2.2E-11
	Chrysene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	2.8E-09	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	2.0E-11
	Aroclor-1254	1.00E+00	mg/kg	1.00E+00	mg/kg	M	5.5E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	1.1E-08
	Aroclor-1260	3.20E-01	mg/kg	3.20E-01	mg/kg	M	1.8E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	3.5E-09
	alpha-BHC	3.30E-03	mg/kg	3.30E-03	mg/kg	M	1.8E-11	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	1.2E-10
	gamma-BHC (Lindane)	2.00E-03	mg/kg	2.00E-03	mg/kg	M	1.1E-11	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	1.4E-11
	Aluminum	3.64E+04	mg/kg	3.64E+04	mg/kg	M	2.0E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Antimony	1.10E+01	mg/kg	1.10E+01	mg/kg	M	6.1E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	2.05E+01	mg/kg	2.05E+01	mg/kg	M	1.1E-07	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	1.7E-07
	Barium	5.60E+02	mg/kg	5.80E+02	mg/kg	M	3.2E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Cadmium	1.73E+01	mg/kg	1.73E+01	mg/kg	M	9.6E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	Chromium	7.94E+01	mg/kg	7.94E+01	mg/kg	M	4.4E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Cobalt	1.02E+01	mg/kg	1.02E+01	mg/kg	M	5.6E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	Copper	9.92E+02	mg/kg	9.92E+02	mg/kg	M	5.5E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Iron	5.33E+04	mg/kg	5.33E+04	mg/kg	M	3.0E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Manganese	3.11E+02	mg/kg	3.11E+02	mg/kg	M	1.7E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Mercury	2.00E-01	mg/kg	2.00E-01	mg/kg	M	1.1E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	Nickel	8.60E+01	mg/kg	8.60E+01	mg/kg	M	4.8E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Silver	1.48E+01	mg/kg	1.48E+01	mg/kg	M	8.2E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	Thallium	1.60E+00	mg/kg	1.60E+00	mg/kg	M	8.9E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	Vanadium	7.00E+01	mg/kg	7.00E+01	mg/kg	M	3.9E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Zinc	1.56E+04	mg/kg	1.56E+04	mg/kg	M	8.6E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										2.1E-07

TABLE 8.7a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SUBSURFACE SOIL
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire SWMU 16
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Benzo(a)anthracene	4.00E-01	mg/kg	4.00E-01	mg/kg	M	2.9E-10	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	2.1E-10
	Benzo(a)pyrene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	3.6E-10	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	2.6E-09
	Benzo(b)fluoranthene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	3.6E-10	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	2.6E-10
	Carbazole	2.00E-01	mg/kg	2.00E-01	mg/kg	M	1.4E-10	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	2.9E-12
	Chrysene	5.00E-01	mg/kg	5.00E-01	mg/kg	M	3.6E-10	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	2.6E-12
	Aroclor-1254	1.00E+00	mg/kg	1.00E+00	mg/kg	M	7.7E-10	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	1.5E-09
	Aroclor-1260	3.20E-01	mg/kg	3.20E-01	mg/kg	M	2.5E-10	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	5.0E-10
	alpha-BHC	3.30E-03	mg/kg	3.30E-03	mg/kg	M	1.8E-12	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	1.2E-11
	gamma-BHC (Lindane)	2.00E-03	mg/kg	2.00E-03	mg/kg	M	4.4E-13	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	5.8E-13
	Aluminum	3.64E+04	mg/kg	3.64E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Antimony	1.10E+01	mg/kg	1.10E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	2.05E+01	mg/kg	2.05E+01	mg/kg	M	3.4E-09	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	5.1E-09
	Barium	5.60E+02	mg/kg	5.80E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Cadmium	1.73E+01	mg/kg	1.73E+01	mg/kg	M	9.6E-11	mg/kg-day		(mg/kg-day)$^{-1}$	
	Chromium	7.94E+01	mg/kg	7.94E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Cobalt	1.02E+01	mg/kg	1.02E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Copper	9.92E+02	mg/kg	9.92E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Iron	5.33E+04	mg/kg	5.33E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Manganese	3.11E+02	mg/kg	3.11E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Mercury	2.00E-01	mg/kg	2.00E-01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Nickel	8.60E+01	mg/kg	8.60E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Silver	1.48E+01	mg/kg	1.48E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Thallium	1.60E+00	mg/kg	1.60E+00	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Vanadium	7.00E+01	mg/kg	7.00E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Zinc	1.56E+04	mg/kg	1.56E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										1.0E-08
										Total Risk Across All Exposure Routes/Pathways	2.2E-07

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03 gamma-BHC - Other Metals - not evaluated for dermal contact with soil.
PCBs - 0.14 Cadmium - 0.001 Other Pesticides - 0.1

TABLE 4.8
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CONSTRUCTION/EXCAVATION WORKERS TO GROUNDWATER
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cgw	Chemical Concentration in Groundwater	mg/L	Maximum	USEPA, December 2002	Maximum	USEPA, December 2002	The equations and parameters for for estimating DAevent and the chemical-specific dermally absorbed dose from water (DAD) are provided in Section 6.2.4. of the text. USEPA, July 2004
	A	Skin Surface Area	cm^2	3,300	USEPA, July 2004	3,300	USEPA, July 2004	
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	EF	Exposure Frequency	days/year	30	Professional Judgement	30	Professional Judgement	
	t_{event}	Duration of Event	hour/event	4	Professional Judgement	2	Professional Judgement	
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	T	Lag Time	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	

Daily Intake Calculations

Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 5.54E-02
Noncancer Dermal Intake(RME) = 3.87E+00

Cancer Dermal Intake(CTE) = 5.54E-02
Noncancer Dermal Intake(CTE) = 3.87E+00

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RM — FUTURE CONSTRUCTION/EXCAVATION WORKERS TO GROUNDWATER

SITE NAME: SWMU 16 - OLD SOUTHSIDE LANDFILL
LOCATION: NWS CHARLESTON, SOUTH CAROLINA
DATE: 09/20/05

REFERENCES: U.S. EPA, July 2004

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent	FA	DAevent
Trichloroethene	3.20E-02		o		1.39E+00	4.00E+00	5.81E-01		1.16E-02		5.13E-02	1.87E-06	1	1.87E-06
Bis(2-Ethylhexyl)phthalate	1.10E-02		o		3.99E+01	4.00E+00	1.66E+01		2.49E-02		1.90E-01	6.18E-06	0.8	4.95E-06

TABLE 7.8 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO GROUNDWATER
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Trichloroethene	3.20E-02	mg/L	3.20E-02	mg/L	M	7.3E-06	mg/kg-day	5.00E-01	mg/kg-day	NA	NA	1.5E-05
	Bis(2-Ethylhexyl)phthalate	1.10E-02	mg/L	1.10E-02	mg/L	M	1.9E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	9.6E-04
	(total)												9.7E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**9.7E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 8.8 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSRUCTION/EXCAVATION WORKERS TO GROUNDWATER
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Trichloroethene	3.20E-02	mg/L	3.20E-02	mg/L	M	1.0E-07	mg/kg-day	1.30E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-09
	Bis(2-Ethylhexyl)phthalate	1.10E-02	mg/L	1.10E-02	mg/L	M	2.7E-07	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	3.8E-09
	(total)										5.2E-09
										Total Risk Across All Exposure Routes/Pathways	**5.2E-09**

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) — FUTURE CONSTRUCTION/EXCAVATION WORKERS TO GROUNDWATER

SITE NAME: SWMU 16 - OLD SOUTHSIDE LANDFILL
LOCATION: NWS CHARLESTON, SOUTH CAROLINA
DATE: 09/20/05

REFERENCES: U.S. EPA, July 2004

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent	FA	DAevent
Trichloroethene	3.20E-02	o	1.39E+00	2.00E+00	5.81E-01	1.16E-02	5.13E-02	1.16E-06	1	1.16E-06
Bis(2-Ethylhexyl)phthalate	1.10E-02	o	3.99E+01	2.00E+00	1.66E+01	2.49E-02	1.90E-01	4.37E-06	0.8	3.50E-06

TABLE 7.8a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO GROUNDWATER
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Trichloroethene	3.20E-02	mg/L	3.20E-02	mg/L	M	4.5E-06	mg/kg-day	5.00E-01	mg/kg-day	NA	NA	9.0E-06
	Bis(2-Ethylhexyl)phthalate	1.10E-02	mg/L	1.10E-02	mg/L	M	1.4E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	6.8E-04
	(total)												6.9E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**6.9E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 8.8a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSRUCTION/EXCAVATION WORKERS TO GROUNDWATER
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Trichloroethene	3.20E-02	mg/L	3.20E-02	mg/L	M	6.4E-08	mg/kg-day	1.30E-02	$(mg/kg\text{-}day)^{-1}$	8.4E-10
	Bis(2-Ethylhexyl)phthalate	1.10E-02	mg/L	1.10E-02	mg/L	M	1.9E-07	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	2.7E-09
	(total)										3.5E-09
										Total Risk Across All Exposure Routes/Pathways	**3.5E-09**

TABLE 4.9

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO AIR IN A TRENCH
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Air in trench (<15 feet deep)
Receptor Population: Construction/Excavation Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	VDEQ, August 2002	Derived	VDEQ, August 2002	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	2.5	USEPA Region 4, May 2000	1.5	USEPA, August 1997	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	30	Professional Judgement	30	Professional Judgement	
	ED	Exposure Duration	(years)	1	Professional Judgement	1	Professional Judgement	
	ET	Exposure Time	(hr/day)	8	USEPA Region 4, May 2000	8	USEPA Region 4, May 2000	
	BW	Body Weight	(kg)	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	365	USEPA, December 1989	365	USEPA, December 1989	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 3.35E-04
Noncancer Inhalation Intake(RME) = 2.35E-02

Cancer Inhalation Intake(CTE) = 2.01E-04
Noncancer Inhalation Intake(CTE) = 1.41E-02

TABLE 7.9. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO AIR IN A TRENCH
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Air in trench (<15 feet deep)
Receptor Population: Construction/Excavation Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Trichloroethene	3.20E+01	mg/L	1.03E-03	mg/m^3	R	2.4E-05	mg/kg-day	1.70E-01	mg/kg-day	6.00E-01	mg/m^3	1.4E-04
	(total)												1.4E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**1.4E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 8.9. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO AIR IN A TRENCH
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Air in trench (<15 feet deep)
Receptor Population: Construction/Excavation Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Trichloroethene	3.20E+01	mg/L	1.03E-03	mg/m^3	R	3.5E-07	mg/kg-day	7.00E-03	$(mg/kg\text{-}day)^{-1}$	2.4E-09
	(total)										2.4E-09
										Total Risk Across All Exposure Routes/Pathways	**2.4E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 7.9a. CENTRAL TENDENCY EXPOURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO AIR IN A TRENCH
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Air in trench (<15 feet deep)
Receptor Population: Construction/Excavation Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Trichloroethene	3.20E+01	mg/L	1.03E-03	mg/m^3	R	1.5E-05	mg/kg-day	1.70E-01	mg/kg-day	6.00E-01	mg/m^3	8.5E-05
	(total)												8.5E-05
												Total Hazard Index Across All Exposure Routes/Pathways	**8.5E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 8.9a. CENTRAL TENDENCY EXPOURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO AIR IN A TRENCH
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Air in trench (<15 feet deep)
Receptor Population: Construction/Excavation Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Trichloroethene	3.20E+01	mg/L	1.03E-03	mg/m^3	R	2.1E-07	mg/kg-day	7.00E-03	$(mg/kg\text{-}day)^{-1}$	1.5E-09
	(total)										1.5E-09
										Total Risk Across All Exposure Routes/Pathways	**1.5E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF AIR CONCENTRATIONS IN A TRENCH
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

For Mass-Transfer Coefficients			For Emission Flux and Concentration in Trench			Trench dimensions		
Kg,H2O	0.833	cm/s	CF1	1.00E-03	L/cm3	Length	8	ft
MWH2O	18		CF2	1.00E+04	cm2/m2		2.44	m
Kg,O2	0.002	cm/s	CF3	3600	s/hr	Width	11	ft
MWO2	32		F	1			3.35	m
T	77	F	ACH	360	hr-1	Depth	10	ft
T	298	K					3.05	m
R	8.20E-05	atm-m3/mol-K				Width/Depth	1.10	

Table 3.8 Exposure-point concentrations (inhalation) for construction/utility workers in a trench: Groundwater less than 15 feet deep

	CAS No.	Molecular Weight MWi g/mol	Henry's Law Constant Hi atm-m3/mol	Gas-Phase Mass Transfer Coefficient KIG cm/s	Liquid-Phase Mass Transfer Coefficient KiL cm/s	Overall Mass Transfer Coefficient Ki cm/s	Concentration of Contaminant in Groundwater Cgw ug/L	Volatilization Factor VF L/m3	Concentration of Contaminant in Trench Ctrench ug/m3
Volatile Organic Compounds (VOCs)									
Trichloroethene	79-01-6	131.39	1.03E-02	4.28E-01	9.87E-04	9.82E-04	3.20E+01	3.22E-02	1.03E+00

TABLE 4.10
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire SWMU 16
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	USEPA, December 2002	Maximum	USEPA, December 2002	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	USEPA Region 4, May 2000	0.01	USEPA Region 4, May 2000	Cw x IR x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	30	Professional Judgment	30	Professional Judgment	
	ED	Exposure Duration	(years)	10	USEPA Region 4, May 2000	5	Professional Judgment	
	ET	Exposure Time	(hr/day)	1.5	USEPA, August 1997	1	USEPA, August 1997	
	BW	Body Weight	(kg)	45	USEPA Region 4, May 2000	45	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	(days)	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	3650	USEPA, December 1989	1825	USEPA, December 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	USEPA, December 2002	Maximum	USEPA, December 2002	The equations and parameters for for estimating DAevent and the chemical-specific dermally absorbed dose from water (DAD) are provided in Section 6.2.4.4 of the text.
	A	Skin Surface Area	cm^2	3,280	USEPA, August 1997	3,280	USEPA, August 1997	
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	
	ED	Exposure Duration	years	10	USEPA Region 4, May 2000	5	USEPA, May 1993	
	EF	Exposure Frequency	days/year	30	Professional judgement	30	Professional judgement	
	t_{event}	Duration of Event	hour/event	1.5	USEPA, August 1997	1	USEPA, August 1997	USEPA, July 2004
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	T	Lag Time	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	BW	Body Weight	kg	45	USEPA Region 4, May 2000	45	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3650	USEPA, December 1989	1825	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 3.91E-06
Noncancer Ingestion Intake(RME) = 2.74E-05

Cancer Ingestion Intake(CTE) = 1.30E-06
Noncancer Ingestion Intake(CTE) = 1.83E-05

Cancer Dermal Intake(RME) = 8.56E-01
Noncancer Dermal Intake(RME) = 5.99E+00

Cancer Dermal Intake(CTE) = 4.28E-01
Noncancer Dermal Intake(CTE) = 5.99E+00

SWMU16SWTrespRME.xls

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
ADOLESCENT TRESPASSERS- REASONABLE MAXIMUM EXPOSURE (RME)

SITE NAME: SWMU 16 - OLD SOUTHSIDE LANDFILL
LOCATION: NWS CHARLESTON, SOUTH CAROLINA
DATE: 09/20/05

REFERENCES: U.S. EPA, July 2004

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	SW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	FA	DAevent
Tetrachloroethene	7.00E-04	o	2.18E+00	1.50E+00	9.06E-01	3.34E-02	1.66E-01	1	7.54E-08
2,4-Dinitrotoluene	4.00E-04	o	2.69E+00	1.50E+00	1.12E+00	3.08E-03	1.60E-02	1	4.42E-09
Aluminum	1.10E+01	i		1.50E+00		1.00E-03		1	1.65E-05
Antimony	1.18E-02	i		1.50E+00		1.00E-03		1	1.77E-08
Iron	9.98E+00	i		1.50E+00		1.00E-03		1	1.50E-05
Lead	4.40E-03	i		1.50E+00		1.00E-03		1	6.60E-09
Manganese	3.88E-01	i		1.50E+00		1.00E-03		1	5.82E-07
Vanadium	2.42E-02	i		1.50E+00		1.00E-03		1	3.63E-08

TABLE 7.10 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire SWMU 16
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Tetrachloroethene	7.00E-04	mg/L	7.00E-04	mg/L	M	1.9E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.9E-06
	2,4-Dinitrotoluene	4.00E-04	mg/L	4.00E-04	mg/L	M	1.1E-08	mg/kg-day	2.00E-03	mg/kg-day	NA	NA	5.5E-06
	Aluminum	1.10E+01	mg/L	1.10E+01	mg/L	M	3.0E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.0E-04
	Antimony	1.18E-02	mg/L	1.18E-02	mg/L	M	3.2E-07	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	8.1E-04
	Iron	9.98E+00	mg/L	9.98E+00	mg/L	M	2.7E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	9.1E-04
	Lead	4.40E-03	mg/L	4.40E-03	mg/L	M	1.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	1.1E-05	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	4.4E-04
	Vanadium	2.42E-02	mg/L	2.42E-02	mg/L	M	6.6E-07	mg/kg-day	1.00E-03	mg/kg-day	NA	NA	6.6E-04
	(total)												3.1E-03
Dermal	Tetrachloroethene	7.00E-04	mg/L	7.00E-04	mg/L	M	4.5E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.5E-05
	2,4-Dinitrotoluene	4.00E-04	mg/L	4.00E-04	mg/L	M	2.6E-08	mg/kg-day	2.00E-03	mg/kg-day	NA	NA	1.3E-05
	Aluminum	1.10E+01	mg/L	1.10E+01	mg/L	M	9.9E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	9.9E-05
	Antimony	1.18E-02	mg/L	1.18E-02	mg/L	M	1.1E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.8E-03
	Iron	9.98E+00	mg/L	9.98E+00	mg/L	M	9.0E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.0E-04
	Lead	4.40E-03	mg/L	4.40E-03	mg/L	M	4.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	3.5E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	3.6E-03
	Vanadium	2.42E-02	mg/L	2.42E-02	mg/L	M	2.2E-07	mg/kg-day	2.60E-05	mg/kg-day	NA	NA	8.4E-03
	(total)												1.4E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.7E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 8.10 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire SWMU 16
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Tetrachloroethene	7.00E-04	mg/L	7.00E-04	mg/L	M	2.7E-09	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	1.5E-09
	2,4-Dinitrotoluene	4.00E-04	mg/L	4.00E-04	mg/L	M	1.6E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aluminum	1.10E+01	mg/L	1.10E+01	mg/L	M	4.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Antimony	1.18E-02	mg/L	1.18E-02	mg/L	M	4.6E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	9.98E+00	mg/L	9.98E+00	mg/L	M	3.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Lead	4.40E-03	mg/L	4.40E-03	mg/L	M	1.7E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	1.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.42E-02	mg/L	2.42E-02	mg/L	M	9.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.5E-09
Dermal	Tetrachloroethene	7.00E-04	mg/L	7.00E-04	mg/L	M	6.5E-08	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	3.5E-08
	2,4-Dinitrotoluene	4.00E-04	mg/L	4.00E-04	mg/L	M	3.8E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aluminum	1.10E+01	mg/L	1.10E+01	mg/L	M	1.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Antimony	1.18E-02	mg/L	1.18E-02	mg/L	M	1.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	9.98E+00	mg/L	9.98E+00	mg/L	M	1.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Lead	4.40E-03	mg/L	4.40E-03	mg/L	M	5.6E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	5.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.42E-02	mg/L	2.42E-02	mg/L	M	3.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.5E-08
										Total Risk Across All Exposure Routes/Pathways	**3.6E-08**

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
ADOLESCENT TRESPASSERS- CENTRAL TENDENCY EXPOURE (CTE)

SITE NAME: SWMU 16 - OLD SOUTHSIDE LANDFILL
LOCATION: NWS CHARLESTON, SOUTH CAROLINA
DATE: 09/20/05

REFERENCES: U.S. EPA, July 2004

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	SW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)			B	FA	DAevent
Tetrachloroethene	7.00E-04		o		2.18E+00	1.00E+00	9.06E-01		3.34E-02			1.66E-01	1	6.16E-08
2,4-Dinitrotoluene	4.00E-04		o		2.69E+00	1.00E+00	1.12E+00		3.08E-03			1.60E-02	1	3.61E-09
Aluminum	1.10E+01		i			1.00E+00			1.00E-03				1	1.10E-05
Antimony	1.18E-02		i			1.00E+00			1.00E-03				1	1.18E-08
Iron	9.98E+00		i			1.00E+00			1.00E-03				1	9.98E-06
Lead	4.40E-03		i			1.00E+00			1.00E-03				1	4.40E-09
Manganese	3.88E-01		i			1.00E+00			1.00E-03				1	3.88E-07
Vanadium	2.42E-02		i			1.00E+00			1.00E-03				1	2.42E-08

TABLE 7.10a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire SWMU 16
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Tetrachloroethene	7.00E-04	mg/L	7.00E-04	mg/L	M	1.3E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.3E-06
	2,4-Dinitrotoluene	4.00E-04	mg/L	4.00E-04	mg/L	M	7.3E-09	mg/kg-day	2.00E-03	mg/kg-day	NA	NA	3.7E-06
	Aluminum	1.10E+01	mg/L	1.10E+01	mg/L	M	2.0E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.0E-04
	Antimony	1.18E-02	mg/L	1.18E-02	mg/L	M	2.2E-07	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	5.4E-04
	Iron	9.96E+00	mg/L	9.98E+00	mg/L	M	1.8E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.1E-04
	Lead	4.40E-03	mg/L	4.40E-03	mg/L	M	8.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	7.1E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	3.0E-04
	Vanadium	2.42E-02	mg/L	2.42E-02	mg/L	M	4.4E-07	mg/kg-day	1.00E-03	mg/kg-day	NA	NA	4.4E-04
	(total)												2.1E-03
Dermal	Tetrachloroethene	7.00E-04	mg/L	7.00E-04	mg/L	M	3.7E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.7E-05
	2,4-Dinitrotoluene	4.00E-04	mg/L	4.00E-04	mg/L	M	2.2E-08	mg/kg-day	2.00E-03	mg/kg-day	NA	NA	1.1E-05
	Aluminum	1.10E+01	mg/L	1.10E+01	mg/L	M	6.6E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	6.6E-05
	Antimony	1.18E-02	mg/L	1.18E-02	mg/L	M	7.1E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.2E-03
	Iron	9.98E+00	mg/L	9.98E+00	mg/L	M	6.0E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.0E-04
	Lead	4.40E-03	mg/L	4.40E-03	mg/L	M	2.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	2.3E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	2.4E-03
	Vanadium	2.42E-02	mg/L	2.42E-02	mg/L	M	1.4E-07	mg/kg-day	2.60E-05	mg/kg-day	NA	NA	5.6E-03
	(total)												9.5E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 8.10a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire SWMU 16
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Tetrachloroethene	7.00E-04	mg/L	7.00E-04	mg/L	M	9.1E-10	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	4.9E-10
	2,4-Dinitrotoluene	4.00E-04	mg/L	4.00E-04	mg/L	M	5.2E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aluminum	1.10E+01	mg/L	1.10E+01	mg/L	M	1.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Antimony	1.18E-02	mg/L	1.18E-02	mg/L	M	1.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	9.98E+00	mg/L	9.98E+00	mg/L	M	1.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Lead	4.40E-03	mg/L	4.40E-03	mg/L	M	5.7E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	5.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.42E-02	mg/L	2.42E-02	mg/L	M	3.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.9E-10
Dermal	Tetrachloroethene	7.00E-04	mg/L	7.00E-04	mg/L	M	2.6E-08	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	2,4-Dinitrotoluene	4.00E-04	mg/L	4.00E-04	mg/L	M	1.5E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aluminum	1.10E+01	mg/L	1.10E+01	mg/L	M	4.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Antimony	1.18E-02	mg/L	1.18E-02	mg/L	M	5.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	9.98E+00	mg/L	9.98E+00	mg/L	M	4.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Lead	4.40E-03	mg/L	4.40E-03	mg/L	M	1.9E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	1.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.42E-02	mg/L	2.42E-02	mg/L	M	1.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.4E-08
										Total Risk Across All Exposure Routes/Pathways	**1.5E-08**

TABLE 4.11
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire SWMU 16
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA Region 4, May 2000	50	USEPA, May 1993	Csoil x IR x Fi x EF x ED x CF
	FI	Fraction Ingested	unitless	1	USEPA Region 4, May 2000	1	USEPA, May 1993	BW x AT
	EF	Exposure Frequency	days/year	30	Professional Judgment	30	Professional Judgment	U.S. EPA, December 1989
	ED	Exposure Duration	years	10	USEPA Region 4, May 2000	5	Professional Judgment	
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	
	BW	Body Weight	kg	45	USEPA Region 4, May 2000	45	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,650	USEPA, December 1989	1,825	USEPA, December 1969	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,280	USEPA, August 1997	3,280	USEPA, August 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA, July 2004	0.04	USEPA, July 2004	U.S. EPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA, July 2004	chemical specific	USEPA, July 2004	
	EF	Exposure Frequency	days/year	30	Professional Judgment	30	Professional Judgment	
	ED	Exposure Duration	years	10	USEPA Region 4, May 2000	5	Professional Judgment	
	BW	Body Weight	kg	45	USEPA Region 4, May 2000	45	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,650	USEPA, December 1989	1,825	USEPA, December 1989	

1 CDI = Chronic Daily Intake

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 2.61E-08
Noncancer Ingestion Intake - RME = 1.83E-07

Cancer Ingestion Intake - CTE = 6.52E-09
Noncancer Ingestion Intake - CTE = 9.13E-08

Cancer Dermal Intake - RME = 1.71E-07
Noncancer Dermal Intake - RME = 1.20E-06

Cancer Dermal Intake - CTE = 1.71E-08
Noncancer Dermal Intake - CTE = 2.40E-07

TABLE 7.11 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire SWMU 16
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BENZO(A)PYRENE	1.60E-01	mg/kg	1.60E-01	mg/kg	M	2.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	2.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
Dermal	BENZO(A)PYRENE	1.60E-01	mg/kg	1.60E-01	mg/kg	M	2.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	1.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
												Total Hazard Index Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13

TABLE 8.11 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire SWMU 16
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BENZO(A)PYRENE	1.60E-01	mg/kg	1.60E-01	mg/kg	M	4.2E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	3.0E-08
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	2.9E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	2.1E-08
	(total)										**5.1E-08**
Dermal	BENZO(A)PYRENE	1.60E-01	mg/kg	1.60E-01	mg/kg	M	3.6E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-08
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	2.4E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	(total)										**4.4E-08**
										Total Risk Across All Exposure Routes/Pathways	**9.5E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13

TABLE 7.11a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire SWMU 16
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BENZO(A)PYRENE	1.60E-01	mg/kg	1.60E-01	mg/kg	M	1.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	1.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
Dermal	BENZO(A)PYRENE	1.60E-01	mg/kg	1.60E-01	mg/kg	M	5.0E-09	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	3.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
												Total Hazard Index Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13

TABLE 8.11a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire SWMU 16
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BENZO(A)PYRENE	1.60E-01	mg/kg	1.60E-01	mg/kg	M	1.0E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	7.6E-09
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	7.2E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	5.2E-09
	(total)										1.3E-08
Dermal	BENZO(A)PYRENE	1.60E-01	mg/kg	1.60E-01	mg/kg	M	3.6E-10	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-09
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	2.4E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1.8E-09
	(total)										4.4E-09
										Total Risk Across All Exposure Routes/Pathways	1.7E-08

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13

TABLE 9.1. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION/EXCAVATION WORKERS
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	Bis(2-Ethylhexyl)phthalate	4.E-07		1.E-07	5.E-07	Bis(2-Ethylhexyl)phthalate	Liver	1.E-01		3.E-02	1.E-01
			Aroclor-1254	6.E-07		2.E-07	8.E-07	Aroclor-1254	Immunological	1.E+00		4.E-01	1.E+00
			Antimony					Antimony	Blood	1.E-01			1.E-01
			Barium					Barium	Kidney	3.E-04			3.E-04
			Cadmium					Cadmium	Kidney	4.E-02		2.E-03	4.E-02
			Chromium		6.E-06		6.E-06	Chromium	Fetotoxicity/GS/Bone	7.E-02	4.E-01		4.E-01
			Lead					Lead					
			Total Risk Across Surface Soil				8.E-06		Total Hazard Index Across Surface Soil				2.E+00
Soil	Soil	Subsurface Soil	Benzo(a)anthracene	2.E-09		6.E-10	2.E-09	Benzo(a)anthracene					
			Benzo(a)pyrene	2.E-08		8.E-09	3.E-08	Benzo(a)pyrene					
			Benzo(b)fluoranthene	2.E-09		6.E-10	3.E-09	Benzo(b)fluoranthene					
			Carbazole	2.E-11		9.E-12	3.E-11	Carbazole					
			Chrysene	2.E-11		8.E-12	3.E-11	Chrysene					
			Aroclor-1254	1.E-08		5.E-09	2.E-08	Aroclor-1254	Immunological	2.E-02		8.E-03	3.E-02
			Aroclor-1260	4.E-09		1.E-09	5.E-09	Aroclor-1260					
			alpha-BHC	1.E-10		3.E-11	1.E-10	alpha-BHC					
			gamma-BHC (Lindane)	1.E-11		2.E-12	2.E-11	gamma-BHC (Lindane)	Kidney, Liver	3.E-06		3.E-07	3.E-06
			Aluminum					Aluminum	Body Weight	1.E-02			1.E-02
			Antimony					Antimony	Blood	1.E-02			1.E-02
			Arsenic	2.E-07		2.E-08	2.E-07	Arsenic	Skin, CVS	3.E-02		2.E-03	3.E-02
			Barium					Barium	Kidney	1.E-03			1.E-03
			Cadmium					Cadmium	Kidney	1.E-02		8.E-04	1.E-02
			Chromium					Chromium	Fetotoxicity/GS/Bone	1.E-02			1.E-02
			Cobalt					Cobalt	NA	2.E-04			2.E-04
			Copper					Copper	Gastrointestinal	1.E-02			1.E-02
			Iron					Iron	Gastrointestinal	7.E-02			7.E-02
			Manganese					Manganese	CNS	2.E-03			2.E-03
			Mercury					Mercury	CNS	3.E-04			3.E-04
			Nickel					Nickel	Body Weight	2.E-03			2.E-03
			Silver					Silver	Skin	1.E-03			1.E-03
			Thallium					Thallium	Liver	9.E-03			9.E-03
			Vanadium					Vanadium	Hair Loss	3.E-02			3.E-02
			Zinc					Zinc	Blood	2.E-02			2.E-02
			Total Risk Across Subsurface Soil				2.E-07		Total Hazard Index Across Subsurface Soil				2.E-01
Groundwater	Groundwater	Groundwater	Trichloroethene		2.E-09	1.E-09	4.E-09	Trichloroethene	CNS		1.E-04	1.E-05	2.E-04
			Bis(2-Ethylhexyl)phthalate			4.E-09	4.E-09	Bis(2-Ethylhexyl)phthalate	Liver			1.E-03	1.E-03
			Total Risk Across Groundwater				8.E-09		Total Hazard Index Across Groundwater				1.E-03
			Total Risk Across Soil and Groundwater				8.E-06		Total Hazard Index Across Soil and Groundwater				2.E+00

Target Organ Analysis

Total Liver HI =	1.E-01	Total CNS HI =	2.E-03
Total Kidney HI =	8.E-02	Total Blood HI =	1.E-01
Total CVS HI =	3.E-02	Total Bone HI =	4.E-01
Total Skin HI =	3.E-02	Total Gastrointestinal System HI =	4.E-01
Total Immune System HI =	1.E+00	Total Hair HI =	3.E-02
Total Fetotoxicity HI =	4.E-01	Total Body Weight HI =	2.E-02

TABLE 9.2. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - OCCUPATIONAL WORKERS
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	Bis(2-Ethylhexyl)phthalate	2.E-05		2.E-05	4.E-05	Bis(2-Ethylhexyl)phthalate	Liver	2.E-01		2.E-01	4.E-01
			Aroclor-1254	3.E-05		3.E-05	7.E-05	Aroclor-1254	Immunological	2.E+00		2.E+00	5.E+00
			Antimony					Antimony	Blood	3.E-01			3.E-01
			Barium					Barium	Kidney	9.E-04			9.E-04
			Cadmium					Cadmium	Kidney	1.E-01		1.E-02	1.E-01
			Chromium		1.E-06		1.E-06	Chromium	Fetotoxicity/GS/Bone	2.E-01	3.E-03		2.E-01
			Lead					Lead					
			Total Risk Across Surface Soil				1.E-04	Total Hazard Index Across Surface Soil					6.E+00

Target Organ Analysis

Total Liver HI =	4.E-01
Total Kidney HI =	1.E-01
Total Immune System HI =	5.E+00
Total Fetotoxicity HI =	2.E-01
Total Blood HI =	3.E-01
Total Bone HI =	2.E-01
Total Gastrointestinal System HI =	2.E-01

TABLE 9.3. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ASOLESCENT TRESPASSERS
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Receptor Population: Trespassers
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	Bis(2-Ethylhexyl)phthalate	2.E-06		1.E-06	3.E-06	Bis(2-Ethylhexyl)phthalate	Liver	5.E-02		3.E-02	7.E-02
			Aroclor-1254	3.E-06		2.E-06	5.E-06	Aroclor-1254	Immunological	5.E-01		4.E-01	9.E-01
			Antimony					Antimony	Blood	5.E-02			5.E-02
			Barium					Barium	Kidney	2.E-04			2.E-04
			Cadmium					Cadmium	Kidney	2.E-02		3.E-03	2.E-02
			Chromium		1.E-08		1.E-08	Chromium	Fetotoxicity/GS/Bone	3.E-02	7.E-05		3.E-02
			Lead					Lead					
			Total Risk Across Surface Soil				8.E-06	Total Hazard Index Across Surface Soil					1.E+00
Sediment	Sediment	Sediment	BENZO(A)PYRENE	3.E-08		3.E-08	6.E-08	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	2.E-08		2.E-08	4.E-08	BENZO(B)FLUORANTHENE					
			Total Risk Across Sediment				1.E-07	Total Hazard Index Across Sediment					
Surface Water	Surface Water	Surface Water	Tetrachloroethene	1.E-09		3.E-08	4.E-08	Tetrachloroethene	Liver	2.E-08		5.E-05	5.E-05
			2,4-Dinitrotoluene					2,4-Dinitrotoluene	CNS, Liver	5.E-06		1.E-05	2.E-05
			Aluminum					Aluminum	Body Weight	3.E-04		1.E-04	4.E-04
			Antimony					Antimony	Blood	8.E-04		2.E-03	3.E-03
			Iron					Iron	Gastrointestinal	9.E-04		3.E-04	1.E-03
			Lead					Lead					
			Manganese					Manganese	CNS	4.E-04		4.E-03	4.E-03
			Vanadium					Vanadium	Hair Loss	7.E-04		8.E-03	9.E-03
			Total Risk Across Surface Water				4.E-08	Total Hazard Index Across Surface Water					2.E-02
			Total Risk Across All Exposure Pathways				8.E-06	Total Hazard Index Across All Exposure Pathways					1.E+00

Target Organ Analysis

Total Liver HI =	7.E-02	Total CNS HI =	4.E-03
Total Kidney HI =	2.E-02	Total Blood HI =	5.E-02
Total CVS HI =	2.E-05	Total Bone HI =	3.E-02
Total Immune System HI =	9.E-01	Total Gastrointestinal System HI =	4.E-02
Total Fetotoxicity HI =	3.E-02	Total Hair HI =	9.E-03
Total Body Weight HI =	4.E-04		

TABLE 9.1a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION/EXCAVATION WORKERS
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	Bis(2-Ethylhexyl)phthalate	4.E-07		4.E-08	4.E-07	Bis(2-Ethylhexyl)phthalate	Liver	1.E-01		1.E-02	1.E-01
			Aroclor-1254	6.E-07		8.E-08	6.E-07	Aroclor-1254	Immunological	1.E+00		1.E-01	1.E+00
			Antimony					Antimony	Blood	1.E-01			1.E-01
			Barium					Barium	Kidney	3.E-04			3.E-04
			Cadmium					Cadmium	Kidney	4.E-02		8.E-04	4.E-02
			Chromium		4.E-06		4.E-06	Chromium	Fetotoxicity/GS/Bone	7.E-02	2.E-01		3.E-01
			Lead					Lead					
			Total Risk Across Surface Soil				5.E-06		Total Hazard Index Across Surface Soil				2.E+00
Soil	Soil	Subsurface Soil	Benzo(a)anthracene	2.E-09		2.E-10	2.E-09	Benzo(a)anthracene					
			Benzo(a)pyrene	2.E-08		3.E-09	2.E-08	Benzo(a)pyrene					
			Benzo(b)fluoranthene	2.E-09		3.E-10	2.E-09	Benzo(b)fluoranthene					
			Carbazole	2.E-11		3.E-12	3.E-11	Carbazole					
			Chrysene	2.E-11		3.E-12	2.E-11	Chrysene					
			Aroclor-1254	1.E-08		2.E-09	1.E-08	Aroclor-1254	Immunological	2.E-02		3.E-03	2.E-02
			Aroclor-1260	4.E-09		5.E-10	4.E-09	Aroclor-1260					
			alpha-BHC	1.E-10		1.E-11	1.E-10	alpha-BHC					
			gamma-BHC (Lindane)	1.E-11		6.E-13	1.E-11	gamma-BHC (Lindane)	Kidney, Liver	3.E-06		1.E-07	3.E-06
			Aluminum					Aluminum	Body Weight	1.E-02			1.E-02
			Antimony					Antimony	Blood	1.E-02			1.E-02
			Arsenic	2.E-07		5.E-09	2.E-07	Arsenic	Skin, CVS	3.E-02		8.E-04	3.E-02
			Barium					Barium	Kidney	1.E-03			1.E-03
			Cadmium					Cadmium	Kidney	1.E-02		3.E-04	1.E-02
			Chromium					Chromium	Fetotoxicity/GS/Bone	1.E-02			1.E-02
			Cobalt					Cobalt	NA	2.E-04			2.E-04
			Copper					Copper	Gastrointestinal	1.E-02			1.E-02
			Iron					Iron	Gastrointestinal	7.E-02			7.E-02
			Manganese					Manganese	CNS	2.E-03			2.E-03
			Mercury					Mercury	CNS	3.E-04			3.E-04
			Nickel					Nickel	Body Weight	2.E-03			2.E-03
			Silver					Silver	Skin	1.E-03			1.E-03
			Thallium					Thallium	Liver	9.E-03			9.E-03
			Vanadium					Vanadium	Hair Loss	3.E-02			3.E-02
			Zinc					Zinc	Blood	2.E-02			2.E-02
			Total Risk Across Subsurface Soil				2.E-07		Total Hazard Index Across Subsurface Soil				2.E-01
Groundwater	Groundwater	Groundwater	Trichloroethene		1.E-09	8.E-10	2.E-09	Trichloroethene	CNS		9.E-05	9.E-06	9.E-05
			Bis(2-Ethylhexyl)phthalate			3.E-09	3.E-09	Bis(2-Ethylhexyl)phthalate	Liver			7.E-04	7.E-04
			Total Risk Across Groundwater				5.E-09		Total Hazard Index Across Groundwater				8.E-04
			Total Risk Across Soil and Groundwater				5.E-06		Total Hazard Index Across Soil and Groundwater				2.E+00

Target Organ Analysis

Total Liver HI =	1.E-01	Total CNS HI =	2.E-03
Total Kidney HI =	6.E-02	Total Blood HI =	1.E-01
Total CVS HI =	3.E-02	Total Bone HI =	3.E-01
Total Skin HI =	3.E-02	Total Gastrointestinal System HI =	3.E-01
Total Immune System HI =	1.E+00	Total Hair HI =	3.E-02
Total Fetotoxicity HI =	3.E-01	Total Body Weight HI =	2.E-02

TABLE 9.2a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - OCCUPATIONAL WORKERS
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	Bis(2-Ethylhexyl)phthalate	4.E-06		5.E-07	4.E-06	Bis(2-Ethylhexyl)phthalate	Liver	1.E-01		1.E-02	1.E-01
			Aroclor-1254	6.E-06		1.E-06	7.E-06	Aroclor-1254	Immunological	1.E+00		2.E-01	1.E+00
			Antimony					Antimony	Blood	1.E-01			1.E-01
			Barium					Barium	Kidney	4.E-04			4.E-04
			Cadmium					Cadmium	Kidney	4.E-02		1.E-03	5.E-02
			Chromium		4.E-07		4.E-07	Chromium	Fetotoxicity/GS/Bone	8.E-02	2.E-03		8.E-02
			Lead					Lead					
			Total Risk Across Surface Soil				1.E-05		Total Hazard Index Across Surface Soil				2.E+00

Target Organ Analysis

Total Liver HI =	1.E-01	Total Blood HI =	1.E-01
Total Kidney HI =	5.E-02	Total Bone HI =	8.E-02
Total Immune System HI =	1.E+00	Total Gastrointestinal System HI =	8.E-02
Total Fetotoxicity HI =	8.E-02		

TABLE 9.3a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ASOLESCENT TRESPASSERS
SWMU 16 - OLD SOUTHSIDE LANDFILL
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Receptor Population: Trespassers
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	Bis(2-Ethylhexyl)phthalate	5.E-07		1.E-07	6.E-07	Bis(2-Ethylhexyl)phthalate	Liver	2.E-02		6.E-03	3.E-02
			Aroclor-1254	7.E-07		2.E-07	9.E-07	Aroclor-1254	Immunological	2.E-01		8.E-02	3.E-01
			Antimony					Antimony	Blood	3.E-02			3.E-02
			Barium					Barium	Kidney	8.E-05			8.E-05
			Cadmium					Cadmium	Kidney	1.E-02		5.E-04	1.E-02
			Chromium		6.E-09		6.E-09	Chromium	Fetotoxicity/GS/Bone	2.E-02	3.E-05		2.E-02
			Lead					Lead					
			Total Risk Across Surface Soil				1.E-06		Total Hazard Index Across Surface Soil				4.E-01
Sediment	Sediment	Sediment	BENZO(A)PYRENE	8.E-09		3.E-09	1.E-08	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	5.E-09		2.E-09	7.E-09	BENZO(B)FLUORANTHENE					
			Total Risk Across Sediment				2.E-08		Total Hazard Index Across Sediment				
Surface Water	Surface Water	Surface Water	Tetrachloroethene	5.E-10		1.E-08	1.E-08	Tetrachloroethene	Liver	1.E-06		4.E-05	4.E-05
			2,4-Dinitrotoluene					2,4-Dinitrotoluene	CNS, Liver	4.E-06		1.E-05	1.E-05
			Aluminum					Aluminum	Body Weight	2.E-04		7.E-05	3.E-04
			Antimony					Antimony	Blood	5.E-04		1.E-03	2.E-03
			Iron					Iron	Gastrointestinal	6.E-04		2.E-04	8.E-04
			Lead					Lead					
			Manganese					Manganese	CNS	3.E-04		2.E-03	3.E-03
			Vanadium					Vanadium	Hair Loss	4.E-04		6.E-03	6.E-03
			Total Risk Across Surface Water				1.E-08		Total Hazard Index Across Surface Water				1.E-02
			Total Risk Across All Exposure Pathways				2.E-06		Total Hazard Index Across All Exposure Pathways				4.E-01

Target Organ Analysis

Total Liver HI =	3.E-02	Total CNS HI =	3.E-03
Total Kidney HI =	1.E-02	Total Blood HI =	3.E-02
Total CVS HI =	1.E-05	Total Bone HI =	2.E-02
Total Immune System HI =	3.E-01	Total Gastrointestinal System HI =	2.E-02
Total Fetotoxicity HI =	2.E-02	Total Hair HI =	6.E-03
Total Body Weight HI =	3.E-04		

SWMU 16

IEUBK CHILD LEAD MODEL
AND
TRW ADULT LEAD MODEL RESULTS

Calculations of Blood Lead Concentrations (PbBs) - NWS Charleston- SW[illegible]MU 16, Surface Soil - Construction Worker

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 05/19/03

Exposure Variable	PbB Equation 1*	PbB Equation 2**	Description of Exposure Variable	Units	Values for Non-Residential Exposure Scenario: Using Equation 1 GSDi = Hom	Using Equation 1 GSDi = Het	Using Equation 2 GSDi = Hom	Using Equation 2 GSDi = Het
PbS	X	X	Soil lead concentration	ug/g or ppm	2760	2760	2760	2760
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--	0.9	0.9	0.9	0.9
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4	0.4	0.4
GSD_i	X	X	Geometric standard deviation PbB	--	2.1	2.3	2.1	2.3
PbB_0	X	X	Baseline PbB	ug/dL	1.5	1.7	1.5	1.7
IR_S	X		Soil ingestion rate (including soil-derived indoor dust)	g/day	0.100	0.100	--	--
IR_{S+D}		X	Total ingestion rate of outdoor soil and indoor dust	g/day	--	--	0.100	0.100
W_S		X	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--	--	1.0	1.0
K_{SD}		X	Mass fraction of soil in dust	--	--	--	0.7	0.7
$AF_{S,D}$	X	X	Absorption fraction (same for soil and dust)	--	0.12	0.12	0.12	0.12
$EF_{S,D}$	X	X	Exposure frequency (same for soil and dust)	days/yr	30	30	30	30
$AT_{S,D}$	X	X	Averaging time (same for soil and dust)	days/yr	90	90	90	90
PbB_{adult}	**PbB of adult worker, geometric mean**			**ug/dL**	**5.9**	**6.1**	**5.9**	**6.1**
$PbB_{fetal,0.95}$	**95th percentile PbB among fetuses of adult workers**			**ug/dL**	**18.0**	**21.7**	**18.0**	**21.7**
PbB_t	**Target PbB level of concern (e.g., 10 ug/dL)**			**ug/dL**	**10.0**	**10.0**	**10.0**	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**			**%**	**19.8%**	**23.7%**	**19.8%**	**23.7%**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S,D}) + PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

****Equation 2, alternate approach based on Eq. 1, 2, and A-19 in USEPA (1996).**

PbB_{adult} =	$PbS*BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])/365+PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Blood Lead Concentrations (PbBs) - NWS Charleston- SWMU 16, Surface Soil - Occupational Worker

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 05/19/03

Exposure Variable	Eq. 1	Eq. 2	Description (press point for variable)	Units	Values for Non-Residential Exposure Scenario: Using Equation 1 GSD = Hom	Using Equation 1 GSD = Het	Using Equation 2 GSD = Hom	Using Equation 2 GSD = Het
PbS	X	X	Soil lead concentration	ug/g or ppm	2760	2760	2760	2760
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--	0.9	0.9	0.9	0.9
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4	0.4	0.4
GSD_i	X	X	Geometric standard deviation PbB	--	2.1	2.3	2.1	2.3
PbB_0	X	X	Baseline PbB	ug/dL	1.5	1.7	1.5	1.7
IR_S	X		Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050	--	--
IR_{S+D}		X	Total ingestion rate of outdoor soil and indoor dust	g/day	--	--	0.050	0.050
W_S		X	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--	--	1.0	1.0
K_{SD}		X	Mass fraction of soil in dust	--	--	--	0.7	0.7
$AF_{S,D}$	X	X	Absorption fraction (same for soil and dust)	--	0.12	0.12	0.12	0.12
$EF_{S,D}$	X	X	Exposure frequency (same for soil and dust)	days/yr	250	250	250	250
$AT_{S,D}$	X	X	Averaging time (same for soil and dust)	days/yr	365	365	365	365
PbB_{adult}			**PbB of adult worker, geometric mean**	ug/dL	**6.0**	**6.2**	**6.0**	**6.2**
$PbB_{fetal,0.95}$			**95th percentile PbB among fetuses of adult workers**	ug/dL	**18.4**	**22.1**	**18.4**	**22.1**
PbB_t			**Target PbB level of concern (e.g., 10 ug/dL)**	ug/dL	**10.0**	**10.0**	**10.0**	**10.0**
$P(PbB_{fetal} > PbB_t)$			**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	%	**20.5%**	**24.4%**	**20.5%**	**24.4%**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

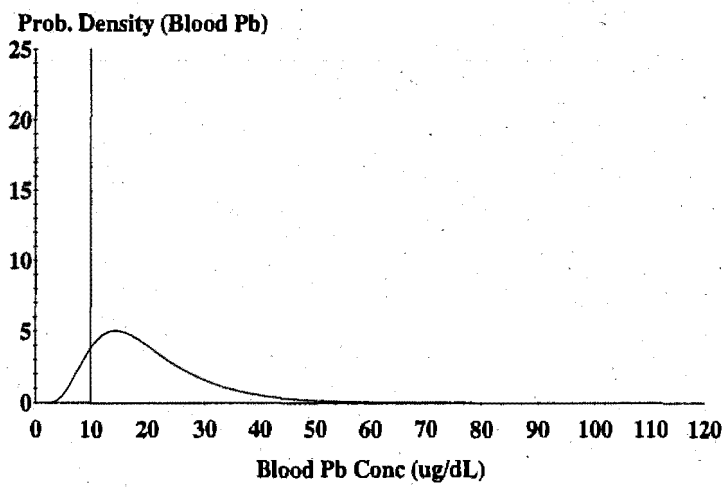
PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S,D}) + PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

****Equation 2, alternate approach based on Eq. 1, 2, and A-19 in USEPA (1996).**

PbB_{adult} =	$PbS*BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])/365+PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

SWMU 16 –
SURFACE SOIL
AVG = 2760 mg/kg



Cutoff = 10.000 ug/dl
Geo Mean = 18.715
GSD = 1.600
% Above = 90.881
% Below = 9.119

Age Range = 0 to 84 months
Time Step = Every 4 Hours
Run Mode = Research

SWMU 17

RISK ASSESSMENT CALCULATIONS
AND
RAGS-PART D TABLES

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population(1)	Receptor Age	Exposure Route	Onsite/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Surface Soil	Surface Soil(2)	Entire Site	Site Worker	Adult	Ingestion Dermal	Onsite Onsite	None None	Potential risks are assumed to be less than the occupational worker. Risks for this receptor will be inferred using the calculated risks for the future occupational worker.
		Air	Vapors and Particulates in Air - Entire Site	Site Worker	Adult	Inhalation	Onsite	None	Potential risks are assumed to be less than the occupational worker. Risks for this receptor will be inferred using the calculated risks for the future occupational worker.
		Surface Soil	Entire Site	Trespasser	Adolescent	Ingestion Dermal	Onsite Onsite	Quant(3) Quant	Although access to the site is currently restricted., this scenario is evaluted to account for the possibility that trespassers may enter the site.
		Air	Vapors and Particulates in Air - Entire Site	Trespasser	Adolescent	Inhalation	Onsite	Quant	Although access to the site is currently restricted., this scenario is evaluted to account for the possibility that trespassers may enter the site.
	Groundwater	Groundwater/Air	Surficial Aquifer/Vapors	Site Worker	Adult	Ingestion Dermal Inhalation	Onsite Onsite Onsite	None None None	Direct contact with groundwater does not occur under current land use. Shallow groundwater is not expected to be used as a source of potable water.
	Surface Water	Surface Water	Onsite Ditches/Streams	Site Worker	Adult	Ingestion Dermal	Onsite Onsite	None None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
				Trespasser	Adolescent	Ingestion Dermal	Onsite Onsite	Quant Quant	Although access to the site is currently restricted., this scenario is evaluted to account for the possibility that trespassers may enter the site.
		Air	Vapors from Onsite Ditches/Streams	Site Workers and Trespassers	Adult and Adolescent	Inhalation	Onsite	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
	Sediment	Sediment	Onsite Ditches/Streams	Site Workers	Adult	Ingestion Dermal	Onsite Onsite	None None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
				Trespasser	Adolescent	Ingestion Dermal	Onsite Onsite	Quant Quant	Although access to the site is currently restricted., this scenario is evaluted to account for the possibility that trespassers may enter the site.

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population(1)	Receptor Age	Exposure Route	Onsite/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Surface Soil(1) and Subsurface Soil	Soil	Entire Site	Excavation/Construction Workers	Adult	Ingestion	On-site	Quant	Excavation/construction or intrusive activities may occur at the site in the future.
						Dermal	On-site	Quant	
		Air	Vapors and Particulates in Air - Entire Site			Inhalation	On-site	Quant	Inhalation of vapors or particulates emitted from soil in may occur during future excavation activities.
	Surface Soil	Soil/Air	Entire Site	Occupational Workers	Adult	Ingestion	On-site	Quant	Although the scenario is unlikely, a commercial/industrial scenario is included to aid in future risk management decisions. Risks to site workers are conservatively inferred from the risks estimated for this receptor.
						Dermal	On-site	Quant	
						Inhalation	On-site	Quant	
				Residents	Adult and Child	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	
						Inhalation	On-site	Quant	
	Groundwater	Groundwater/Air	Surficial Aquifer	Excavation/Construction Workers	Adult	Ingestion	On-site	None	Minimal exposure by ingestion is anticipated.
						Dermal	On-site	Quant	Direct contact with groundwater and inhlation of vapors may occur if excavation/construction activities occur on the site in the future.
						Inhalation	On-site	Quant	
				Occupational Workers	Adult	Ingestion	On-site	None	Although the scenario is unlikely, a commercial/industrial scenario is included to aid in future risk management decisions. Direct contact would not be expected for this receptor. Inhalation of vapors emitted from groundwater in buildings may occur if buildings were constructed on the site in the future.
						Dermal	On-site	None	
						Inhalation	On-site	Quant	
				Residents	Adult and Child	Ingestion	On-site	Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisionscontact . Inhalation of vapors from groundwater into buildings may occur if buildings were constructed on the site in the future
						Dermal	On-site	Quant	
						Inhalation	On-site	Quant	
	Surface Water	Surface Water	Onsite Ditches/Streams	Excavation/Construction and Occupational Workers	Adult	Ingestion	Onsite	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
						Dermal	Onsite	None	
				Residents	Adult and Child	Ingestion	Onsite	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	Onsite	Quant	
		Air	Vapors from Onsite Ditches/Streams	Excavation/Constuction and Occupational Workers, Residents	Adult and Child	Inhalation	Onsite	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
	Sediment	Sediment	Onsite Ditches/Streams	Excavation/Construction and Occupational Workers	Adult	Ingestion	Onsite	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
						Dermal	Onsite	None	
				Residents	Adult and Child	Ingestion	Onsite	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	Onsite	Quant	

Footnotes:

1 Receptor groups were previously identified in the Generic RFI/CMS Workplan (ABB Environmental, Services, Services, Inc., January 1995).

2 Surface soil is defined as soil collected from 0 to 1 feet below ground surface (bgs).

3 Evaluared quantitatively in the HHRA.

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Volatile Organics (mg/kg)																	
78-93-3	2-BUTANONE	0.004	J	0.006	J	mg/kg	17-B-06-00	3/29	0.005 - 0.42	0.006	NA	2200	N	4.4 24000	SSL-MIGR SSL-INH	No	BSL
67-64-1	ACETONE	0.021	J	0.065		mg/kg	17-B-15-00-D	3/29	0.007 - 0.69	0.065	NA	1400	N	6.6 NA	SSL-MIGR SSL-INH	No	BSL
74-83-9	BROMOMETHANE	0.003	J	0.003	J	mg/kg	17-B-26-00	1/29	0.005 - 0.21	0.003	NA	0.39	N	0.012 9.5	SSL-MIGR SSL-INH	No	BSL
75-00-3	CHLOROETHANE	0.002	J	0.002	J	mg/kg	17-B-19-00	1/29	0.005 - 0.21	0.002	NA	3	C	NA 1200	SSL-MIGR SSL-INH	No	BSL
67-66-3	CHLOROFORM	0.003	J	0.023		mg/kg	17-B-14-00	2/29	0.005 - 0.21	0.023	NA	0.22	C	0.029 0.28	SSL-MIGR SSL-INH	No	BSL
79-20-9	METHYL ACETATE	0.016		0.016		mg/kg	17-B-07-00	1/27	0.005 - 0.008	0.016	NA	2200	N	7.4 NA	SSL-MIGR SSL-INH	No	BSL
75-09-2	METHYLENE CHLORIDE	0.011	J	0.014	J	mg/kg	17-B-26-00	4/29	0.005 - 0.21	0.014	NA	9.1	C	0.0012 13	SSL-MIGR SSL-INH	Yes	ASL
100-42-5	STYRENE	0.002	J	0.002	J	mg/kg	17-B-06-00	1/29	0.005 - 0.21	0.002	NA	1700	sat	0.18 1500	SSL-MIGR SSL-INH	No	BSL
79-01-6	TRICHLOROETHENE(7)	0.005		3.2		mg/kg	17-B-17-00	4/29	0.005 - 0.21	3.2	NA	2.9	C	0.0028 0.071	SSL-MIGR SSL-INH	Yes	ASL
75-69-4	TRICHLOROFLUOROMETHANE	0.006		0.047		mg/kg	17-B-26-00	10/29	0.005 - 0.21	0.047	NA	39	N	8 1100	SSL-MIGR SSL-INH	No	BSL
156-59-2	CIS-1,2-DICHLOROETHENE	0.007		0.025		mg/kg	17-B-17-00	1/29	0.005 - 0.21	0.025	NA	4.3	N	0.02 NA	SSL-MIGR SSL-INH	Yes	ASL
Semivolatile Organics (mg/kg)																	
106-44-5	4-METHYLPHENOL	0.042	J	0.042	J	mg/kg	17-B-11-00	1/17	0.36 - 2.2	0.042	NA	31	N	0.066 NA	SSL-MIGR SSL-INH	No	BSL
83-32-9	ACENAPHTHENE	0.17	J	0.17	J	mg/kg	17-B-02-00	1/19	0.36 - 0.82	0.17	NA	370	N	31 NA	SSL-MIGR SSL-INH	No	BSL
208-96-8	ACENAPHTHYLENE	0.052	J	0.052	J	mg/kg	17-B-11-00	1/19	0.36 - 2.2	0.052	NA	370	N	NA NA	SSL-MIGR SSL-INH	No	BSL
120-12-7	ANTHRACENE	0.066	J	0.45	J	mg/kg	17-B-02-00	2/19	0.36 - 0.82	0.45	0.253	2200	N	650 NA	SSL-MIGR SSL-INH	No	BSL
100-52-7	BENZALDEHYDE	0.46		0.46		mg/kg	17-B-05-00	1/17	0.36 - 2.2	0.46	NA	610	N	0.86 NA	SSL-MIGR SSL-INH	No	BSL
56-55-3	BENZO(A)ANTHRACENE	0.028	J	1	J	mg/kg	17-B-02-00	4/19	0.36 - 0.82	1	0.43	0.62	C	0.16 NA	SSL-MIGR SSL-INH	Yes	ASL
50-32-8	BENZO(A)PYRENE	0.02	J	0.74	J	mg/kg	17-B-02-00	4/19	0.36 - 0.82	0.74	0.48	0.062	C	0.41 NA	SSL-MIGR SSL-INH	Yes	ASL
205-99-2	BENZO(B)FLUORANTHENE	0.036	J	1.1	J	mg/kg	17-B-02-00	5/19	0.36 - 0.82	1.1	0.6	0.62	C	0.49 NA	SSL-MIGR SSL-INH	Yes	ASL
191-24-2	BENZO(G,H,I)PERYLENE	0.023	J	0.37	J	mg/kg	17-B-02-00	3/19	0.36 - 0.82	0.37	0.31	230	N	NA NA	SSL-MIGR SSL-INH	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	0.033	J	0.34	J	mg/kg	17-B-02-00	3/19	0.36 - 0.82	0.34	0.27	6.2	C	0.49 NA	SSL-MIGR SSL-INH	No	BSL
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	1.1	J	1.1	J	mg/kg	17-B-02-00	1/19	0.36 - 0.82	1.1	NA	35	C	180 NA	SSL-MIGR SSL-INH	No	BSL
85-68-7	BUTYL BENZYL PHTHALATE	0.08	J	0.08	J	mg/kg	17-B-11-00	1/19	0.36 - 2.2	0.08	NA	1200	N	840 NA	SSL-MIGR SSL-INH	No	BSL
86-74-8	CARBAZOLE	0.45	J	0.45	J	mg/kg	17-B-02-00	1/17	0.36 - 0.82	0.45	0.11	24	C	0.03 NA	SSL-MIGR SSL-INH	Yes	ASL

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
218-01-9	CHRYSENE	0.026	J	0.91	J	mg/kg	17-B-02-00	4/19	0.36 - 0.82	0.91	0.47	62	C	0.16 7500	SSL-MIGR SSL-INH	Yes	ASL
53-70-3	DIBENZO(A,H)ANTHRACENE	0.09	J	0.13	J	mg/kg	17-B-02-00	2/19	0.36 - 0.82	0.13	NA	0.062	C	1.5 NA	SSL-MIGR SSL-INH	Yes	ASL
132-64-9	DIBENZOFURAN	0.074	J	0.074	J	mg/kg	17-B-02-00	1/19	0.36 - 0.82	0.074	NA	15	N	2.4 NA	SSL-MIGR SSL-INH	No	BSL
206-44-0	FLUORANTHENE	0.026	J	1.7	J	mg/kg	17-B-02-00	4/19	0.36 - 0.82	1.7	1.3	230	N	310 NA	SSL-MIGR SSL-INH	No	BSL
86-73-7	FLUORENE	0.17	J	0.17	J	mg/kg	17-B-02-00	1/19	0.36 - 0.82	0.17	0.055	270	N	41 NA	SSL-MIGR SSL-INH	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.023	J	0.41	J	mg/kg	17-B-02-00	3/19	0.36 - 0.82	0.41	0.31	0.62	C	1.4 NA	SSL-MIGR SSL-INH	No	BSL
91-20-3	NAPHTHALENE	0.092	J	0.092	J	mg/kg	17-B-02-00	1/19	0.36 - 0.82	0.092	NA	5.6	N	3.1 170	SSL-MIGR SSL-INH	No	BSL
85-01-8	PHENANTHRENE	0.019	J	1.4	J	mg/kg	17-B-02-00	3/19	0.36 - 0.82	1.4	0.75	230	N	NA NA	SSL-MIGR SSL-INH	No	BSL
129-00-0	PYRENE	0.041	J	1.7	J	mg/kg	17-B-02-00	5/19	0.36 - 0.82	1.7	0.85	230	N	230 NA	SSL-MIGR SSL-INH	No	BSL
Pesticides/PCBs (mg/kg)																	
72-54-8	4,4'-DDD	0.0036	J	0.037		mg/kg	17-B-12-00	2/18	0.0018 -	0.037	0.1	2.4	C	0.71 NA	SSL-MIGR SSL-INH	No	BSL
72-55-9	4,4'-DDE	0.00054	J	0.0092		mg/kg	17-B-14-00	5/18	0.0035 -	0.0092	0.021	1.7	C	2.2 NA	SSL-MIGR SSL-INH	No	BSL
50-29-3	4,4'-DDT	0.00065	J	0.02		mg/kg	17-B-14-00	8/19	0.0035 -	0.02	0.059	1.7	C	1.3 750	SSL-MIGR SSL-INH	No	BSL
309-00-2	ALDRIN	0.0022	J	0.0022	J	mg/kg	17-B-12-00	1/19	0.0018 -	0.0022	NA	0.029	C	0.025 3.4	SSL-MIGR SSL-INH	No	BSL
5103-71-9	ALPHA-CHLORDANE	0.00055	J	0.00055	J	mg/kg	17-B-07-00	1/19	0.0018 -	0.00055	1.88	1.6	C	0.48 72	SSL-MIGR SSL-INH	No	BSL
12672-29-6	AROCLOR-1248	0.57		0.57		mg/kg	17-B-11-00	1/19	0.018 - 0.024	0.57	NA	0.22	C	NA NA	SSL-MIGR SSL-INH	Yes	ASL
11097-69-1	AROCLOR-1254	0.0051	J	0.87		mg/kg	17-B-11-00	4/19	0.018 - 0.024	0.87	NA	0.22	C	NA NA	SSL-MIGR SSL-INH	Yes	ASL
11096-82-5	AROCLOR-1260	0.17		0.35		mg/kg	17-B-11-00	2/19	0.018 - 0.024	0.35	NA	0.22	C	NA NA	SSL-MIGR SSL-INH	Yes	ASL
7421-93-4	ENDRIN ALDEHYDE	0.0013	J	0.0013	J	mg/kg	17-B-01-00	1/19	0.0018 -	0.0013	NA	1.8	N	NA NA	SSL-MIGR SSL-INH	No	BSL
53494-70-5	ENDRIN KETONE	0.00026	J	0.0054		mg/kg	17-B-12-00	4/18	0.0035 -	0.0054	NA	1.8	N	NA NA	SSL-MIGR SSL-INH	No	BSL
76-44-8	HEPTACHLOR	0.00048	J	0.0028	J	mg/kg	17-B-11-00	2/19	0.0018 -	0.0028	NA	0.11	C	1.1 4.2	SSL-MIGR SSL-INH	No	BSL
319-84-6	ALPHA-BHC	0.00067	J	0.00067	J	mg/kg	17-B-13-00	1/19	0.0018 -	0.00067	NA	0.09	C	0.000036 0.76	SSL-MIGR SSL-INH	Yes	ASL
319-85-7	BETA-BHC	0.0009	J	0.0009	J	mg/kg	17-B-04-00	1/19	0.0018 -	0.0009	NA	0.32	C	0.00013 6	SSL-MIGR SSL-INH	Yes	ASL
319-86-8	DELTA-BHC	0.0018	J	0.0018	J	mg/kg	17-B-16-00-D	1/19	0.0018 -	0.0018	NA	0.09	C	NA NA	SSL-MIGR SSL-INH	No	BSL
58-89-9	GAMMA-BHC (LINDANE)	0.00087	J	0.00087	J	mg/kg	17-B-13-00	1/19	0.0018 -	0.00087	0.0145	0.44	C	0.00047 NA	SSL-MIGR SSL-INH	Yes	ASL

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Inorganics (mg/kg)																	
7429-90-5	Aluminum	3370		31800		mg/kg	17-B-07-00	19/19	---	31800	16900	7600	N	8.3 6860000	SSL-MIGR SSL-INH	Yes	ASL
7440-36-0	Antimony	26.6		31.4		mg/kg	17-B-11-00	2/19	0.3 - 0.76	31.4	0.33	3.1	N	0.27 NA	SSL-MIGR SSL-INH	Yes	ASL
7440-38-2	Arsenic	1.5		11.5		mg/kg	17-B-07-00	15/19	1.4 - 2.5	11.5	9.45	0.39	C	0.29 745	SSL-MIGR SSL-INH	Yes	ASL
7440-39-3	Barium	19		244		mg/kg	17-B-11-00	19/19	---	244	64.5	540	N	82 686000	SSL-MIGR SSL-INH	Yes	ASL
7440-41-7	Beryllium	0.47		1.7		mg/kg	17-B-16-00	12/19	0.27 - 0.46	1.7	0.58	15	N	32 1330	SSL-MIGR SSL-INH	No	BSL
7440-43-9	Cadmium	0.96		12.5		mg/kg	17-B-12-00	4/19	0.03 - 0.41	12.5	0.12	3.7	N	0.38 1780	SSL-MIGR SSL-INH	Yes	ASL
7440-70-2	Calcium	171		4840		mg/kg	17-B-02-00-D	19/19	---	4840	6120	NA		NA NA	SSL-MIGR SSL-INH	No	NUT, BKG
7440-47-3	Chromium	4.5		392		mg/kg	17-B-11-00	19/19	---	392	42.9	210	C	2.1 267	SSL-MIGR SSL-INH	Yes	ASL
7440-48-4	Cobalt	0.9		12.8		mg/kg	17-B-11-00	15/19	0.46 - 1.3	12.8	2.71	140	N	0.17 1140	SSL-MIGR SSL-INH	Yes	ASL
7440-50-8	Copper	2.1		1930		mg/kg	17-B-12-00	19/19	---	1930	3.23	310	N	560 NA	SSL-MIGR SSL-INH	Yes	ASL
7439-89-6	Iron	2810		45500		mg/kg	17-B-12-00	19/19	---	45500	67900	2300	N	NA NA	SSL-MIGR SSL-INH	No	BKG
7439-92-1	Lead	10.3		670		mg/kg	17-B-12-00	19/19	---	670	15.5	400		NA NA	SSL-MIGR SSL-INH	Yes	ASL
7439-95-4	Magnesium	226		1920		mg/kg	17-B-17-00	19/19	---	1920	746	NA		NA NA	SSL-MIGR SSL-INH	No	NUT
7439-96-5	Manganese	22.6	J	378		mg/kg	17-B-11-00	19/19	---	378	25.1	180	N	110 68600	SSL-MIGR SSL-INH	Yes	ASL
7439-97-6	Mercury	0.04		1.8		mg/kg	17-B-17-00-D	13/19	0.02 - 0.05	1.8	0.21	2.3	N	0.1 2.9	SSL-MIGR SSL-INH	Yes	ASL
7440-02-0	Nickel	2.4		348		mg/kg	17-B-11-00	18/19	1.2	348	12.1	160	N	14 NA	SSL-MIGR SSL-INH	Yes	ASL
7440-09-7	Potassium	160		1110		mg/kg	17-B-07-00	19/19	---	1110	225	NA		NA NA	SSL-MIGR SSL-INH	No	NUT
7440-23-5	Sodium	25.1		343		mg/kg	17-B-11-00	3/19	25.8 - 139	343	370	NA		NA NA	SSL-MIGR SSL-INH	No	NUT, BKG
7440-62-2	Vanadium	6.9		51.8		mg/kg	17-B-07-00	19/19	---	51.8	66.3	7.8	N	260 NA	SSL-MIGR SSL-INH	No	BKG
7440-66-6	Zinc	9.2		1510		mg/kg	17-B-11-00	18/19	8.3	1510	20.5	2300	N	680 NA	SSL-MIGR SSL-INH	Yes	ASL

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NWS CHARLESTON, SOUTH CAROLINA

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Medium: Soil
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CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 If the maximum inorganic concentration is greater than the Charleston NWS background concentration, (Baseline Background Study. Naval Weapons Station, Charleston, SC. TtNUS, March 2002), that inorganic is not selected as a COPC .
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 The "CAL- Modified PRG" is used as the screening value for trichloroethene (USEPA, Region 9, October 2004).

Surrogate Chemicals

Acenaphthene is used as a surrogate for acenaphthylene.
Pyrene is used as a surrogate for benzo(ghi)perylene, and phenanthrene.
Alpha-BHC is used as surrogate for delta-BHC.
Endrin is used as a surrogate for endrin aldehyde and endrin ketone.
Chlordane is used a surrogate for alpha and gamma-chlordane.
The PRG for chromium represents a 1:6 ratio of Cr VI:Cr III (USEPA Region 9, October 2004).

Associated Samples:

17-B-01-00	17-B-06-00	17-B-11-00	17-B-16-00
17-B-02-00	17-B-07-00	17-B-12-00	17-B-16-00-D
17-B-02-00-D	17-B-08-00	17-B-13-00	17-B-17-00
17-B-03-00	17-B-09-00	17-B-14-00	17-B-17-00-D
17-B-04-00	17-B-09-00-D	17-B-15-00	17-B-18-00
17-B-05-00	17-B-10-00	17-B-15-00-D	

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BKG = Within background levels
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient
NTX = No Toxicity Information

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
N = Noncarcinogen
NA = Not Applicable.
SSL-INH = Soil Screening Level for transfers from soil to air (Inhalation) calculated online at http://risk.lsd.ornl.gov/calc_start.shtml by the USEPA's Soil Screenng Guidance (USEPA, July 1996).
SSL-MIGR = Soil Screening Level for transfers from soil to groundwater for a Dilution and Attenuation Factor of 1 calculated online at http://risk.lsd.ornl.gov/calc_start.shtml (USEPA July 1996)

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Suburface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Volatile Organics (mg/kg)																	
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.002	J	0.21		mg/kg	17-B-14-03	6/81	0.005 - 0.15	0.21	NA	0.41	C	0.00017 0.59	SSL-MIGR SSL-INH	Yes	ASL
79-00-5	1,1,2-TRICHLOROETHANE	0.001	J	0.27	J	mg/kg	17-B-17-05	12/82	0.005 - 0.15	0.27	NA	0.73	C	0.00091 0.98	SSL-MIGR SSL-INH	Yes	ASL
120-82-1	1,2,4-TRICHLOROBENZENE	0.002	J	0.002	J	mg/kg	17-B-17-05	1/76	0.005 - 0.16	0.002	NA	6.2	N	0.26 180	SSL-MIGR SSL-INH	No	BSL
95-63-6	1,2,4-TRIMETHYLBENZENE	0.005	J	0.005	J	mg/kg	17-B-25-03	1/20	0.005 - 0.007	0.005	NA	5.2	N	14 130	SSL-MIGR SSL-INH	No	BSL
95-50-1	1,2-DICHLOROBENZENE	0.002	J	0.002	J	mg/kg	17-B-17-05	1/76	0.005 - 0.16	0.002	NA	600	sat	0.86 600	SSL-MIGR SSL-INH	No	BSL
78-87-5	1,2-DICHLOROPROPANE	0.004	J	0.004	J	mg/kg	17-B-17-05	1/82	0.005 - 0.16	0.004	NA	0.34	C	0.0015 15	SSL-MIGR SSL-INH	Yes	ASL
541-73-1	1,3-DICHLOROBENZENE	0.003	J	0.003	J	mg/kg	17-B-17-05	1/76	0.005 - 0.16	0.003	NA	53	N	NA NA	SSL-MIGR SSL-INH	No	BSL
106-46-7	1,4-DICHLOROBENZENE	0.002	J	0.002	J	mg/kg	17-B-17-05	1/76	0.005 - 0.16	0.002	NA	3.4	C	0.11 11000	SSL-MIGR SSL-INH	No	BSL
78-93-3	2-BUTANONE	0.013	J	0.013	J	mg/kg	17-B-33-03	1/82	0.005 - 0.28	0.013	NA	2200	N	4.4 24000	SSL-MIGR SSL-INH	No	BSL
67-64-1	ACETONE	0.012	J	16		mg/kg	17-B-14-01	42/82	0.006 - 1.3	16	NA	1400	N	6.6	SSL-MIGR SSL-INH	Yes	ASL
71-43-2	BENZENE	0.002	J	0.002	J	mg/kg	17-B-17-05	2/82	0.005 - 0.16	0.002	NA	0.64	C	0.0017 0.84	SSL-MIGR SSL-INH	Yes	ASL
75-27-4	BROMODICHLOROMETHANE	0.004	J	0.16	J	mg/kg	17-B-14-03	3/82	0.005 - 0.15	0.16	NA	0.82	C	0.032 NA	SSL-MIGR SSL-INH	Yes	ASL
74-83-9	BROMOMETHANE	0.001	J	0.001	J	mg/kg	17-B-29-01	1/82	0.005 - 0.16	0.001	NA	0.39	N	0.012 9.5	SSL-MIGR SSL-INH	No	BSL
75-15-0	CARBON DISULFIDE	0.002	J	0.002	J	mg/kg	17-B-17-05	1/82	0.005 - 0.16	0.002	NA	36	N	1.5 720	SSL-MIGR SSL-INH	No	BSL
56-23-5	CARBON TETRACHLORIDE	0.018		5.2		mg/kg	17-B-14-03	3/82	0.005 - 0.15	5.2	NA	0.22	C	0.0033 0.33	SSL-MIGR SSL-INH	Yes	ASL
75-00-3	CHLOROETHANE	0.002	J	0.002	J	mg/kg	17-B-08-01	3/82	0.005 - 0.16	0.002	NA	3	C	NA 1200	SSL-MIGR SSL-INH	No	BSL
67-66-3	CHLOROFORM	0.002	J	9.1		mg/kg	17-B-14-03	10/82	0.005 - 0.14	9.1	NA	0.22	C	0.029 0.028	SSL-MIGR SSL-INH	Yes	ASL
74-87-3	CHLOROMETHANE	0.055	J	0.088	J	mg/kg	17-B-14-03	2/82	0.002 - 0.15	0.088	NA	4.7	N	0.002 2.1	SSL-MIGR SSL-INH	Yes	ASL
75-71-8	DICHLORODIFLUOROMETHANE	0.002	J	0.002	J	mg/kg	17-B-18-05	2/82	0.005 - 0.16	0.002	NA	9.4	N	28 250	SSL-MIGR SSL-INH	No	BSL
79-20-9	METHYL ACETATE	0.01		0.49		mg/kg	17-B-14-03	6/75	0.005 - 0.1	0.49	NA	2200	N	7.4 NA	SSL-MIGR SSL-INH	No	BSL
75-09-2	METHYLENE CHLORIDE	0.008	J	0.014	J	mg/kg	17-B-26-03	9/82	0.004 - 0.16	0.014	NA	9.1	C	0.0012 13	SSL-MIGR SSL-INH	Yes	ASL
127-18-4	TETRACHLOROETHENE	0.002	J	0.056	J	mg/kg	17-B-14-03	4/82	0.005 - 0.15	0.056	NA	0.48	C	0.0029 11	SSL-MIGR SSL-INH	Yes	ASL
108-88-3	TOLUENE	0.0007	J	0.003	J	mg/kg	17-B-17-05	2/82	0.005 - 0.16	0.003	NA	520	sat	0.59 650	SSL-MIGR SSL-INH	No	BSL
540-59-0	TOTAL 1,2-DICHLOROETHENE	0.005	J	0.21		mg/kg	17-B-30-02	7/24	0.006 - 0.016	0.21	NA	4.3	N	NA NA	SSL-MIGR SSL-INH	No	BSL
156-60-5	TRANS-1,2-DICHLOROETHENE	0.001	J	0.03		mg/kg	17-B-21-03	5/82	0.005 - 0.16	0.03	NA	6.9	N	0.034 NA	SSL-MIGR SSL-INH	No	BSL

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Suburface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
79-01-6	TRICHLOROETHENE(7)	0.001	J	910		mg/kg	17-B-17-03	24/82	0.005 - 0.15	910	NA	2.9	C	0.0028 0.071	SSL-MIGR SSL-INH	Yes	ASL
75-69-4	TRICHLOROFLUOROMETHANE	0.003	J	0.046		mg/kg	17-B-27-03	21/82	0.005 - 0.16	0.046	NA	39	N	8 1100	SSL-MIGR SSL-INH	No	BSL
75-01-4	VINYL CHLORIDE	0.005	J	0.005	J	mg/kg	17-B-17-03	1/82	0.005 - 0.28	0.005	NA	0.079	C	0.00067 0.28	SSL-MIGR SSL-INH	Yes	ASL
156-59-2	CIS-1,2-DICHLOROETHENE	0.003	J	1.3		mg/kg	17-B-17-03	15/82	0.005 - 0.16	1.3	NA	4.3	N	0.02 NA	SSL-MIGR SSL-INH	Yes	ASL
Semivolatile Organics (mg/kg)																	
121-14-2	2,4-DINITROTOLUENE	0.51		0.51		mg/kg	17-B-08-01	1/162	0.1 - 21	0.51	NA	12	N	0.000049 NA	SSL-MIGR SSL-INH	Yes	ASL
91-57-6	2-METHYLNAPHTHALENE	0.053	J	0.053	J	mg/kg	17-B-17-05	1/62	0.36 - 21	0.053	NA	5.6	N	NA NA	SSL-MIGR SSL-INH	No	BSL
100-52-7	BENZALDEHYDE	0.47		0.81		mg/kg	17-B-33-03	2/55	0.36 - 21	0.81	NA	610	N	0.86 NA	SSL-MIGR SSL-INH	No	BSL
56-55-3	BENZO(A)ANTHRACENE	0.024	J	0.024	J	mg/kg	17-B-17-03	1/62	0.36 - 21	0.024	0.43	0.62	C	0.16 NA	SSL-MIGR SSL-INH	No	BSL
205-99-2	BENZO(B)FLUORANTHENE	0.029	J	0.029	J	mg/kg	17-B-12-05	1/61	0.36 - 21	0.029	0.6	0.62	C	0.49 NA	SSL-MIGR SSL-INH	No	BSL
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.23	J	5.2		mg/kg	17-B-08-03	6/62	0.36 - 21	5.2	NA	35	C	180 NA	SSL-MIGR SSL-INH	No	BSL
85-68-7	BUTYL BENZYL PHTHALATE	0.024	J	0.033	J	mg/kg	17-B-17-05	2/62	0.36 - 21	0.033	NA	1200	N	840 NA	SSL-MIGR SSL-INH	No	BSL
84-74-2	DI-N-BUTYL PHTHALATE	0.04	J	1		mg/kg	17-B-33-03	4/62	0.36 - 21	1	NA	610	N	250 NA	SSL-MIGR SSL-INH	No	BSL
117-84-0	DI-N-OCTYL PHTHALATE	0.37		0.37		mg/kg	17-B-14-01	1/61	0.36 - 21	0.37	NA	240	N	240000 NA	SSL-MIGR SSL-INH	No	BSL
206-44-0	FLUORANTHENE	0.035	J	0.21	J	mg/kg	17-B-33-03	2/62	0.36 - 21	0.21	1.3	230	N	310 NA	SSL-MIGR SSL-INH	No	BSL
91-20-3	NAPHTHALENE	0.073	J	0.073	J	mg/kg	17-B-17-05	1/62	0.36 - 21	0.073	NA	5.6	N	3.1 170	SSL-MIGR SSL-INH	No	BSL
87-86-5	PENTACHLOROPHENOL	0.38	J	0.38	J	mg/kg	17-B-17-05	1/61	0.91 - 52	0.38	NA	3	C	0.0014 NA	SSL-MIGR SSL-INH	Yes	ASL
85-01-8	PHENANTHRENE	0.025	J	0.16	J	mg/kg	17-B-33-03	2/62	0.36 - 21	0.16	0.75	230	N	NA NA	SSL-MIGR SSL-INH	No	BSL
129-00-0	PYRENE	0.033	J	0.17	J	mg/kg	17-B-33-03	3/62	0.36 - 21	0.17	0.85	230	N	230 NA	SSL-MIGR SSL-INH	No	BSL
Pesticides/PCBs (mg/kg)																	
72-54-8	4,4'-DDD	0.0073		0.0073		mg/kg	17-B-33-03	1/62	0.002 - 0.41	0.0073	0.1	2.4	C	0.71 NA	SSL-MIGR SSL-INH	No	BSL
72-55-9	4,4'-DDE	0.0008	J	0.006		mg/kg	17-B-33-03	2/62	0.002 - 0.41	0.006	0.021	1.7	C	2.2 NA	SSL-MIGR SSL-INH	No	BSL
50-29-3	4,4'-DDT	0.00017	J	0.0039	J	mg/kg	17-B-10-03	8/62	0.002 - 0.41	0.0039	0.0591	1.7	C	1.3 750	SSL-MIGR SSL-INH	No	BSL
309-00-2	ALDRIN	0.00075	J	0.00075	J	mg/kg	17-B-18-01	1/62	0.0018 - 0.21	0.00075	NA	0.029	C	0.025 3.4	SSL-MIGR SSL-INH	No	BSL
11097-69-1	AROCLOR-1254	0.014	J	0.03		mg/kg	17-B-17-05	2/62	0.018 - 0.026	0.03	NA	0.22	C	NA NA	SSL-MIGR SSL-INH	No	BSL
60-57-1	DIELDRIN	0.00014	J	0.00021	J	mg/kg	17-B-11-01	1/62	0.002 - 0.41	0.00021	NA	0.03	C	0.00023 1.1	SSL-MIGR SSL-INH	No	BSL

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
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NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
7421-93-4	ENDRIN ALDEHYDE	0.00072	J	0.0013	J	mg/kg	17-B-07-05-D	3/62	0.002 - 0.41	0.0013	NA	1.8	N	NA NA	SSL-MIGR SSL-INH	No	BSL
53494-70-5	ENDRIN KETONE	0.00079	J	0.0012	J	mg/kg	17-B-15-01	2/62	0.002 - 0.41	0.0012	NA	1.8	N	NA NA	SSL-MIGR SSL-INH	No	BSL
5103-74-2	GAMMA-CHLORDANE	0.067	J	0.067	J	mg/kg	17-B-14-03	1/62	0.0018 - 0.2	0.067	0.0145	1.6	C	0.48 72	SSL-MIGR SSL-INH	No	BSL
319-86-8	DELTA-BHC	0.0014	J	0.073	J	mg/kg	17-B-14-03	2/62	0.0018 - 0.2	0.073	NA	0.09	C	NA NA	SSL-MIGR SSL-INH	No	BSL
Explosives (mg/kg)																	
118-96-7	2,4,6-TRINITROTOLUENE	0.35		0.35		mg/kg	17-B-08-01	1/62	0.1 - 0.25	0.35	16900	3.1	N	0.00057 NA	SSL-MIGR SSL-INH	Yes	ASL
Inorganics (mg/kg)																	
7429-90-5	ALUMINUM	6100		52500		mg/kg	17-B-18-05	62/62	---	52500	16900	7600	N	8.3 6860000	SSL-MIGR SSL-INH	Yes	ASL
7440-38-2	ARSENIC	1.8		13.2		mg/kg	17-B-19-03	55/62	0.22 - 2.5	13.2	9.45	0.39	C	0.29 745	SSL-MIGR SSL-INH	Yes	ASL
7440-39-3	BARIUM	8.9		359		mg/kg	17-B-18-05	62/62	---	359	64.5	540	N	82 686000	SSL-MIGR SSL-INH	Yes	ASL
7440-41-7	BERYLLIUM	0.21		1.1		mg/kg	17-B-13-03	31/62	0.22 - 0.53	1.1	0.58	15	N	32 1330	SSL-MIGR SSL-INH	No	BSL
7440-43-9	CADMIUM	0.18		0.56		mg/kg	17-B-33-03	3/62	0.02 - 0.46	0.56	0.12	3.7	N	0.38 1780	SSL-MIGR SSL-INH	Yes	ASL
7440-70-2	CALCIUM	155		3420		mg/kg	17-B-03-01	62/62	---	3420	6120	NA		NA NA	SSL-MIGR SSL-INH	No	NUT, BKG
7440-47-3	CHROMIUM	9.9		62.7		mg/kg	17-B-18-05	62/62	---	62.7	42.9	210	C	2.1 267	SSL-MIGR SSL-INH	Yes	ASL
7440-48-4	COBALT	1.1		5.9		mg/kg	17-B-06-03	62/62	2.6	5.9	2.71	140	C	0.17 1140	SSL-MIGR SSL-INH	Yes	ASL
7440-50-8	COPPER	0.95		39.7		mg/kg	17-B-33-03	37/62	0.5 - 2.1	39.7	3.23	310	N	560 NA	SSL-MIGR SSL-INH	No	BSL
7439-89-6	IRON	4620		66500		mg/kg	17-B-16-03	62/62	---	66500	67900	2300	N	NA NA	SSL-MIGR SSL-INH	No	BKG
7439-92-1	LEAD	4.1		77.1		mg/kg	17-B-33-03	62/62	---	77.1	15.5	400		NA NA	SSL-MIGR SSL-INH	No	BSL
7439-95-4	MAGNESIUM	385		3900		mg/kg	17-B-18-05	62/62	---	3900	746	NA		NA NA	SSL-MIGR SSL-INH	No	NUT
7439-96-5	MANGANESE	12.2		71.5	J	mg/kg	17-B-31-02-D	62/62	---	71.5	25.1	180	N	110 68600	SSL-MIGR SSL-INH	No	BSL
7439-97-6	MERCURY	0.01		0.14		mg/kg	17-B-03-01	11/62	0.01 - 0.05	0.14	0.21	2.3	N	0.1 2.9	SSL-MIGR SSL-INH	No	BKG
7440-02-0	NICKEL	2.4		16		mg/kg	17-B-18-05	62/62	---	16	12.1	160	N	14 NA	SSL-MIGR SSL-INH	Yes	ASL
7440-09-7	POTASSIUM	270		1270		mg/kg	17-B-03-05	62/62	---	1270	225	NA		NA NA	SSL-MIGR SSL-INH	No	NUT
7440-22-4	SILVER	0.2		0.2		mg/kg	17-B-33-03	1/62	0.04 - 0.25	0.2	3.2	39	N	1.6 NA	SSL-MIGR SSL-INH	No	BSL,BKG
7440-23-5	SODIUM	22.6		981		mg/kg	17-B-34-06	21/62	18.5 - 235	981	370	NA		NA NA	SSL-MIGR SSL-INH	No	NUT
7440-28-0	THALLIUM	0.44		1		mg/kg	17-B-11-01-D	3/62	0.32 - 1.7	1	1.63	0.52	N	0.056 NA	SSL-MIGR SSL-INH	No	BKG

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NWS CHARLESTON, SOUTH CAROLINA

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Medium: Soil
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CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
7440-62-2	VANADIUM	12.7		68.9		mg/kg	17-B-18-05	62/62	---	68.9	66.3	7.8 N	260 NA	SSL-MIGR SSL-INH	Yes	ASL
7440-66-6	ZINC	5.8		1240		mg/kg	17-B-14-03	57/62	12.1 - 30.5	1240	20.5	2300 N	680 NA	SSL-MIGR SSL-INH	Yes	ASL
57-12-5	CYANIDE	0.21	J	5		mg/kg	17-B-17-05	8/62	1.1 - 1.5	5	NA	120 N	2 NA	SSL-MIGR SSL-INH	Yes	ASL

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 If the maximum inorganic concentration is greater than the Charleston NWS background concentration, (Baseline Background Study. Naval Weapons Station, Charleston, SC. TtNUS, March 2002), that inorganic is not selected as a COPC .
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 The "CAL- Modified PRG" is used as the screening value for trichloroethene (USEPA, Region 9, October 2004).

Surrogate Chemicals

Naphthalene is used as a surrogate for 2-methylnaphthalene.
Pyrene is used as a surrogate for benzo(ghi)perylene, and phenanthrene.
Alpha-BHC is used as surrogate for delta-BHC.
Endrin is used as a surrogate for endrin aldehyde and endrin ketone.
Chlordane is used a surrogate for gamma-chlordane.
The PRG for chromium represents a 1:6 ratio of Cr VI:Cr III (USEPA Region 9, October 2004).

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BSL = Below COPC Screening Level/ARAR/TBC
NTX = No Toxicity Information
NUT = Essential Nutrient

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
N = Noncarcinogen
NA = Not Applicable.
SSL-INH = Soil Screening Level for transfers from soil to air (Inhalation) calculated online at http://risk.lsd.ornl.gov/calc_start.shtml by the USEPA's Soil Screenng Guidance (USEPA, July 1996).
SSL-MIGR = Soil Screening Level for transfers from soil to groundwater for a Dilution and Attenuation Factor of 1 calculated online at http://risk.lsd.ornl.gov/calc_start.shtml (USEPA July 1996)

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
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CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)

Associated Samples:

17-B-01-01	17-B-06-05	17-B-12-01	17-B-18-01	17-B-25-03
17-B-01-03	17-B-07-01	17-B-12-03	17-B-18-03	17-B-26-01
17-B-01-05	17-B-07-03	17-B-12-05	17-B-18-05	17-B-26-03
17-B-02-01	17-B-07-05	17-B-13-01	17-B-19-01	17-B-26-03-D
17-B-02-03	17-B-07-05-D	17-B-13-03	17-B-19-03	17-B-27-01
17-B-02-05	17-B-08-01	17-B-13-05	17-B-19-05	17-B-27-03
17-B-03-01	17-B-08-03	17-B-14-01	17-B-20-01	17-B-28-01
17-B-03-03	17-B-08-05	17-B-14-03	17-B-20-03	17-B-28-03
17-B-03-05	17-B-09-01	17-B-14-05	17-B-21-01	17-B-29-01
17-B-04-01	17-B-09-03	17-B-15-01	17-B-21-03	17-B-29-03
17-B-04-03	17-B-09-05	17-B-15-03	17-B-22-01	17-B-30-02
17-B-04-05	17-B-10-01	17-B-15-05	17-B-22-01-D	17-B-31-02
17-B-04-05-D	17-B-10-03	17-B-16-01	17-B-22-03	17-B-31-02-D
17-B-05-01	17-B-10-05	17-B-16-03	17-B-23-01	17-B-32-03
17-B-05-03	17-B-11-01	17-B-16-05	17-B-23-03	17-B-33-03
17-B-05-05	17-B-11-01-D	17-B-17-01	17-B-24-01	17-B-34-06
17-B-06-01	17-B-11-03	17-B-17-03	17-B-24-03	
17-B-06-03	17-B-11-05	17-B-17-05	17-B-25-01	

TABLE 2.3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Volatile Organics (ug/L)																	
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.6	J	140		ug/L	17-Q-13-0403	15/92	5 - 100	140	NA	0.055	C	NA	FED-MCL	Yes	ASL
79-00-5	1,1,2-TRICHLOROETHANE	0.5	J	93		ug/L	17-G-07S-0205	19/92	5 - 100	93	NA	0.2	C	5	FED-MCL	Yes	ASL
76-13-1	1,1,2-TRICHLOROTRIFLUOROETHANE	0.3	J	2500	J	ug/L	17-Q-28-0403	38/84	5 - 50	2500	NA	5900	N	NA	FED-MCL	No	BSL
75-34-3	1,1-DICHLOROETHANE	0.2	J	5	J	ug/L	17-G-07S-0205	12/88	5 - 100	5	NA	81	N	NA	FED-MCL	No	BSL
75-35-4	1,1-DICHLOROETHENE	0.4	J	11	J	ug/L	17-G-07S-0205	27/92	5 - 100	11	NA	34	N	7	FED-MCL	Yes	ASL
107-06-2	1,2-DICHLOROETHANE	0.6	J	14		ug/L	17-Q-56-0105	8/88	5 - 100	14	NA	0.12	C	5	FED-MCL	Yes	ASL
78-87-5	1,2-DICHLOROPROPANE	1	J	2	J	ug/L	17-Q-25D-0403	2/88	5 - 100	2	NA	0.16	C	5	FED-MCL	Yes	ASL
67-64-1	ACETONE	2	J	20	J	ug/L	17-Q-41-0105	6/33	5 - 23	20	NA	550	N	NA	FED-MCL	No	BSL
71-43-2	BENZENE	0.2	J	35		ug/L	17-G-05S-0205-D	24/92	5 - 100	35	NA	0.35	C	5	FED-MCL	Yes	ASL
75-27-4	BROMODICHLOROMETHANE	4	J	4	J	ug/L	17-G-05S-0205	1/88	5 - 100	4	NA	0.18	C	80	FED-MCL	Yes	ASL
75-15-0	CARBON DISULFIDE	0.3	J	0.3	J	ug/L	17-Q-25D-0403	3/88	5 - 100	0.3	NA	100	N	NA	FED-MCL	No	BSL
56-23-5	CARBON TETRACHLORIDE	1	J	68		ug/L	17-Q-56-0105	5/88	5 - 100	68	NA	0.17	C	5	FED-MCL	Yes	ASL
67-66-3	CHLOROFORM	0.4	J	770		ug/L	17-G-07S-0205	28/104	0.5 - 50	770	NA	0.17	C	80	FED-MCL	Yes	ASL
156-59-2	CIS-1,2-DICHLOROETHENE	0.5	J	2500		ug/L	17MW6S	54/104	0.5 - 5	2500	NA	6.1	N	70	FED-MCL	Yes	ASL
75-71-8	DICHLORODIFLUOROMETHANE	2	J	380	J	ug/L	17-Q-19-0403	20/92	5 - 100	380	NA	39	N	NA	FED-MCL	Yes	ASL
74-84-0	ETHANE	0.01		0.2		ug/L	17-PSTW-4	16/16	---	0.2	NA	NA		NA	FED-MCL	No	NTX
74-85-1	ETHENE	0.02		1.77		ug/L	17-PSTW-5	16/16	---	1.77	NA	NA		NA	FED-MCL	No	NTX
100-41-4	ETHYLBENZENE	0.2	J	0.2	J	ug/L	17-Q-19-0403	1/88	5 - 100	0.2	NA	130	N	700	FED-MCL	No	BSL
TTNUS054	M+P-XYLENES	0.2	J	0.4	J	ug/L	17-Q-19-0403	3/73	5 - 200	0.4	NA	21	N	10000	FED-MCL	No	BSL
74-82-8	METHANE	10.2		113.9		ug/L	17-PSTW-9	16/16	---	113.9	NA	NA		NA	FED-MCL	No	NTX
108-87-2	METHYL CYCLOHEXANE	0.8	J	95		ug/L	17-Q-19-0403	2/84	5 - 100	95	NA	520	N	NA	FED-MCL	No	BSL
75-09-2	METHYLENE CHLORIDE	7		19		ug/L	17-Q-19-0403	2/92	1 - 200	19	NA	4.3	C	5	FED-MCL	Yes	ASL
91-20-3	NAPHTHALENE	3	J	3	J	ug/L	17-G-07S-0205	1/46	10 - 50	3	NA	0.62	N	NA	FED-MCL	Yes	ASL
95-47-6	O-XYLENE	0.2	J	0.8	J	ug/L	17-Q-19-0403	5/73	5 - 100	0.8	NA	21	N	10000	FED-MCL	No	BSL
127-18-4	TETRACHLOROETHENE	0.5	J	330		ug/L	17-G-22S-0205	28/92	5 - 100	330	NA	0.1	C	5	FED-MCL	Yes	ASL
108-88-3	TOLUENE	0.2	J	98		ug/L	17-Q-10S-0302	17/92	5 - 100	98	NA	72	N	1000	FED-MCL	Yes	ASL
540-59-0	TOTAL 1,2-DICHLOROETHENE	0.6	J	1000		ug/L	17-G-07S-0205	36/69	5 - 10	1000	NA	6.1	N	NA	FED-MCL	Yes	ASL
1330-20-7	TOTAL XYLENES	0.3	J	1	J	ug/L	17-Q-19-0403	6/92	5 - 300	1	NA	21	N	10000	FED-MCL	No	BSL
156-60-5	TRANS-1,2-DICHLOROETHENE	0.3	J	25		ug/L	17-PSTW-13	21/104	0.5 - 100	25	NA	12	N	100	FED-MCL	Yes	ASL
79-01-6	TRICHLOROETHENE(7)	0.3	J	130000		ug/L	17-G-07S-0205	62/104	5 - 8	130000	NA	1.4	C	5	FED-MCL	Yes	ASL
75-69-4	TRICHLOROFLUOROMETHANE	0.5	J	14		ug/L	17-Q-28-0403	10/88	5 - 100	14	NA	130	N	NA	FED-MCL	No	BSL
75-01-4	VINYL CHLORIDE	0.4	J	21	J	ug/L	17-G-07S-0205	18/92	2 - 100	21	NA	0.02	C	2	FED-MCL	Yes	ASL
Semivolatile Organics (ug/L)																	
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	8	J	54		ug/L	17-G-14S-0305	3/42	10 - 11	54	NA	4.8	C	6	FED-MCL	Yes	ASL
105-60-2	CAPROLACTAM	5	J	5	J	ug/L	17-Q-35-0105	1/38	10 - 11	5	NA	1800	N	NA	FED-MCL	No	BSL
84-74-2	DI-N-BUTYL PHTHALATE	2	J	8	J	ug/L	17-G-12S-0205-D	7/42	10 - 11	8	NA	360	N	NA	FED-MCL	No	BSL
84-66-2	DIETHYL PHTHALATE	2	J	2	J	ug/L	17-G-07S-0205	1/42	10 - 11	2	NA	2900	N	NA	FED-MCL	No	BSL
Explosives (ug/L)																	
121-82-4	RDX	0.92		2.1		ug/L	17-G-05S-0205-D	2/43	0.16 - 2.7	2.1	NA	0.61	C	NA	FED-MCL	Yes	ASL
Inorganics (ug/L)																	
7429-90-5	ALUMINUM	117		39000		ug/L	17-G-16S-0305	18/43	18.2 - 638	39000	1150000	3600	N	50	FED-SMCL	No	BKG
7440-36-0	ANTIMONY	3.9		5.6		ug/L	17-G-18S-0205	2/43	2.34 - 4.3	5.6	ND	1.5	N	6	FED-MCL	Yes	ASL
7440-38-2	ARSENIC	3.8		22.7		ug/L	17-G-12D-0205	11/43	2.8 - 14.2	22.7	4.4	0.045	C	10	FED-MCL	Yes	ASL
7440-39-3	BARIUM	3.4		1920		ug/L	17-G-14S-0305	43/43	---	1920	300	260	N	2000	FED-MCL	Yes	ASL
7440-41-7	BERYLLIUM	0.42		43.6		ug/L	17-G-14S-0305	14/43	0.25 - 1.4	43.6	2.3	7.3	N	4	FED-MCL	Yes	ASL
7440-70-2	CALCIUM	663		929000		ug/L	17-G-14D-0305	43/43	---	929000	583000	NA		NA	FED-MCL	No	NUT

TABLE 2.3
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SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
7440-47-3	CHROMIUM	10.3		19.7		ug/L	17-Q-42-0105	4/43	0.8 - 7.1	19.7	44.5	11	N	100	FED-MCL	No	BKG
7440-48-4	COBALT	0.78		988		ug/L	17-G-14S-0305	29/43	0.64 - 4.3	988	16	73	N	NA	FED-MCL	Yes	ASL
7440-50-8	COPPER	6.7		24.9		ug/L	17-G-03S-0205-D	7/43	0.86 - 14.6	24.9	7	150	N	1300	FED-AL	No	BSL
7439-89-6	IRON	84		360000		ug/L	17-G-18S-0205	40/43	42.9 - 123	360000	521000	1100	N	300	FED-SMCL	No	BKG
7439-92-1	LEAD	2.3		4.2		ug/L	17-G-16S-0305	6/43	1.7 - 3.6	4.2	15	NA		15	FED-AL	No	BSL,BKG
7439-95-4	MAGNESIUM	825		270000		ug/L	17-G-16S-0305	43/43	---	270000	11700	NA		NA	FED-MCL	No	NUT
7439-96-5	MANGANESE	9.7		4850		ug/L	17-G-17S-0205	43/43	---	4850	2580	88	N	50	FED-SMCL	Yes	ASL
7439-97-6	MERCURY	0.01		0.03		ug/L	17-G-04S-0205	11/43	0.01 - 0.06	0.03	ND	1.1	N	2	FED-MCL	No	BSL
7440-02-0	NICKEL	10.8		508		ug/L	17-G-14S-0305	15/43	2.6 - 57.3	508	24.7	73	N	NA	FED-MCL	Yes	ASL
7440-09-7	POTASSIUM	257		12700		ug/L	17-G-18D-0205	35/43	238 - 6210	12700	5200	NA		NA	FED-MCL	No	NUT
7782-49-2	SELENIUM	3.8		3.8		ug/L	17-Q-42-0105	1/43	3.71 - 4.1	3.8	ND	18	N	50	FED-MCL	No	BSL
7440-23-5	SODIUM	18600		2800000		ug/L	17-G-16S-0305	43/43	---	2800000	208000	NA		NA	FED-MCL	No	NUT
7440-62-2	VANADIUM	1		30		ug/L	17-Q-42-0105	13/43	0.75 - 5.07	30	78.8	3.6	N	NA	FED-MCL	No	BKG
7440-66-6	ZINC	7.9		590		ug/L	17-G-14S-0305	29/43	2.5 - 15.5	590	153	1100	N	5000	FED-SMCL	No	BSL
Miscellaneous Parameters (ug/L)																	
24959-67-9	BROMIDE	500		7900		ug/L	17-PSTW-15	12/12	---	7900	NA	NA		NA	FED-MCL	No	NTX
16887-00-6	CHLORIDE	51000		2800000		ug/L	17-PSTW-15	12/12	---	2800000	NA	NA		250000	FED-SMCL	Yes	ASL
57-12-5	CYANIDE	4.2	J	4.2	J	ug/L	17-G-20S-0205	1/43	10	4.2	NA	73	N	200	FED-MCL	No	BSL
14808-79-8	SULFATE	34000		320000		ug/L	17-PSTW-15	12/12	---	320000	NA	NA		250000	FED-SMCL	Yes	ASL

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 If the maximum inorganic concentration is greater than the Charleston NWS background concentration, (Baseline Background Study. Naval Weapons Station, Charleston, SC. TtNUS, March 2002), that inorganic is not selected as a COPC .
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 The "CAL- Modified PRG" is used as the screening value for trichloroethene (USEPA, Region 9, October 2004).

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BKG = Within background levels
BSL = Below COPC Screening Level/ARAR/TBC
NTX = No Toxicity Information
NUT = Essential Nutrient

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
N = Noncarcinogen
NA = Not Applicable.
FED-MCL = Federal Maximum Contaminant Level (USEPA, Winter 2004)
FED-SMCL = Federal Secondary Maximum Contaminant Level (USEPA, Winter 2004
FED-AL = Federal Action Level (USEPA, Winter 2004)

TABLE 2.3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)

Associated Samples:

17-G-01S-0205,17MW01,20050224
17-G-02S-0205,17MW02S,20050227
17-G-03S-0205,17MW03S,20050214
17-G-03S-0205-AVG,17MW03S,20050214
17-G-03S-0205-D,17MW03S,20050214
17-G-04S-0205,17MW04S,20050227
17-G-05S-0205,17MW05S,20050225
17-G-05S-0205-AVG,17MW05S,20050225
17-G-05S-0205-D,17MW05S,20050225
17-G-06D-0205,17MW06D,20050224
17-G-07S-0205,17MW07S,20050228
17-G-11S-0205,17MIP03-TW29-MW11S,20050223
17-G-12D-0205,17MW12D,20050228
17-G-12D-0205-AVG,17MW12D,20050228
17-G-12D-0205-D,17MW12D,20050228
17-G-12S-0205,17MIP29-TW38-MW12S,20050225
17-G-12S-0205-AVG,17MIP29-TW38-MW12S,20050225
17-G-12S-0205-D,17MIP29-TW38-MW12S,20050225
17-G-13S-0205,17MW13S,20050227
17-G-14D-0305,17MW14D,20050309
17-G-14S-0305,17MIP38-TW47-MW14S,20050309
17-G-15D-0305,17MW15D,20050309
17-G-15S-0305,17MIP39-TW48-MW15S,20050309
17-G-16D-0305,17MW16D,20050308
17-G-16I-0305,17MIP40-TW49-MW16I,20050308
17-G-16S-0305,17MW16S,20050308
17-G-17D-0305,17MW17D,20050308
17-G-17I-0205,17MIP41-TW50-MW17I,20050226
17-G-17S-0205,17MW17S,20050226
17-G-18D-0205,17MW18D,20050226
17-G-18S-0205,17MIP42-TW51-MW18S,20050226
17-G-19S-0205,17MIP43-TW52-MW19S,20050224
17-G-20S-0205,17MIP48-TW57-MW20S,20050227
17-G-21S-0205,17MW21S,20050215
17-G-22S-0205,17MIP02-TW30-MW22S,20050223
17-G-22S-0205-AVG,17MIP02-TW30-MW22S,20050223
17-G-22S-0205-D,17MIP02-TW30-MW22S,20050223
17-G-23S-0205,17MW23S,20050224
17-PSTW-10,17-PSTW-10,20041110
17-PSTW-11,17-PSTW-11,20041110
17-PSTW-12,17-PSTW-12,20041110
17-PSTW-13,17-PSTW-13,20041110
17-PSTW-14,17-PSTW-14,20041110
17-PSTW-15,17-PSTW-15,20041110
17-PSTW-4,17-PSTW-4,20041109
17-PSTW-5,17-PSTW-5,20041109
17-PSTW-6,17-PSTW-6,20041109
17-PSTW-7,17-PSTW-7,20041110
17-PSTW-8,17-PSTW-8,20041110
17-PSTW-9,17-PSTW-9,20041110
17-Q-01-0302,17TW01S,20020307
17-Q-02-0302,17TW02S,20020307
17-Q-03-0302,17TW03,20020307
17-Q-04-0302,17TW04S,20020307
17-Q-05-0302,17TW05S,20020308
17-Q-06D-0302,17TW06D,20020308
17-Q-06S-0302,17TW06S,20020308
17-Q-07D0302,17TW07D,20020308
17-Q-07S-0302,17TW07S,20020307
17-Q-08D-0302,17TW08D,20020308
17-Q-08S-0302,17TW08S,20020308
17-Q-09D-0302,17TW09D,20020309
17-Q-09S-0302,17TW09S,20020309
17-Q-10D-0302,17TW10D,20020308
17-Q-10S-0302,17TW10S,20020308
17-Q-11-0403,17MIP11-TW11,20030426
17-Q-12-0403,17MIP12-TW12,20030426
17-Q-13-0403,17MIP21-TW13,20030426
17-Q-14-0403,17MIP16-TW14,20030426
17-Q-15-0403,17MIP15-TW15,20030426
17-Q-15-0403-AVG,17MIP15-TW15,20030426
17-Q-15-0403-D,17MIP15-TW15,20030426
17-Q-16-0403,17MIP13-TW16,20030426
17-Q-17-0403,17MIP18-TW17,20030426
17-Q-18-0403,17MIP19-TW18,20030426
17-Q-19-0403,17MIP20-TW19,20030427
17-Q-20-0403,17MIP17-TW20,20030427
17-Q-21-0403,17MIP09-TW21,20030427
17-Q-22-0403,17MIP14-TW22,20030427
17-Q-23-0403,17MIP08-TW23,20030427
17-Q-24-0403,17MIP07-TW24,20030427
17-Q-25D-0403,17MIP10-TW25SD,20030427
17-Q-25S-0403,17MIP10-TW25SD,20030427
17-Q-26-0403,17MIP06-TW26,20030427
17-Q-26-0403-AVG,17MIP06-TW26,20030427
17-Q-26-0403-D,17MIP06-TW26,20030427
17-Q-27-0403,17MIP05-TW27,20030427
17-Q-28-0403,17MIP04-TW28,20030427
17-Q-31-0403,17MIP01-TW31,20030427
17-Q-32-0105,17MIP23-TW32,20050115
17-Q-32-0105-AVG,17MIP23-TW32,20050115
17-Q-32-0105-D,17MIP23-TW32,20050115
17-Q-33-0105,17MIP24-TW33,20050117
17-Q-34-0105,17MIP25-TW34,20050115
17-Q-35-0105,17MIP26-TW35,20050117
17-Q-36-0105,17MIP27-TW36,20050117
17-Q-37-0105,17MIP28-TW37,20050116
17-Q-39-0105,17MIP30-TW39,20050116
17-Q-39-0105-AVG,17MIP30-TW39,20050116
17-Q-39-0105-D,17MIP30-TW39,20050116
17-Q-40-0105,17MIP31-TW40,20050116
17-Q-41-0105,17MIP32-TW41,20050117
17-Q-42-0105,17MIP33-TW42,20050117
17-Q-43-0105,17MIP34-TW43,20050116
17-Q-44-0105,17MIP35-TW44,20050117
17-Q-45-0105,17MIP36-TW45,20050117
17-Q-46-0105,17MIP37-TW46,20050116
17-Q-53-0105,17MIP44-TW53,20050115
17-Q-54-0105,17MIP45-TW54,20050115
17-Q-54-0105-AVG,17MIP45-TW54,20050115
17-Q-54-0105-D,17MIP45-TW54,20050115
17-Q-55-0105,17MIP46-TW55,20050117
17-Q-56-0105,17MIP47-TW56,20050115
17-Q-56-0105-AVG,17MIP47-TW56,20050115
17-Q-56-0105-D,17MIP47-TW56,20050115
17-Q-58-0105,17MIP49-TW58,20050116
17-Q-59-0105,17MIP50-TW59,20050115
17-Q-60-0105,17MIP51-TW60,20050117
17-Q-61-0105,17MIP52-TW61,20050117
17-Q-62-0105,17MIP53-TW62,20050116
17-Q-63-0105,17MIP54-TW63,20050116
17-Q-64-0105,17MIP55-TW64,20050116
17MW6S,17MW06S,20041116
17PS-01,17-PS-1,20040401
17PS-02,17-PS-2,20040401
17PS-03,17-PS-3,20040401

TABLE 2.4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE WATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Inorganics (ug/L)																	
7429-90-5	ALUMINUM	1400		1400		ug/L	17-W-01-1001	1/1	---	1400	3520	3600	N	NA	FED-AWQC	No	BSL,BKG
7440-36-0	ANTIMONY	5.5		5.5		ug/L	17-W-01-1001	1/1	---	5.5	ND	1.5	N	5.6	FED-AWQC	Yes	ASL
7440-38-2	ARSENIC	4.4		4.4		ug/L	17-W-01-1001	1/1	---	4.4	6.8	0.045	C	0.018	FED-AWQC	No	BKG
7440-39-3	BARIUM	47.3		47.3		ug/L	17-W-01-1001	1/1	---	47.3	46.6	260	N	1000	FED-AWQC	No	BSL
7440-70-2	CALCIUM	167000		167000		ug/L	17-W-01-1001	1/1	---	167000	226000	NA		NA	FED-AWQC	No	N UT
7440-48-4	COBALT	2.9		2.9		ug/L	17-W-01-1001	1/1	---	2.9	NA	73	N	NA	FED-AWQC	No	BSL
7439-89-6	IRON	2740		2740		ug/L	17-W-01-1001	1/1	---	2740	2480	1100	N	300	FED-AWQC	Yes	ASL
7439-95-4	MAGNESIUM	488000		488000		ug/L	17-W-01-1001	1/1	---	488000	610000	NA		NA	FED-AWQC	No	NUT
7439-96-5	MANGANESE	169		169		ug/L	17-W-01-1001	1/1	---	169	106	88	N	50	FED-AWQC	Yes	ASL
7440-09-7	POTASSIUM	143000		143000		ug/L	17-W-01-1001	1/1	---	143000	354000	NA		NA	FED-AWQC	No	NUT
7440-22-4	SILVER	1.3		1.3		ug/L	17-W-01-1001	1/1	---	1.3	ND	18	N	NA	FED-AWQC	No	BSL
7440-23-5	SODIUM	4100000		4100000		ug/L	17-W-01-1001	1/1	---	4100000	4300000	NA		NA	FED-AWQC	No	NUT
7440-62-2	VANADIUM	5.2		5.2		ug/L	17-W-01-1001	1/1	---	5.2	11	3.6	N	NA	FED-AWQC	No	BKG
7440-66-6	ZINC	16.4		16.4		ug/L	17-W-01-1001	1/1	---	16.4	NA	1100	N	7400	FED-AWQC	No	BSL

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 If the maximum inorganic concentration is greater than the concentration at the upgradient location, 23SW/SD08, that inorganic is not selected as a COPC .
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).

Associated Samples:
17-W-01-1001

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BKG = Within background levels
BSL = Below COPC Screening Level/ARAR/TBC
NTX = No Toxicity Information
NUT = Essential Nutrient

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
N = Noncarcinogen
NA = Not Applicable.
FED-AWQC = Nationl Recommended Water Quality Criteria for Priority Toxic Pollutants, Human Health for Consumption of Water and Organisms (USEPA, 2004).

TABLE 2.5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SEDIMENT
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Background Value(4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Volatile Organics (mg/kg)																	
75-15-0	CARBON DISULFIDE	0.019	J	0.019	J	mg/kg	17-D-01-1001	1/1	---	0.019	NA	36	N	NA	NA	No	BSL
Pesticides/PCBs (mg/kg)																	
72-55-9	4,4'-DDE	0.0036	J	0.0036	J	mg/kg	17-D-01-1001	1/1	---	0.0036	NA	1.7	C	NA	NA	No	BSL
1031-07-8	ENDOSULFAN SULFATE	0.0028	J	0.0028	J	mg/kg	17-D-01-1001	1/1	---	0.0028	NA	37	N	NA	NA	No	BSL
76-44-8	HEPTACHLOR	0.0015	J	0.0015	J	mg/kg	17-D-01-1001	1/1	---	0.0015	NA	0.11	C	NA	NA	No	BSL
Inorganics (mg/kg)																	
7429-90-5	ALUMINUM	20900		20900		mg/kg	17-D-01-1001	1/1	---	20900	52800	7600	N	NA	NA	No	BKG
7440-38-2	ARSENIC	9.4		9.4		mg/kg	17-D-01-1001	1/1	---	9.4	36.6	0.39	C	NA	NA	No	BKG
7440-39-3	BARIUM	27.6		27.6		mg/kg	17-D-01-1001	1/1	---	27.6	72.4	540	N	NA	NA	No	BSL,BKG
7440-41-7	BERYLLIUM	1.3		1.3		mg/kg	17-D-01-1001	1/1	---	1.3	3.2	15	N	NA	NA	No	BSL,BKG
7440-70-2	CALCIUM	2410		2410		mg/kg	17-D-01-1001	1/1	---	2410	14760	---		NA	NA	No	NUT, BKG
7440-47-3	CHROMIUM	40.2		40.2		mg/kg	17-D-01-1001	1/1	---	40.2	113.6	210	N	NA	NA	No	BSL,BKG
7440-48-4	COBALT	10.5		10.5		mg/kg	17-D-01-1001	1/1	---	10.5	22.6	140	N	NA	NA	No	BSL,BKG
7440-50-8	COPPER	18.4		18.4		mg/kg	17-D-01-1001	1/1	---	18.4	57.4	310	N	NA	NA	No	BSL,BKG
7439-89-6	IRON	24500		24500		mg/kg	17-D-01-1001	1/1	---	24500	69200	2300	N	NA	NA	No	BKG
7439-92-1	LEAD	35.2		35.2		mg/kg	17-D-01-1001	1/1	---	35.2	53.6	400	N	NA	NA	No	BSL,BKG
7439-95-4	MAGNESIUM	5070		5070		mg/kg	17-D-01-1001	1/1	---	5070	13100	---		NA	NA	No	NUT, BKG
7439-96-5	MANGANESE	256		256		mg/kg	17-D-01-1001	1/1	---	256	704	180	N	NA	NA	No	BKG
7439-97-6	MERCURY	0.39		0.39		mg/kg	17-D-01-1001	1/1	---	0.39	0.28	2.3	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	2480		2480		mg/kg	17-D-01-1001	1/1	---	2480	6960	---		NA	NA	No	NUT
7440-23-5	SODIUM	11500		11500		mg/kg	17-D-01-1001	1/1	---	11500	15200	---	N	NA	NA	No	NUT
7440-62-2	VANADIUM	60.9		60.9		mg/kg	17-D-01-1001	1/1	---	60.9	127.4	7.8		NA	NA	No	BKG
7440-66-6	ZINC	73.4		73.4		mg/kg	17-D-01-1001	1/1	---	73.4	162.2	2300	N	NA	NA	No	BSL,BKG

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 If the maximum inorganic concentration is greater than the concentration at the upgradient location, 23SW/SD08, that inorganic is not selected as a COPC .
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).

Surrogate Chemicals

Endosulfan is used as a surrogate for endosulfan sulfate.
The PRG for chromium represents a 1:6 ratio of Cr VI:Cr III (USEPA Region 9, October 2004).

Associated Sample:

17-D-01-1001

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BKG = Within background levels
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
N = Noncarcinogen
NA = Not Applicable.

TABLE 3.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: SWMU 17

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
METHYLENE CHLORIDE	mg/kg	0.008	0.01	0.014	J	mg/kg	0.014	Maximum	(1)	0.014	Maximum	(1)
TRICHLOROETHENE	mg/kg	0.1	0.3	3.2		mg/kg	3.2	Maximum	Undefined, FOD (2)	3.2	Maximum	Undefined, FOD (2)
CIS-1,2-DICHLOROETHENE	mg/kg	0.007	0.01	0.025		mg/kg	0.025	Maximum	Undefined, FOD	0.025	Maximum	Undefined, FOD
BENZO(A)ANTHRACENE	mg/kg	0.2	0.3	1	J	mg/kg	1	Maximum	Undefined, FOD	1	Maximum	Undefined, FOD
BENZO(A)PYRENE	mg/kg	0.2	0.3	0.74	J	mg/kg	0.74	Maximum	Undefined, FOD	0.74	Maximum	Undefined, FOD
BENZO(B)FLUORANTHENE	mg/kg	0.2	0.3	1.1	J	mg/kg	1.1	Maximum	Undefined, FOD	1.1	Maximum	Undefined, FOD
CARBAZOLE	mg/kg	0.2	0.2	0.45	J	mg/kg	0.45	Maximum	Undefined, FOD	0.45	Maximum	Undefined, FOD
CHRYSENE	mg/kg	0.2	0.3	0.91	J	mg/kg	0.91	Maximum	Undefined, FOD	0.91	Maximum	Undefined, FOD
DIBENZO(A,H)ANTHRACENE	mg/kg	0.2	0.2	0.13	J	mg/kg	0.13	Maximum	Undefined, FOD	0.13	Maximum	Undefined, FOD
AROCLOR-1248	mg/kg	0.04	0.091	0.57		mg/kg	0.57	Maximum	Undefined, FOD	0.57	Maximum	Undefined, FOD
AROCLOR-1254	mg/kg	0.079	0.16	0.87		mg/kg	0.87	Maximum	Undefined, FOD	0.87	Maximum	Undefined, FOD
AROCLOR-1260	mg/kg	0.037	0.07	0.35		mg/kg	0.35	Maximum	Undefined, FOD	0.35	Maximum	Undefined, FOD
ALPHA-BHC	mg/kg	0.001	0.001	0.00067	J	mg/kg	0.00067	Maximum	UCL>Max, FOD	0.00067	Maximum	UCL>Max, FOD
BETA-BHC	mg/kg	0.001	0.001	0.0009	J	mg/kg	0.0009	Maximum	UCL>Max, FOD	0.0009	Maximum	UCL>Max, FOD
GAMMA-BHC (LINDANE)	mg/kg	0.001	0.001	0.00087	J	mg/kg	0.00087	Maximum	Undefined, FOD	0.00087	Maximum	Undefined, FOD
ALUMINUM	mg/kg	11800	14700	31800		mg/kg	15300	H-UCL	ProUCL (3)	15300	H-UCL	ProUCL (3)
ANTIMONY	mg/kg	3.2	6.9	31.4		mg/kg	31.4	Maximum	Undefined, FOD	31.4	Maximum	Undefined, FOD
ARSENIC	mg/kg	3.4	4.5	11.5		mg/kg	5.2	H-UCL	ProUCL (3)	5.2	H-UCL	ProUCL (3)
BARIUM	mg/kg	52.3	72.5	244		mg/kg	69.5	H-UCL	ProUCL (3)	69.5	H-UCL	ProUCL (3)
CADMIUM	mg/kg	1.3	2.6	12.5		mg/kg	12.5	Maximum	Undefined, FOD	12.5	Maximum	Undefined, FOD
CHROMIUM	mg/kg	37.6	72.2	392		mg/kg	50.4	H-UCL	Undefined (3)	50.4	H-UCL	Undefined (3)
COBALT	mg/kg	2.4	3.6	12.8		mg/kg	4.3	H-UCL	ProUCL (3)	4.3	H-UCL	ProUCL (3)
COPPER	mg/kg	176	378	1930		mg/kg	557	H-UCL	Undefined (4)	557	H-UCL	Undefined (4)
LEAD	mg/kg	94	175	670		mg/kg	94	Average	Average (5)	94	Average	Average (5)
MANGANESE	mg/kg	80.5	119	378		mg/kg	114	H-UCL	Undefined (4)	114	H-UCL	Undefined (4)
MERCURY	mg/kg	0.22	0.41	1.8		mg/kg	0.47	H-UCL	Undefined (4)	0.47	H-UCL	Undefined (4)
NICKEL	mg/kg	34.2	66.9	348		mg/kg	83.7	H-UCL	Undefined (4)	83.7	H-UCL	Undefined (4)
ZINC	mg/kg	191	371	1510		mg/kg	531	H-UCL	Undefined (4)	531	H-UCL	Undefined (4)

Footnotes:

1 - UCL is greater than the maximum concentration. Therefore, the maximum concentration is used as the EPC.

2 - Undefined, FOD - Distribution is undefined. Less than 50 percent positive detections. Maximum concentration is used as the EPC.

3 - ProUCL indicates data are log-normally distributed.

4 - Distribution is undefined. Lognormal UCL is recommended as the EPC.

5 - Average concentration is used as the EPC for lead, as recommended in IEUBK Model and Adult Lead Model guidance.

TABLE 3.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SUBSURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: SWMU 17

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
1,1,2,2-TETRACHLOROETHANE	mg/kg	0.009	0.01	0.21		mg/kg	0.21	Maximum	Undefined, FOD (1)	0.21	Maximum	Undefined, FOD (1)
1,1,2-TRICHLOROETHANE	mg/kg	0.01	0.02	0.27	J	mg/kg	0.27	Maximum	Undefined, FOD	0.27	Maximum	Undefined, FOD
1,2-DICHLOROPROPANE	mg/kg	0.007	0.01	0.004	J	mg/kg	0.004	Maximum	(2)	0.004	Maximum	(2)
ACETONE	mg/kg	0.5	0.8	16		mg/kg	0.9	H-UCL	Undefined (3)	0.9	H-UCL	Undefined (3)
BENZENE	mg/kg	0.007	0.01	0.002	J	mg/kg	0.002	Maximum	(2)	0.002	Maximum	(2)
BROMODICHLOROMETHANE	mg/kg	0.008	0.01	0.16	J	mg/kg	0.16	Maximum	Undefined, FOD	0.16	Maximum	Undefined, FOD
CARBON TETRACHLORIDE	mg/kg	0.07	0.2	5.2		mg/kg	5.2	Maximum	Undefined, FOD	5.2	Maximum	Undefined, FOD
CHLOROFORM	mg/kg	0.1	0.3	9.1		mg/kg	9.1	Maximum	Undefined, FOD	9.1	Maximum	Undefined, FOD
CHLOROMETHANE	mg/kg	0.007	0.01	0.088	J	mg/kg	0.088	Maximum	Undefined, FOD	0.088	Maximum	Undefined, FOD
METHYLENE CHLORIDE	mg/kg	0.008	0.01	0.014	J	mg/kg	0.014	Maximum	(2)	0.014	Maximum	(2)
TETRACHLOROETHENE	mg/kg	0.007	0.01	0.056	J	mg/kg	0.056	Maximum	Undefined, FOD	0.056	Maximum	Undefined, FOD
TRICHLOROETHENE	mg/kg	14	32	910		mg/kg	910	Maximum	Undefined, FOD	910	Maximum	Undefined, FOD
VINYL CHLORIDE	mg/kg	0.008	0.01	0.005	J	mg/kg	0.005	Maximum	(2)	0.005	Maximum	(2)
CIS-1,2-DICHLOROETHENE	mg/kg	0.04	0.07	1.3		mg/kg	1.3	Maximum	Undefined, FOD	1.3	Maximum	Undefined, FOD
2,4-DINITROTOLUENE	mg/kg	0.1	0.1	0.51		mg/kg	0.51	Maximum	Undefined, FOD	0.51	Maximum	Undefined, FOD
2,4,6-TRINITROTOLUENE	mg/kg	0.1	0.1	0.35		mg/kg	0.35	Maximum	Undefined, FOD	0.35	Maximum	Undefined, FOD
PENTACHLOROPHENOL	mg/kg	1	2	0.38	J	mg/kg	0.38	Maximum	(2)	0.38	Maximum	(2)
ALUMINUM	mg/kg	21300	23100	52500		mg/kg	23600	H-UCL	ProUCL (4)	23600	H-UCL	ProUCL (4)
ARSENIC	mg/kg	4.7	5.2	13.2		mg/kg	5.2	Student-t	ProUCL (5)	5.2	Student-t	ProUCL (5)
BARIUM	mg/kg	47.5	59.1	359		mg/kg	51.1	H-UCL	Undefined (3)	51.1	H-UCL	Undefined (3)
CADMIUM	mg/kg	0.067	0.085	0.56		mg/kg	0.56	Maximum	Undefined, FOD	0.56	Maximum	Undefined, FOD
CHROMIUM	mg/kg	31.2	33.6	62.7		mg/kg	33.6	Student-t	ProUCL (5)	33.6	Student-t	ProUCL (5)
COBALT	mg/kg	2.7	2.9	5.9		mg/kg	3	H-UCL	ProUCL (4)	3	H-UCL	ProUCL (4)
NICKEL	mg/kg	6.2	6.7	16		mg/kg	6.8	H-UCL	ProUCL (4)	6.8	H-UCL	ProUCL (4)
VANADIUM	mg/kg	35.9	38.6	68.9		mg/kg	39.4	H-UCL	ProUCL (4)	39.4	H-UCL	ProUCL (4)
ZINC	mg/kg	56.9	97.9	1240		mg/kg	39.6	H-UCL	Undefined (3)	39.6	H-UCL	Undefined (3)
CYANIDE	mg/kg	0.71	0.85	5		mg/kg	5	Maximum	Undefined, FOD	5	Maximum	Undefined, FOD

Footnotes:

1 - Undefined, FOD - Distribution is undefined. Less than 50 percent positive detections. Maximum concentration is used as the EPC.
2 - UCL is greater than the maximum concentration. Therefore, the maximum concentration is used as the EPC.
3 - Distribution is undefined. Lognormal UCL is recommended as the EPC.
4 - ProUCL indicates data are log-normally distributed.
5 - ProUCL indicates data are normally distributed.

TABLE 3.3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: SWMU 17

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
1,1,2,2-Tetrachloroethane	ug/L	8	NA	140		ug/L	140	Maximum	(1)	140	Maximum	(1)
1,1,2-Trichloroethane	ug/L	10	NA	93		ug/L	93	Maximum	(1)	93	Maximum	(1)
1,1-Dichloroethene	ug/L	4	NA	11	J	ug/L	11	Maximum	(1)	11	Maximum	(1)
1,2-Dichloroethane	ug/L	4	NA	14		ug/L	14	Maximum	(1)	14	Maximum	(1)
1,2-Dichloropropane	ug/L	3	NA	2	J	ug/L	2	Maximum	(1)	2	Maximum	(1)
Benzene	ug/L	5	NA	35		ug/L	35	Maximum	(1)	35	Maximum	(1)
Bromodichloromethane	ug/L	3	NA	4	J	ug/L	4	Maximum	(1)	4	Maximum	(1)
Carbon Tetrachloride	ug/L	4	NA	68		ug/L	68	Maximum	(1)	68	Maximum	(1)
Chloroform	ug/L	40	NA	770		ug/L	770	Maximum	(1)	770	Maximum	(1)
cis-1,2-Dichloroethene	ug/L	96	NA	2500		ug/L	2500	Maximum	(1)	2500	Maximum	(1)
Dichlorodifluoromethane	ug/L	17	NA	380	J	ug/L	380	Maximum	(1)	380	Maximum	(1)
Methylene Chloride	ug/L	8	NA	19		ug/L	19	Maximum	(1)	19	Maximum	(1)
Naphthalene	ug/L	7	NA	3	J	ug/L	3	Maximum	(1)	3	Maximum	(1)
Tetrachloroethene	ug/L	18	NA	330		ug/L	330	Maximum	(1)	330	Maximum	(1)
Toluene	ug/L	8	NA	98		ug/L	98	Maximum	(1)	98	Maximum	(1)
Total 1,2-Dichloroethene	ug/L	52	NA	1000		ug/L	1000	Maximum	(1)	1000	Maximum	(1)
trans-1,2-Dichloroethene	ug/L	6	NA	25		ug/L	25	Maximum	(1)	25	Maximum	(1)
Trichloroethene	ug/L	8200	NA	130000		ug/L	130000	Maximum	(1)	130000	Maximum	(1)
Vinyl Chloride	ug/L	4	NA	21	J	ug/L	21	Maximum	(1)	21	Maximum	(1)
Bis(2-Ethylhexyl)phthalate	ug/L	6	NA	54		ug/L	54	Maximum	(1)	54	Maximum	(1)
RDX	ug/L	0.3	NA	2.1		ug/L	2.1	Maximum	(1)	2.1	Maximum	(1)
Antimony	ug/L	1.7	NA	5.6		ug/L	5.6	Maximum	(1)	5.6	Maximum	(1)
Arsenic	ug/L	3.7	NA	22.7		ug/L	22.7	Maximum	(1)	22.7	Maximum	(1)
Barium	ug/L	182	NA	1920		ug/L	1920	Maximum	(1)	1920	Maximum	(1)
Beryllium	ug/L	3.9	NA	43.6		ug/L	43.6	Maximum	(1)	43.6	Maximum	(1)
Cobalt	ug/L	79	NA	988		ug/L	988	Maximum	(1)	988	Maximum	(1)
Manganese	ug/L	627	NA	4850		ug/L	4850	Maximum	(1)	4850	Maximum	(1)
Nickel	ug/L	38.6	NA	508		ug/L	508	Maximum	(1)	508	Maximum	(1)
Chloride	ug/L	948000	NA	2800000		ug/L	2800000	Maximum	(1)	2800000	Maximum	(1)
Sulfate	ug/L	108000	NA	320000		ug/L	320000	Maximum	(1)	320000	Maximum	(1)

1 - The maximum detected concentration is selected as the EPC for groundwater (See Section 6.2.3 of text).

TABLE 3.4
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE WATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: SWMU 17

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Antimony	ug/L	5.5	NA	5.5		ug/L	5.5	Maximum	N < 10	5.5	Maximum	N < 10
Iron	ug/L	2740	NA	2740		ug/L	2740	Maximum	N < 10	2740	Maximum	N < 10
Manganese	ug/L	169	NA	169		ug/L	169	Maximum	N < 10	169	Maximum	N < 10

(1) Dataset consists of less than 10 samples. Therefore, the maximum concentration is used as the EPC.

TABLE 3.5
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SEDIMENT
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: SWMU 17

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale

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TABLE 5.1
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
SWMUS 16 & 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal[1]	Absorbed RfD for Dermal[2]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s)
Volatile Organic Compounds										
1,1,2,2-Tetrachloroethane	Chronic	6.0E-02	mg/kg/day	1	6.0E-02	mg/kg/day	Liver	NA	NCEA	4/2005
1,1,2-Trichloroethane	Chronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Blood	1000/1	IRIS	8/2005
1,1-Dichloroethene	Chronic	5.0E-02	mg/kg/day	1	5.0E-02	mg/kg/day	Liver	100/1	IRIS	8/2005
1,2-Dichloroethane	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	NA	NA	NCEA	4/2005
1,2-Dichloropropane	NA	NA	NA	NA	NA	NA	NA	NA	IRIS	8/2005
Acetone	Chronic	9.0E-01	mg/kg/day	1	9.0E-01	mg/kg/day	Kidney	1000/1	IRIS	8/2005
Benzene	Chronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Blood	300/1	IRIS	8/2005
Bromodichloromethane	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Kidney	1000/1	IRIS	8/2005
Carbon Tetrachloride	Chronic	7.0E-04	mg/kg/day	1	7.0E-04	mg/kg/day	Liver	1000/1	IRIS	8/2005
Chloroform	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Liver	1000/1	IRIS	8/2005
Chloromethane	NA	NA	NA	NA	NA	NA	NA	NA	IRIS	8/2005
cis-1,2-Dichloroethene	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Blood	NA	EPA III	4/2005
Dichlorodifluoromethane	Chronic	2.0E-01	mg/kg/day	1	2.0E-01	mg/kg/day	Body Weight	100/1	IRIS	8/2005
Methylene Chloride	Chronic	6.0E-02	mg/kg/day	1	6.0E-02	mg/kg/day	Liver	100/1	IRIS	8/2005
Tetrachloroethene	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Liver	1000/1	IRIS	8/2005
Toluene	Chronic	2.0E-01	mg/kg/day	1	2.0E-01	mg/kg/day	Kidney, Liver	1000/1	IRIS	8/2005
Total-1,2-Dichloroethene	Chronic	9.0E-03	mg/kg/day	1	9.0E-03	mg/kg/day			HEAST	7/1997
trans-1,2-Dichloroethene	Chronic	2.0E-01	mg/kg/day	1	2.0E-01	mg/kg/day	Blood	1000/1	IRIS	8/2005
Trichloroethene	Chronic	5.0E-01	mg/kg/day	1	5.0E-01	mg/kg/day	CNS	NA	CAL EPA	8/2005
Vinyl Chloride	Chronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Liver	30/1	IRIS	8/2005
Semivolatile Organic Compounds										
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Body Weight	3000/1	IRIS	8/2005
Bis(2-ethylhexyl)phthalate	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Liver	1000/1	IRIS	8/2005
Pesticides/PCBs										
Pentachlorophenol	Chronic	3.0E-02	mg/kg/day	1	3.0E-02	mg/kg/day	Liver, Kidney	100/1	IRIS	8/2005
Aroclor-1248	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	Chronic	2.0E-05	mg/kg/day	1	2.0E-05	mg/kg/day	Immunological	300/1	IRIS	8/2005
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-BHC	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA
beta-BHC	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC (LINDANE)	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Liver, Kidney	1000/1	IRIS	8/2005
Energetics										
2,4,6-Trinitrotoluene	Chronic	5.0E-04	mg/kg/day	1	5.0E-04	mg/kg/day	Liver	1000/1	IRIS	8/2005
2,4-Dinitrotoluene	Chronic	2.0E-03	mg/kg/day	1	2.0E-03	mg/kg/day	CNS, Liver	100/1	HEAST	7/1997
RDX	Chronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Prostate	100/1	IRIS	8/2005
Inorganics										
Aluminum	Chronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	CNS	100	NCEA	4/2005
Antimony	Chronic	4.0E-04	mg/kg/day	0.15	6.0E-05	mg/kg/day	Blood	1000/1	IRIS	8/2005
Arsenic	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Skin, CVS	3/1	IRIS	8/2005
Barium	Chronic	7.0E-02	mg/kg/day	0.07	4.9E-03	mg/kg/day	Kidney	3/1	IRIS	8/2005
Beryllium	Chronic	2.0E-03	mg/kg/day	0.007	1.4E-05	mg/kg/day	GS	300/1	IRIS	8/2005
Cadmium[3]	Chronic	5.0E-04	mg/kg/day	0.05	2.5E-05	mg/kg/day	Kidney	10/1	IRIS	8/2005
Chromium VI	Chronic	3.0E-03	mg/kg/day	0.025	7.5E-05	mg/kg/day	Fetotoxicity/GS/Bone	300/3	IRIS	8/2005

TABLE 5.1
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
SWMUS 16 & 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal[1]	Absorbed RfD for Dermal[2]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s)
Cobalt	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	NA	NA	EPA 3	4/2005
Copper	Chronic	4.0E-02	mg/kg/day	1	4.0E-02	mg/kg/day	GS	NA	HEAST	7/1997
Iron	Chronic	3.0E-01	mg/kg/day	1	3.0E-01	mg/kg/day	NA	1	NCEA	4/2005
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Soil)	Chronic	7.0E-02	mg/kg/day	0.04	2.8E-03	mg/kg/day	CNS	1/1	IRIS	8/2005
Manganese (Water)	Chronic	2.4E-02	mg/kg/day	0.04	9.6E-04	mg/kg/day	CNS	3/1	IRIS	8/2005
Mercury[4]	Chronic	3.0E-04	mg/kg/day	0.07	2.1E-05	mg/kg/day	CNS	1000/1	IRIS	8/2005
Nickel	Chronic	2.0E-02	mg/kg/day	0.04	8.0E-04	mg/kg/day	Body Weight	300/1	IRIS	8/2005
Silver	Chronic	5.0E-03	mg/kg/day	1	5.0E-03	mg/kg/day	Skin	3/1	IRIS	8/2005
Vanadium	Chronic	1.0E-03	mg/kg/day	0.026	2.6E-05	mg/kg/day	Kidney	300	NCEA	4/2005
Zinc	Chronic	3.0E-01	mg/kg/day	1	3.0E-01	mg/kg/day	Blood	3/1	IRIS	8/2005
Cyanide	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Weight Loss, Thyroid	100/5	IRIS	8/2005

Notes:
1 - USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
2 - Adjusted dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.
3 - Water value for cadmium is listed.
4 - Values are for mercuric chloride.

Definitions:
CNS = Central Nervous System
CVS = Cardiovascular system
GS = Gastrointestinal System
EPA 3 = USEPA Region 3 RBC Table, April, 2005.
EPA 9 = USEPA Region 9 PRG Table, October 19, 2004.
HEAST= Health Effects Assessment Summary Tables
IRIS = Integrated Risk Information System
NA = Not Applicable
NCEA = USEPA National Center for Environmental Assessment
NOEL = No Observed Effect Level

TABLE 5.2
NON-CANCER TOXICITY DATA – INHALATION
SWMUS 16 & 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD[1]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s)
Volatile Organic Compounds									
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	Chronic	2.0E-01	mg/m^3	5.7E-02	(mg/kg/day)	Liver	30/1	IRIS	8/2005
1,2-Dichloroethane	Chronic	2.5E+00	mg/m^3	7.0E-01	(mg/kg/day)		NA	NCEA	10/19/2004
1,2-Dichloropropane	Chronic	4.0E-03	mg/m^3	1.1E-03	(mg/kg/day)	Nasal	300/1	IRIS	8/2005
Acetone	Chronic	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	Chronic	3.0E-02	mg/m^3	8.6E-03	(mg/kg/day)	Blood	300/1	IRIS	8/2005
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	Chronic	1.8E-01	mg/m^3	5.0E-02	(mg/kg/day)	Liver	NA	NCEA	10/19/2004
Chloroform	Chronic	4.9E-02	mg/m^3	1.4E-02	(mg/kg/day)	Liver	NA	NCEA	10/19/2004
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	Chronic	9.0E-02	mg/m^3	2.6E-02	(mg/kg/day)	Neurological	1000/1	IRIS	8/2005
Dichlorodifluoromethane	Chronic	2.0E-01	mg/m^3	5.7E-02	(mg/kg/day)	Liver	10000	HEAST	8/2005
Methylene Chloride	Chronic	1.1E+00	mg/m^3	3.0E-01	(mg/kg/day)	Liver	NA	EPA 3	4/2005
Tetrachloroethene	Chronic	4.9E-01	mg/m^3	1.4E-01	(mg/kg/day)	Liver	NA	NCEA	10/19/2004
Toluene	Chronic	4.0E-01	mg/m^3	1.1E-01	(mg/kg/day)	CNS	300/1	IRIS	8/2005
Total-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trans-1,2-Dichloroethene	NA	7.0E-02	mg/m^3	2.0E-02	(mg/kg/day)	Blood, Liver	NA	NA	NA
Trichloroethene	Chronic	6.0E-01	mg/m^3	1.7E-01	(mg/kg/day)	CNS	NA	EPA 9	10/2004
Vinyl Chloride	Chronic	1.0E-01	mg/m^3	2.9E-02	(mg/kg/day)	Liver	30/1	IRIS	8/2005
Semivolatile Organic Compounds									
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	Chronic	0.003	mg/m^3	8.6E-04	(mg/kg/day)	Nasal	3000/1	IRIS	8/2005
Pesticides/PCBs									
PCBs	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA
beta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC (LINDANE)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Energetics									
2,4,6-Trinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA
RDX	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 5.2
NON-CANCER TOXICITY DATA – INHALATION
SWMUS 16 & 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD[1]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s)
Metals									
Aluminum	Chronic	3.5E-03	mg/m^3	1.0E-03	(mg/kg/day)	CNS	300	NCEA	10/19/2004
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	Chronic	5.0E-04	mg/m^3	1.4E-04	(mg/kg/day)	Fetus	1000/1	HEAST	7/1997
Beryllium	Chronic	2.0E-05	mg/m^3	5.7E-06	(mg/kg/day)	Lungs	10/1	IRIS	8/2005
Cadmium	Chronic	2.0E-04	mg/m^3	5.7E-05	(mg/kg/day)	Kidney	NA	EPA 3	10/19/2004
Chromium III	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium VI	Chronic	1.0E-04	mg/m^3	2.9E-05	(mg/kg/day)	Lungs	300/1	IRIS	8/2005
Cobalt	Chronic	2.0E-05	mg/m^3	5.7E-06	(mg/kg/day)	NA	NA	EPA 3	10/19/2004
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lithium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	Chronic	5.0E-05	mg/m^3	1.4E-05	(mg/kg/day)	CNS	1000/1	IRIS	8/2005
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

1 - Extrapolated RfD = RfC *$20m^3$/day / 70 kg

Definitions:

NA = Not Applicable

CNS = Central Nervous System

EPA 3 = USEPA Region 3 RBC Table, April, 2005.

EPA 9 = USEPA Region 9 PRG Table, October 19, 2004.

HEAST= *Health Effects Assessment* Summary Tables

IRIS = Integrated Risk Information System

NCEA = USEPA National Center for Environmental Assessment

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
SWMUS 16 & 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal[1]	Absorbed Cancer Slope Factor for Dermal[2]		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds								
1,1,2,2-Tetrachloroethane	2.0E-01	$(mg/kg/day)^{-1}$	1	2.0E-01	$(mg/kg/day)^{-1}$	C	IRIS	8//2005
1,1,2-Trichloroethane	5.7E-02	$(mg/kg/day)^{-1}$	1	5.7E-02	$(mg/kg/day)^{-1}$	C	IRIS	8//2005
1,1-Dichloroethene	NA	NA	NA	NA	NA	C	IRIS	8//2005
1,2-Dichloroethane	9.1E-02	$(mg/kg/day)^{-1}$	1	9.1E-02	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
1,2-Dichloropropane	6.8E-02	$(mg/kg/day)^{-1}$	1	6.8E-02	$(mg/kg/day)^{-1}$	NA	HEAST	7/1997
Acetone	NA	NA	NA	NA	NA	D	IRIS	8//2005
Benzene	5.5E-02	$(mg/kg/day)^{-1}$	1	5.5E-02	$(mg/kg/day)^{-1}$	A	IRIS	8//2005
Bromodichloromethane	6.2E-02	$(mg/kg/day)^{-1}$	1	6.2E-02	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
Carbon Tetrachloride	1.3E-01	$(mg/kg/day)^{-1}$	1	1.3E-01	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
Chloroform	NA	NA	NA	NA	NA	B2	IRIS	8//2005
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	D	IRIS	8//2005
Chloromethane	NA	NA	NA	NA	NA	NA	IRIS	8//2005
Dichlorodifluoromethane	NA	NA	NA	NA	NA	D	IRIS	8//2005
Methylene Chloride	7.5E-03	$(mg/kg/day)^{-1}$	1	7.5E-03	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
Tetrachloroethene	5.4E-01	$(mg/kg/day)^{-1}$	1	5.4E-01	$(mg/kg/day)^{-1}$	NA	EPA 3	10/19/2004
Toluene	NA	NA	NA	NA	NA	D	IRIS	8//2005
Total-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA
Trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	1.3E-02	$(mg/kg/day)^{-1}$	1	1.3E-02	$(mg/kg/day)^{-1}$	C	EPA 9	10/2004
Vinyl Chloride (child)	1.5E+00	$(mg/kg/day)^{-1}$	1	1.5E+00	$(mg/kg/day)^{-1}$	A	IRIS	8//2005
Vinyl Chloride (adult)	7.2E-01	$(mg/kg/day)^{-1}$	1	7.2E-01	$(mg/kg/day)^{-1}$	A	IRIS	8//2005
Semivolatile Organic Compounds								
Benzo(a)anthracene	7.3E-01	$(mg/kg/day)^{-1}$	1	7.3E-01	$(mg/kg/day)^{-1}$	B2	EPA(1)	7/1993
Benzo(a)pyrene	7.3E+00	$(mg/kg/day)^{-1}$	1	7.3E+00	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
Benzo(b)fluoranthene	7.3E-01	$(mg/kg/day)^{-1}$	1	7.3E-01	$(mg/kg/day)^{-1}$	B2	EPA(1)	7/1993
Carbazole	2.0E-02	$(mg/kg/day)^{-1}$	1	2.0E-02	$(mg/kg/day)^{-1}$	NA	HEAST	7/1997
Chrysene	7.3E-03	$(mg/kg/day)^{-1}$	1	7.3E-03	$(mg/kg/day)^{-1}$	B2	EPA(1)	7/1993
Dibenzo(a,h)anthracene	7.3E+00	$(mg/kg/day)^{-1}$	1	7.3E+00	$(mg/kg/day)^{-1}$	B2	EPA(1)	7/1993
Naphthalene	NA	NA	NA	NA	NA	C	IRIS	8//2005
Bis(2-ethylhexyl)phthalate	1.4E-02	$(mg/kg/day)^{-1}$	1	1.4E-02	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
Pesticides/PCBs								
PCBs	2.0E+00	$(mg/kg/day)^{-1}$	1	2.0E+00	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
Pentachlorophenol	1.2E-01	$(mg/kg/day)^{-1}$	1	1.2E-01	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
alpha-BHC	6.3E+00	$(mg/kg/day)^{-1}$	1	6.3E+00	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
beta-BHC	1.8E+00	$(mg/kg/day)^{-1}$	1	1.8E+00	$(mg/kg/day)^{-1}$	C	IRIS	8//2005
gamma-BHC (LINDANE)	1.3E+00	$(mg/kg/day)^{-1}$	1	1.3E+00	$(mg/kg/day)^{-1}$	NA	HEAST	7/1997

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
SWMUS 16 & 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal[1]	Absorbed Cancer Slope Factor for Dermal[2]		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s)
Energetics								
2,4,6-Trinitrotoluene	3.0E-02	$(mg/kg/day)^{-1}$	1	3.0E-02	$(mg/kg/day)^{-1}$	C	IRIS	8//2005
2,4-Drinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA
RDX	1.1E-01	$(mg/kg/day)^{-1}$	1	1.1E-01	$(mg/kg/day)^{-1}$	C	IRIS	8//2005
Metals								
Arsenic	1.5E+00	$(mg/kg/day)^{-1}$	1	1.5E+00	$(mg/kg/day)^{-1}$	A	IRIS	8//2005

Notes:

1 - USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

2 - Adjusted cancer slope factor for dermal = Oral cancer slope factor x Oral Absorption Efficiency for Dermal.

EPA Group:

A - Human carcinogen.

B1 - Probable human carcinogen - indicates that limited human data are available.

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans .

C - Possible human carcinogen.

D - Not classifiable as a human carcinogen.

E - Evidence of noncarcinogenicity.

Definitions:

IRIS = Integrated Risk Information System.

HEAST= Health Effects Assessment Summary Tables.

EPA 3 = USEPA Region 3 RBC Table, April, 2005.

EPA 9 = USEPA Region 9 PRG Table, October 19, 2004.

EPA(1) = USEPA, PCBs: Cancer Dose-Response Assessment and Applications to Environmental Mixtures, September 1996, EPA/600/P-96/001F.

NA = Not Available.

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
SWMUS 16 & 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor[1]		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds							
1,1,2,2-Tetrachloroethane	5.8E-02	$(mg/m^3)^{-1}$	2.0E-01	$(mg/kg/day)^{-1}$	C	IRIS	8//2005
1,1,2-Trichloroethane	1.6E-02	$(mg/m^3)^{-1}$	5.6E-02	$(mg/kg/day)^{-1}$	C	IRIS	8//2005
1,1-Dichloroethene	NA	NA	NA	NA	C	IRIS	8//2005
1,2-Dichloroethane	2.6E-02	$(mg/m^3)^{-1}$	9.1E-02	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
1,2-Dichloropropane	1.9E-05	$(mg/m^3)^{-1}$	6.8E-02	$(mg/kg/day)^{-1}$	NA	HEAST, EPA 9	10/2004
Acetone	NA	NA	NA	NA	NA	NA	NA
Benzene	7.8E-03	$(mg/m^3)^{-1}$	2.7E-02	$(mg/kg/day)^{-1}$	A	IRIS	8//2005
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	1.5E-02	$(mg/m^3)^{-1}$	5.3E-02	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
Chloroform	2.3E-02	$(mg/m^3)^{-1}$	8.1E-02	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
cis-1,2-Dichloroethene	NA	NA	NA	NA	D	IRIS	8//2005
Chloromethane	NA	NA	NA	NA	NA	IRIS	8//2005
Dichlorodifluoromethane	NA	NA	NA	NA	NA	IRIS	8//2005
Methylene Chloride	4.7E-04	$(mg/m^3)^{-1}$	1.6E-03	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
Tetrachloroethene	5.7E-03	$(mg/m^3)^{-1}$	2.0E-02	$(mg/kg/day)^{-1}$	NA	EPA 3	10/19/2004
Toluene	NA	NA	NA	NA	D	IRIS	8//2005
Total-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA
Trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	2.0E-03	$(mg/m^3)^{-1}$	7.0E-03	$(mg/kg/day)^{-1}$	C	EPA 9	10/2004
Vinyl Chloride (child)	8.8E-03	$(mg/m^3)^{-1}$	3.0E-02	$(mg/kg/day)^{-1}$	A	IRIS	8//2005
Vinyl Chloride (adult)	4.4E-03	$(mg/m^3)^{-1}$	1.5E-02	$(mg/kg/day)^{-1}$	A	IRIS	8//2005
Semivolatile Organic Compounds							
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	8.9E-01	$(mg/m^3)^{-1}$	3.1E+00	$(mg/kg/day)^{-1}$	B2	NCEA	10/19/2004
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	4.0E-03	$(mg/m^3)^{-1}$	1.4E-02	$(mg/kg/day)^{-1}$	B2	NCEA	10/19/2004
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	C	IRIS	8//2005
Pesticides/PCBs							
PCBs	5.7E-01	$(mg/m^3)^{-1}$	2.0E+00	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA
alpha-BHC	1.8E+00	$(mg/m^3)^{-1}$	6.3E+00	$(mg/kg/day)^{-1}$	B2	IRIS	8//2005
beta-BHC	5.1E-01	$(mg/m^3)^{-1}$	1.8E+00	$(mg/kg/day)^{-1}$	C	IRIS	8//2005

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
SWMUS 16 & 17
NWS CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor[1]		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
gamma-BHC (LINDANE)	NA	NA	NA	NA	NA	NA	NA
Energetics							
2,4,6-Trinitrotoluene	NA	NA	NA	NA	NA	NA	NA
2,4-Drinitrotoluene	NA	NA	NA	NA	NA	NA	NA
RDX	NA	NA	NA	NA	NA	NA	NA
Metals							
Arsenic	4.3E+00	$(mg/m^3)^{-1}$	1.5E+01	$(mg/kg/day)^{-1}$	A	IRIS	8//2005
Beryllium	2.4E+00	$(mg/m^3)^{-1}$	8.4E+00	$(mg/kg/day)^{-1}$	B1	IRIS	8//2005
Cadmium	1.8E+00	$(mg/m^3)^{-1}$	6.3E+00	$(mg/kg/day)^{-1}$	B1	IRIS	8//2005
Chromium VI	1.2E+01	$(mg/m^3)^{-1}$	4.2E+01	$(mg/kg/day)^{-1}$	A	IRIS	8//2005
Cobalt	2.8E+00	$(mg/m^3)^{-1}$	9.8E+00	$(mg/kg/day)^{-1}$	NA	EPA 3	10/19/2004

Notes:
1 - Inhalation CSF = Unit Risk * 70 kg / 20m^3/day.

Definitions:
IRIS = Integrated Risk Information System.
HEAST= Health Effects Assessment Summary Tables.
EPA 3 = USEPA Region 3 RBC Table, April, 2005.
EPA 9 = USEPA Region 9 PRG Table, October 19, 2004.
NCEA = USEPA National Center for Environmental Assessment

EPA Group:
A - Human carcinogen.
B1 - Probable human carcinogen - indicates that limited human data are available.
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans .
C - Possible human carcinogen.
D - Not classifiable as a human carcinogen.
E - Evidence of noncarcinogenicity.

TABLE 4.1
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	330	USEPA, December 2002	330	USEPA, December 2002	Csoil x IR x Fi x EF x ED x CF / BW x AT
	Fi	Fraction Ingested	unitless	1	USEPA Region 4, May 2000	1	USEPA, May 1993	
	EF	Exposure Frequency	days/year	30	Professional Judgement	30	Professional Judgement	U.S. EPA, December 1989
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	Csoil x CF x SA x AF x ABS x EF x ED / BW x AT
	SA	Skin Surface Area	cm^2/day	3,300	USEPA, July 2004	3,300	USEPA, July 2004	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.3	USEPA, July 2004	0.1	USEPA, July 2004	U.S. EPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA, July 2004	chemical specific	USEPA, July 2004	
	EF	Exposure Frequency	days/year	30	USEPA Region 4, May 2000	30	USEPA, May 1993	
	ED	Exposure Duration	years	1	USEPA Region 4, May 2000	1	USEPA, May 1993	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	

1 CDI = Chronic Daily Intake

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 5.54E-09
Noncancer Ingestion Intake - RME = 3.87E-07

Cancer Ingestion Intake - CTE = 5.54E-09
Noncancer Ingestion Intake - CTE = 3.87E-07

Cancer Dermal Intake - RME = 1.66E-08
Noncancer Dermal Intake - RME = 1.16E-06

Cancer Dermal Intake - CTE = 5.54E-09
Noncancer Dermal Intake - CTE = 3.87E-07

TABLE 7.1 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	5.4E-09	mg/kg-day	6.0E-02	mg/kg-day	NA	NA	9.0E-08
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M	1.2E-06	mg/kg-day	5.0E-01	mg/kg-day	NA	NA	2.5E-06
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	9.7E-09	mg/kg-day	1.0E-02	mg/kg-day	NA	NA	9.7E-07
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	3.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	2.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	4.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	1.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	3.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	5.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	2.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	3.4E-07	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	1.7E-02
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	1.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	ALPHA-BHC	8.70E-04	mg/kg	8.70E-04	mg/kg	M	2.6E-10	mg/kg-day		mg/kg-day	NA	NA	
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	3.5E-10	mg/kg-day		mg/kg-day	NA	NA	
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	3.4E-10	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.1E-06
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M	5.9E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.9E-03
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M	1.2E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	3.0E-02
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.0E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.7E-03
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M	2.7E-05	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.3E-04
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	4.8E-06	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	9.7E-03
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M	2.0E-05	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	6.5E-03
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M	1.7E-08	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	8.3E-05
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M	2.2E-04	mg/kg-day	4.0E-02	mg/kg-day	NA	NA	5.4E-03
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M	3.8E-05	mg/kg-day		mg/kg-day	NA	NA	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M	4.4E-05	mg/kg-day	7.0E-02	mg/kg-day	NA	NA	6.3E-04
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M	1.8E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.1E-04
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M	3.2E-05	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	1.6E-03
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M	2.1E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	6.9E-04
	(total)												8.5E-02

TABLE 7.1 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	6.0E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M		mg/kg-day	5.0E-01	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M		mg/kg-day	1.0E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	1.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	1.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	1.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	6.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	1.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	2.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	9.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	1.4E-07	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	7.1E-03
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	5.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	7.8E-11	mg/kg-day		mg/kg-day	NA	NA	
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	1.0E-10	mg/kg-day		mg/kg-day	NA	NA	
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	4.0E-11	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.3E-07
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M		mg/kg-day	6.0E-05	mg/kg-day	NA	NA	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	1.8E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.0E-04
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M		mg/kg-day	1.4E-02	mg/kg-day	NA	NA	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	1.5E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	5.8E-04
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M		mg/kg-day	7.5E-05	mg/kg-day	NA	NA	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M		mg/kg-day	2.0E-02	mg/kg-day	NA	NA	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M		mg/kg-day	4.0E-02	mg/kg-day	NA	NA	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M		mg/kg-day	2.8E-03	mg/kg-day	NA	NA	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M		mg/kg-day	2.1E-05	mg/kg-day	NA	NA	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M		mg/kg-day	8.0E-04	mg/kg-day	NA	NA	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	(total)												8.3E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**9.4E-02**

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13
PCBs - 0.14
gamma-BHC - 0.04
Other Pesticides - 0.1
Arsenic - 0.03
Cadmium - 0.001
Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 8.1 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Conatruction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	7.7E-11	mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	5.8E-13
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M	1.8E-08	mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	2.3E-10
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	1.4E-10	mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	5.5E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	4.0E-09
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	4.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	3.0E-08
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	6.1E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	4.4E-09
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	2.5E-09	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	5.0E-11
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	5.0E-09	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	3.7E-11
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	7.2E-10	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	5.3E-09
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	3.2E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	6.3E-09
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	4.8E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	9.6E-09
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	1.9E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	3.9E-09
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	3.7E-12	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	2.3E-11
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	5.0E-12	mg/kg-day	1.8E+00	(mg/kg-day)$^{-1}$	9.0E-12
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	4.8E-12	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	6.3E-12
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M	8.5E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M	1.7E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.9E-08	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	4.3E-08
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M	3.8E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	6.9E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M	2.8E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M	2.4E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M	3.1E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M	5.2E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M	6.3E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M	2.6E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M	4.6E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M	2.9E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										1.1E-07

TABLE 8.1 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M		mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	2.2E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	1.6E-09
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	1.6E-09	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	1.2E-08
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	2.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	1.7E-09
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	9.7E-10	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	1.9E-11
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	2.0E-09	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	1.4E-11
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	2.8E-10	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	2.0E-09
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	1.3E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	2.7E-09
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	2.0E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	4.0E-09
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	8.1E-10	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	1.6E-09
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	1.1E-12	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	7.0E-12
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	1.5E-12	mg/kg-day	1.8E+00	(mg/kg-day)$^{-1}$	2.7E-12
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	5.8E-13	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	7.5E-13
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.6E-09	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	3.9E-09
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	2.1E-10	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										2.9E-08
										Total Risk Across All Exposure Routes/Pathways	1.4E-07

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13
PCBs - 0.14
gamma-BHC - 0.04
Other Pesticides - 0.1

Arsenic - 0.03
Cadmium - 0.001
Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 7.1a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	5.4E-09	mg/kg-day	6.0E-02	mg/kg-day	NA	NA	9.0E-08
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M	1.2E-06	mg/kg-day	6.0E-01	mg/kg-day	NA	NA	2.5E-06
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	9.7E-09	mg/kg-day	1.0E-02	mg/kg-day	NA	NA	9.7E-07
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	3.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	2.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	4.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	1.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	3.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	5.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	2.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	3.4E-07	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	1.7E-02
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	1.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	2.6E-10	mg/kg-day		mg/kg-day	NA	NA	
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	3.5E-10	mg/kg-day		mg/kg-day	NA	NA	
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	3.4E-10	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.1E-06
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M	5.9E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.9E-03
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M	1.2E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	3.0E-02
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.0E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.7E-03
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M	2.7E-05	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.3E-04
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	4.8E-06	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	9.7E-03
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M	2.0E-05	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	6.5E-03
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M	1.7E-06	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	8.3E-05
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M	2.2E-04	mg/kg-day	4.0E-02	mg/kg-day	NA	NA	5.4E-03
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M	3.6E-05	mg/kg-day		mg/kg-day	NA	NA	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M	4.4E-05	mg/kg-day	7.0E-02	mg/kg-day	NA	NA	6.3E-04
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M	1.8E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.1E-04
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M	3.2E-05	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	1.6E-03
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M	2.1E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	6.9E-04
	(total)												8.5E-02

TABLE 7.1a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	6.0E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M		mg/kg-day	5.0E-01	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M		mg/kg-day	1.0E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	5.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	3.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	5.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	2.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	4.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	6.5E-09	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	3.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	4.7E-08	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	2.4E-03
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	1.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	2.6E-11	mg/kg-day		mg/kg-day	NA	NA	
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	3.5E-11	mg/kg-day		mg/kg-day	NA	NA	
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	1.3E-11	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.5E-08
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M		mg/kg-day	6.0E-05	mg/kg-day	NA	NA	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	6.0E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.0E-04
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M		mg/kg-day	1.4E-02	mg/kg-day	NA	NA	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	4.8E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.9E-04
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M		mg/kg-day	7.5E-05	mg/kg-day	NA	NA	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M		mg/kg-day	2.0E-02	mg/kg-day	NA	NA	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M		mg/kg-day	4.0E-02	mg/kg-day	NA	NA	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M		mg/kg-day	2.8E-03	mg/kg-day	NA	NA	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M		mg/kg-day	2.1E-05	mg/kg-day	NA	NA	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M		mg/kg-day	8.0E-04	mg/kg-day	NA	NA	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	(total)												2.8E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**8.8E-02**

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13
PCBs - 0.14
gamma-BHC - 0.04
Other Pesticides - 0.1

Arsenic - 0.03
Cadmium - 0.001
Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 8.1a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	7.7E-11	mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	5.8E-13
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M	1.8E-08	mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	2.3E-10
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	1.4E-10	mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	5.5E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	4.0E-09
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	4.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	3.0E-08
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	6.1E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	4.4E-09
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	2.5E-09	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	5.0E-11
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	5.0E-09	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	3.7E-11
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	7.2E-10	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	5.3E-09
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	3.2E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	6.3E-09
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	4.8E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	9.6E-09
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	1.9E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	3.9E-09
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	3.7E-12	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	2.3E-11
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	5.0E-12	mg/kg-day	1.8E+00	(mg/kg-day)$^{-1}$	9.0E-12
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	4.8E-12	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	6.3E-12
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M	8.5E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M	1.7E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.9E-08	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	4.3E-08
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M	3.8E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	6.9E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M	2.8E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M	2.4E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M	3.1E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M	5.2E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M	6.3E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M	2.6E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M	4.6E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M	2.9E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										1.1E-07

TABLE 8.1a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M		mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	7.2E-10	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	5.3E-10
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	5.3E-10	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	3.9E-09
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	7.9E-10	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	5.8E-10
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	3.2E-10	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	6.5E-12
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	6.5E-10	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	4.8E-12
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	9.4E-11	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	6.8E-10
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	4.4E-10	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	8.8E-10
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	6.7E-10	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	1.3E-09
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	2.7E-10	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	5.4E-10
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	3.7E-13	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	2.3E-12
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	5.0E-13	mg/kg-day	1.8E+00	(mg/kg-day)$^{-1}$	9.0E-13
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	1.9E-13	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	2.5E-13
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	8.6E-10	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	1.3E-09
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	6.9E-11	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										9.8E-09
										Total Risk Across All Exposure Routes/Pathways	1.2E-07

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13
PCBs - 0.14
gamma-BHC - 0.04
Other Pesticides - 0.1

Arsenic - 0.03
Cadmium - 0.001
Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 4.2
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF OCCUPATIONAL WORKERS TO SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Occupational Workers
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA Region 4, May 2000	50	USEPA, May 1993	Csoil x IR x FI x EF x ED x CF
	FI	Fraction Ingested	unitless	1	USEPA Region 4, May 2000	1	USEPA, May 1993	BW x AT
	EF	Exposure Frequency	days/year	250	USEPA Region 4, May 2000	219	USEPA, May 1993	U.S. EPA, December 1989
	ED	Exposure Duration	years	25	USEPA Region 4, May 2000	9	USEPA, May 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA, December 1989	3,285	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,300	USEPA, July 2004	3,300	USEPA, July 2004	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA, July 2004	0.02	USEPA, July 2004	U.S. EPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA, July 2004	chemical specific	USEPA, July 2004	
	EF	Exposure Frequency	days/year	250	USEPA Region 4, May 2000	219	USEPA, May 1993	
	ED	Exposure Duration	years	25	USEPA Region 4, May 2000	9	USEPA, May 1993	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA, December 1989	3,285	USEPA, December 1989	

1 CDI = Chronic Daily Intake

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 3.49E-07
Noncancer Ingestion Intake - RME = 9.78E-07

Cancer Ingestion Intake - CTE = 5.51E-08
Noncancer Ingestion Intake - CTE = 4.29E-07

Cancer Dermal Intake - RME = 2.31E-06
Noncancer Dermal Intake - RME = 6.46E-06

Cancer Dermal Intake - CTE = 7.27E-08
Noncancer Dermal Intake - CTE = 5.66E-07

TABLE 7.2 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Occupational Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	1.4E-08	mg/kg-day	6.0E-02	mg/kg-day	NA	NA	2.3E-07
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M	3.1E-06	mg/kg-day	5.0E-01	mg/kg-day	NA	NA	6.3E-06
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	2.4E-08	mg/kg-day	1.0E-02	mg/kg-day	NA	NA	2.4E-06
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	9.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	7.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	1.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	4.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	8.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	5.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	8.5E-07	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	4.3E-02
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	3.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	6.6E-10	mg/kg-day		mg/kg-day	NA	NA	
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	8.8E-10	mg/kg-day		mg/kg-day	NA	NA	
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	8.5E-10	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.8E-06
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M	1.5E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.5E-02
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M	3.1E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	7.7E-02
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	5.1E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.7E-02
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M	6.8E-05	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.4E-04
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	1.2E-05	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	2.4E-02
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M	4.9E-05	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	1.6E-02
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M	4.2E-06	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	2.1E-04
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M	5.5E-04	mg/kg-day	4.0E-02	mg/kg-day	NA	NA	1.4E-02
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M	9.2E-05	mg/kg-day		mg/kg-day	NA	NA	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M	1.1E-04	mg/kg-day	7.0E-02	mg/kg-day	NA	NA	1.6E-03
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M	4.6E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.5E-03
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M	8.2E-05	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	4.1E-03
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M	5.2E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.7E-03
	(total)												2.2E-01

TABLE 7.2 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Occupational Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	6.0E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M		mg/kg-day	5.0E-01	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M		mg/kg-day	1.0E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	8.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	6.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	9.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	3.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	7.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	1.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	5.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	7.9E-07	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	3.9E-02
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	3.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	4.3E-10	mg/kg-day		mg/kg-day	NA	NA	
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	5.8E-10	mg/kg-day		mg/kg-day	NA	NA	
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	2.2E-10	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	7.5E-07
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M		mg/kg-day	5.0E-05	mg/kg-day	NA	NA	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.4E-03
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M		mg/kg-day	1.4E-02	mg/kg-day	NA	NA	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	8.1E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	3.2E-03
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M		mg/kg-day	7.5E-05	mg/kg-day	NA	NA	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M		mg/kg-day	2.0E-02	mg/kg-day	NA	NA	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M		mg/kg-day	4.0E-02	mg/kg-day	NA	NA	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M		mg/kg-day	2.8E-03	mg/kg-day	NA	NA	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M		mg/kg-day	2.1E-05	mg/kg-day	NA	NA	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M		mg/kg-day	8.0E-04	mg/kg-day	NA	NA	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	(total)												4.6E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**2.6E-01**

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13
PCBs - 0.14
gamma-BHC - 0.04
Other Pesticides - 0.1

Arsenic - 0.03
Cadmium - 0.001
Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 8.2 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Occupational Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	4.9E-09	mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	3.7E-11
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M	1.1E-06	mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	1.5E-08
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	8.7E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	3.5E-07	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	2.6E-07
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	2.6E-07	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	1.9E-06
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	3.8E-07	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	2.8E-07
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	1.6E-07	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	3.1E-09
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	3.2E-07	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	2.3E-09
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	4.5E-08	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	3.3E-07
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	2.0E-07	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	4.0E-07
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	3.0E-07	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	6.1E-07
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	1.2E-07	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	2.4E-07
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	2.3E-10	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	1.5E-09
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	3.1E-10	mg/kg-day	1.8E+00	(mg/kg-day)$^{-1}$	5.7E-10
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	3.0E-10	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	4.0E-10
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M	5.3E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M	1.1E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	1.8E-06	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	2.7E-06
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M	2.4E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	4.4E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M	1.8E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M	1.5E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M	1.9E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M	3.3E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M	4.0E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M	1.6E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M	2.9E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M	1.9E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										6.8E-06

TABLE 8.2 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Occupational Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M		mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	3.0E-07	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	2.2E-07
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	2.2E-07	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	1.6E-06
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	3.3E-07	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	2.4E-07
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	1.3E-07	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	2.7E-09
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	2.7E-07	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	2.0E-09
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	3.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	2.8E-07
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	1.8E-07	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	3.7E-07
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	2.8E-07	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	5.6E-07
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	1.1E-07	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	2.3E-07
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	1.5E-10	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	9.7E-10
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	2.1E-10	mg/kg-day	1.8E+00	(mg/kg-day)$^{-1}$	3.7E-10
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	8.0E-11	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	1.0E-10
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	3.6E-07	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	5.4E-07
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	2.9E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										4.1E-06
										Total Risk Across All Exposure Routes/Pathways	1.1E-05

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13
PCBs - 0.14
gamma-BHC - 0.04
Other Pesticides - 0.1

Arsenic - 0.03
Cadmium - 0.001
Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 7.2a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Occupational Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	6.0E-09	mg/kg-day	6.0E-02	mg/kg-day	NA	NA	1.0E-07
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M	1.4E-06	mg/kg-day	5.0E-01	mg/kg-day	NA	NA	2.7E-06
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	1.1E-08	mg/kg-day	1.0E-02	mg/kg-day	NA	NA	1.1E-06
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	4.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	3.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	4.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	1.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	3.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	5.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	2.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	3.7E-07	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	1.9E-02
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	1.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	2.9E-10	mg/kg-day		mg/kg-day	NA	NA	
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	3.9E-10	mg/kg-day		mg/kg-day	NA	NA	
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	3.7E-10	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.2E-06
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M	6.6E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.6E-03
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M	1.3E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	3.4E-02
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.2E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	7.4E-03
	BARIUM	8.95E+01	mg/kg	8.95E+01	mg/kg	M	3.0E-05	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.5E-04
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	5.4E-06	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	1.1E-02
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M	2.2E-05	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	7.2E-03
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M	1.8E-06	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	9.2E-05
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M	2.4E-04	mg/kg-day	4.0E-02	mg/kg-day	NA	NA	6.0E-03
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M	4.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M	4.9E-05	mg/kg-day	7.0E-02	mg/kg-day	NA	NA	7.0E-04
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M	2.0E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.7E-04
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M	3.6E-05	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	1.8E-03
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M	2.3E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	7.6E-04
	(total)												9.4E-02

TABLE 7.2a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Occupational Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	6.0E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M		mg/kg-day	5.0E-01	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M		mg/kg-day	1.0E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	7.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	5.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	8.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	3.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	6.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	9.6E-09	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	4.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	6.9E-08	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	3.4E-03
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	2.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	3.8E-11	mg/kg-day		mg/kg-day	NA	NA	
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	5.1E-11	mg/kg-day		mg/kg-day	NA	NA	
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	2.0E-11	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.6E-08
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M		mg/kg-day	6.0E-05	mg/kg-day	NA	NA	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	8.8E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.9E-04
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M		mg/kg-day	1.4E-02	mg/kg-day	NA	NA	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	7.1E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.8E-04
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M		mg/kg-day	7.5E-05	mg/kg-day	NA	NA	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M		mg/kg-day	2.0E-02	mg/kg-day	NA	NA	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M		mg/kg-day	4.0E-02	mg/kg-day	NA	NA	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M		mg/kg-day	2.8E-03	mg/kg-day	NA	NA	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M		mg/kg-day	2.1E-05	mg/kg-day	NA	NA	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M		mg/kg-day	8.0E-04	mg/kg-day	NA	NA	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	(total)												4.0E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**9.8E-02**

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13
PCBs - 0.14
gamma-BHC - 0.04
Other Pesticides - 0.1
Arsenic - 0.03
Cadmium - 0.001
Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 8.2a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Occupational Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	7.7E-10	mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	5.8E-12
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M	1.8E-07	mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	2.3E-09
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	1.4E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	5.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	4.0E-08
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	4.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	3.0E-07
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	6.1E-08	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	4.4E-08
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	2.5E-08	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	5.0E-10
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	5.0E-08	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	3.7E-10
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	7.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	5.2E-08
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	3.1E-08	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	6.3E-08
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	4.8E-08	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	9.6E-08
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	1.9E-08	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	3.9E-08
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	3.7E-11	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	2.3E-10
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	5.0E-11	mg/kg-day	1.8E+00	(mg/kg-day)$^{-1}$	8.9E-11
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	4.8E-11	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	6.2E-11
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M	8.4E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M	1.7E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.9E-07	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	4.3E-07
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M	3.8E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	6.9E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M	2.8E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M	2.4E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M	3.1E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M	5.2E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M	6.3E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M	2.6E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M	4.6E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M	2.9E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										1.1E-06

TABLE 8.2a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Occupational Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M		mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	9.5E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	6.9E-09
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	7.0E-09	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	5.1E-08
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	1.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	7.6E-09
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	4.3E-09	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	8.5E-11
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	8.6E-09	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	6.3E-11
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	1.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	9.0E-09
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	5.8E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	1.2E-08
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	8.9E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	1.8E-08
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	3.6E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	7.1E-09
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	4.9E-12	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	3.1E-11
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	6.5E-12	mg/kg-day	1.8E+00	(mg/kg-day)$^{-1}$	1.2E-11
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	2.5E-12	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	3.3E-12
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	1.1E-08	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	1.7E-08
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	9.1E-10	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										1.3E-07
										Total Risk Across All Exposure Routes/Pathways	**1.2E-06**

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13
PCBs - 0.14
gamma-BHC - 0.04
Other Pesticides - 0.1

Arsenic - 0.03
Cadmium - 0.001
Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 4.3
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF ADOLESCENT TRESPASSERS TO SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA Region 4, May 2000	50	USEPA, May 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	unitless	1	USEPA Region 4, May 2000	1	USEPA, May 1993	BW x AT
	EF	Exposure Frequency	days/year	30	Professional Judgment	30	Professional Judgment	U.S. EPA, December 1989
	ED	Exposure Duration	years	10	USEPA Region 4, May 2000	5	Professional Judgment	
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	
	BW	Body Weight	kg	45	USEPA Region 4, May 2000	45	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,650	USEPA, December 1989	1,825	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,280	USEPA, August 1997	3,280	USEPA, August 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA, July 2004	0.04	USEPA, July 2004	U.S. EPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA, July 2004	chemical specific	USEPA, July 2004	
	EF	Exposure Frequency	days/year	30	Professional Judgment	30	Professional Judgment	
	ED	Exposure Duration	years	10	USEPA Region 4, May 2000	5	Professional Judgment	
	BW	Body Weight	kg	45	USEPA Region 4, May 2000	45	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,650	USEPA, December 1989	1,825	USEPA, December 1989	

1 CDI = Chronic Daily Intake

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 2.61E-08
Noncancer Ingestion Intake - RME = 1.83E-07

Cancer Ingestion Intake - CTE = 6.52E-09
Noncancer Ingestion Intake - CTE = 9.13E-08

Cancer Dermal Intake - RME = 1.71E-07
Noncancer Dermal Intake - RME = 1.20E-06

Cancer Dermal Intake - CTE = 1.71E-08
Noncancer Dermal Intake - CTE = 2.40E-07

TABLE 7.3 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	2.6E-09	mg/kg-day	6.0E-02	mg/kg-day	NA	NA	4.3E-08
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M	5.8E-07	mg/kg-day	5.0E-01	mg/kg-day	NA	NA	1.2E-06
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	4.6E-09	mg/kg-day	1.0E-02	mg/kg-day	NA	NA	4.6E-07
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	1.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	1.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	2.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	8.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	1.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	2.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	1.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	1.6E-07	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	7.9E-03
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	6.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	1.2E-10	mg/kg-day		mg/kg-day	NA	NA	
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	1.6E-10	mg/kg-day		mg/kg-day	NA	NA	
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	1.6E-10	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.3E-07
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M	2.8E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.8E-03
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M	5.7E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.4E-02
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	9.5E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.2E-03
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M	1.3E-05	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	6.3E-05
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	2.3E-06	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	4.6E-03
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M	9.2E-06	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	3.1E-03
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M	7.9E-07	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	3.9E-05
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M	1.0E-04	mg/kg-day	4.0E-02	mg/kg-day	NA	NA	2.5E-03
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M	1.7E-05	mg/kg-day		mg/kg-day	NA	NA	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M	2.1E-05	mg/kg-day	7.0E-02	mg/kg-day	NA	NA	3.0E-04
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M	8.6E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.9E-04
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M	1.5E-05	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	7.6E-04
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M	9.7E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	3.2E-04
	(total)												4.0E-02

TABLE 7.3 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	6.0E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M		mg/kg-day	5.0E-01	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M		mg/kg-day	1.0E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	1.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	1.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	1.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	7.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	1.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	2.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	9.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	1.5E-07	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	7.3E-03
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	5.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	8.0E-11	mg/kg-day		mg/kg-day	NA	NA	
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	1.1E-10	mg/kg-day		mg/kg-day	NA	NA	
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	4.2E-11	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.4E-07
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M		mg/kg-day	6.0E-05	mg/kg-day	NA	NA	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	1.9E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.2E-04
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M		mg/kg-day	1.4E-02	mg/kg-day	NA	NA	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	1.5E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	6.0E-04
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M		mg/kg-day	7.5E-05	mg/kg-day	NA	NA	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M		mg/kg-day	2.0E-02	mg/kg-day	NA	NA	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M		mg/kg-day	4.0E-02	mg/kg-day	NA	NA	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M		mg/kg-day	2.8E-03	mg/kg-day	NA	NA	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M		mg/kg-day	2.1E-05	mg/kg-day	NA	NA	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M		mg/kg-day	8.0E-04	mg/kg-day	NA	NA	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	(total)												8.5E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**4.9E-02**

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13
PCBs - 0.14
gamma-BHC - 0.04
Other Pesticides - 0.1

Arsenic - 0.03
Cadmium - 0.001
Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 8.3 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	3.7E-10	mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	2.7E-12
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M	8.3E-08	mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	1.1E-09
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	6.5E-10	mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	2.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	1.9E-08
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	1.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	1.4E-07
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	2.9E-08	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	2.1E-08
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	1.2E-08	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	2.3E-10
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	2.4E-08	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	1.7E-10
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	3.4E-09	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	2.5E-08
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	1.5E-08	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	3.0E-08
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	2.3E-08	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	4.5E-08
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	9.1E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	1.8E-08
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	1.7E-11	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	1.1E-10
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	2.3E-11	mg/kg-day	1.8E+00	(mg/kg-day)$^{-1}$	4.2E-11
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	2.3E-11	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	3.0E-11
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M	4.0E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M	8.2E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	1.4E-07	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	2.0E-07
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M	1.8E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	3.3E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M	1.3E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M	1.1E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M	1.5E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M	2.5E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M	3.0E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M	1.2E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M	2.2E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M	1.4E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										5.0E-07

TABLE 8.3 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M		mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	2.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	1.6E-08
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	1.6E-08	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	1.2E-07
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	2.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	1.8E-08
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	1.0E-08	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	2.0E-10
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	2.0E-08	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	1.5E-10
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	2.9E-09	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	2.1E-08
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	1.4E-08	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	2.7E-08
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	2.1E-08	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	4.2E-08
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	8.4E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	1.7E-08
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	1.1E-11	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	7.2E-11
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	1.5E-11	mg/kg-day	1.8E+00	(mg/kg-day)$^{-1}$	2.6E-11
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	6.70E-04	mg/kg	M	6.0E-12	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	7.7E-12
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.7E-08	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	4.0E-08
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	2.1E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										3.0E-07
										Total Risk Across All Exposure Routes/Pathways	8.1E-07

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13
PCBs - 0.14
gamma-BHC - 0.04
Other Pesticides - 0.1

Arsenic - 0.03
Cadmium - 0.001
Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 7.3a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	1.3E-09	mg/kg-day	6.0E-02	mg/kg-day	NA	NA	2.1E-08
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M	2.9E-07	mg/kg-day	5.0E-01	mg/kg-day	NA	NA	5.8E-07
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	2.3E-09	mg/kg-day	1.0E-02	mg/kg-day	NA	NA	2.3E-07
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	9.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	6.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	1.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	4.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	8.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	1.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	5.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	7.9E-08	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	4.0E-03
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	3.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	6.1E-11	mg/kg-day		mg/kg-day	NA	NA	
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	8.2E-11	mg/kg-day		mg/kg-day	NA	NA	
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	7.9E-11	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.6E-07
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M	1.4E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.4E-03
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M	2.9E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	7.2E-03
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	4.7E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.6E-03
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M	6.3E-06	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.2E-05
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	1.1E-06	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	2.3E-03
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M	4.6E-06	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	1.5E-03
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M	3.9E-07	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	2.0E-05
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M	5.1E-05	mg/kg-day	4.0E-02	mg/kg-day	NA	NA	1.3E-03
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M	8.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M	1.0E-05	mg/kg-day	7.0E-02	mg/kg-day	NA	NA	1.5E-04
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M	4.3E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.4E-04
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M	7.6E-06	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	3.8E-04
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M	4.8E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.6E-04
	(total)												2.0E-02

TABLE 7.3a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	6.0E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M		mg/kg-day	5.0E-01	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M		mg/kg-day	1.0E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	3.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	2.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	3.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	1.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	2.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	4.0E-09	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	1.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	2.9E-08	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	1.5E-03
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	1.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	1.6E-11	mg/kg-day		mg/kg-day	NA	NA	
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	2.2E-11	mg/kg-day		mg/kg-day	NA	NA	
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	8.3E-12	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.8E-08
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M		mg/kg-day	6.0E-05	mg/kg-day	NA	NA	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	3.7E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.2E-04
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M		mg/kg-day	1.4E-02	mg/kg-day	NA	NA	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	3.0E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.2E-04
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M		mg/kg-day	7.5E-05	mg/kg-day	NA	NA	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M		mg/kg-day	2.0E-02	mg/kg-day	NA	NA	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M		mg/kg-day	4.0E-02	mg/kg-day	NA	NA	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M		mg/kg-day	2.8E-03	mg/kg-day	NA	NA	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M		mg/kg-day	2.1E-05	mg/kg-day	NA	NA	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M		mg/kg-day	8.0E-04	mg/kg-day	NA	NA	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	(total)												1.7E-03

Total Hazard Index Across All Exposure Routes/Pathways **2.2E-02**

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13
PCBs - 0.14
gamma-BHC - 0.04
Other Pesticides - 0.1

Arsenic - 0.03
Cadmium - 0.001
Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 8.3a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	9.1E-11	mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	6.8E-13
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M	2.1E-08	mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	2.7E-10
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	1.6E-10	mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	6.5E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	4.8E-09
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	4.8E-09	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	3.5E-08
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	7.2E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	5.2E-09
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	2.9E-09	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	5.9E-11
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	5.9E-09	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	4.3E-11
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	8.5E-10	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	6.2E-09
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	3.7E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	7.4E-09
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	5.7E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	1.1E-08
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	2.3E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	4.6E-09
	ALPHA-BHC	6.70E-04	mg/kg	8.70E-04	mg/kg	M	4.4E-12	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	2.8E-11
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	5.9E-12	mg/kg-day	1.8E+00	(mg/kg-day)$^{-1}$	1.1E-11
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	5.7E-12	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	7.4E-12
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M	1.0E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M	2.0E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	3.4E-08	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	5.1E-08
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M	4.5E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	8.2E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M	3.3E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M	2.8E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M	3.6E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M	6.1E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M	7.4E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M	3.1E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M	5.5E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M	3.5E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										1.3E-07

TABLE 8.3a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M		mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	2.2E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	1.6E-09
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	1.6E-09	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	1.2E-08
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	2.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	1.8E-09
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	1.0E-09	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	2.0E-11
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	2.0E-09	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	1.5E-11
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	2.9E-10	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	2.1E-09
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	1.4E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	2.7E-09
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	2.1E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	4.2E-09
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	8.4E-10	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	1.7E-09
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	1.1E-12	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	7.2E-12
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	1.5E-12	mg/kg-day	1.8E+00	(mg/kg-day)$^{-1}$	2.8E-12
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	6.0E-13	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	7.7E-13
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.7E-09	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	4.0E-09
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	2.1E-10	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										3.0E-08
										Total Risk Across All Exposure Routes/Pathways	1.6E-07

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13
PCBs - 0.14
gamma-BHC - 0.04
Other Pesticides - 0.1

Arsenic - 0.03
Cadmium - 0.001
Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 4.4
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF FUTURE ADULT RESIDENTS TO SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA Region 4, May 2000	50	USEPA, May 1993	Csoil x IR x Fi x EF x ED x CF
	FI	Fraction Ingested	unitless	1	USEPA Region 4, May 2000	1	USEPA, May 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA Region 4, May 2000	234	USEPA, May 1993	U.S. EPA, December 1989
	ED	Exposure Duration	years	24	USEPA Region 4, May 2000	7	USEPA, May 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,700	USEPA, July 2004	5,700	USEPA, July 2004	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA, July 2004	0.01	USEPA, July 2004	U.S. EPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA, July 2004	chemical specific	USEPA, July 2004	
	EF	Exposure Frequency	days/year	350	USEPA Region 4, May 2000	234	USEPA, May 1993	
	ED	Exposure Duration	years	24	USEPA Region 4, May 2000	7	USEPA, May 1993	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

1 CDI = Chronic Daily Intake

Daily Intake Calculations

Ingestion Intake = (IR x FI x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.70E-07
Noncancer Ingestion Intake - RME = 1.37E-06

Cancer Ingestion Intake - CTE = 4.58E-08
Noncancer Ingestion Intake - CTE = 4.58E-07

Cancer Dermal Intake - RME = 1.87E-06
Noncancer Dermal Intake - RME = 5.47E-06

Cancer Dermal Intake - CTE = 5.22E-08
Noncancer Dermal Intake - CTE = 5.22E-07

TABLE 7.4 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	1.9E-08	mg/kg-day	6.0E-02	mg/kg-day	NA	NA	3.2E-07
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M	4.4E-06	mg/kg-day	5.0E-01	mg/kg-day	NA	NA	8.8E-06
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	3.4E-08	mg/kg-day	1.0E-02	mg/kg-day	NA	NA	3.4E-06
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	1.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	1.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	1.5E-06	mg/kg-day		mg/kg-day	NA	NA	
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	6.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	1.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	1.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	7.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	1.2E-06	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	6.0E-02
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	4.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	9.2E-10	mg/kg-day		mg/kg-day	NA	NA	
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	1.2E-09	mg/kg-day		mg/kg-day	NA	NA	
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	1.2E-09	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.0E-06
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M	2.1E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.1E-02
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M	4.3E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.1E-01
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	7.1E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.4E-02
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M	9.5E-05	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	4.8E-04
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	1.7E-05	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	3.4E-02
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M	6.9E-05	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	2.3E-02
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M	5.9E-06	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	2.9E-04
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M	7.6E-04	mg/kg-day	4.0E-02	mg/kg-day	NA	NA	1.9E-02
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M	1.3E-04	mg/kg-day		mg/kg-day	NA	NA	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M	1.6E-04	mg/kg-day	7.0E-02	mg/kg-day	NA	NA	2.2E-03
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M	6.4E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.1E-03
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M	1.1E-04	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	5.7E-03
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M	7.3E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.4E-03
	(total)												3.0E-01

TABLE 7.4 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	6.0E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M		mg/kg-day	5.0E-01	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M		mg/kg-day	1.0E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	7.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	5.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	7.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	3.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	6.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	9.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	4.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	6.7E-07	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	3.3E-02
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	2.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	3.7E-10	mg/kg-day		mg/kg-day	NA	NA	
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	4.9E-10	mg/kg-day		mg/kg-day	NA	NA	
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	1.9E-10	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.3E-07
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M		mg/kg-day	6.0E-05	mg/kg-day	NA	NA	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	8.5E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.8E-03
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M		mg/kg-day	1.4E-02	mg/kg-day	NA	NA	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	6.8E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.7E-03
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M		mg/kg-day	7.5E-05	mg/kg-day	NA	NA	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M		mg/kg-day	2.0E-02	mg/kg-day	NA	NA	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M		mg/kg-day	4.0E-02	mg/kg-day	NA	NA	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M		mg/kg-day	2.8E-03	mg/kg-day	NA	NA	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M		mg/kg-day	2.1E-05	mg/kg-day	NA	NA	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M		mg/kg-day	8.0E-04	mg/kg-day	NA	NA	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	(total)												3.9E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**3.4E-01**

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13
PCBs - 0.14
gamma-BHC - 0.04
Other Pesticides - 0.1

Arsenic - 0.03
Cadmium - 0.001
Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 8.4 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	6.6E-09	mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	4.9E-11
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M	1.5E-06	mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	2.0E-08
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	1.2E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	4.7E-07	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	3.4E-07
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	3.5E-07	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	2.5E-06
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	5.2E-07	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	3.8E-07
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	2.1E-07	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	4.2E-09
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	4.3E-07	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	3.1E-09
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	6.1E-08	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	4.5E-07
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	2.7E-07	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	5.4E-07
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	4.1E-07	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	8.2E-07
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	1.6E-07	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	3.3E-07
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	3.1E-10	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	2.0E-09
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	4.2E-10	mg/kg-day	1.8E+00	(mg/kg-day)$^{-1}$	7.6E-10
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	4.1E-10	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	5.3E-10
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M	7.2E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M	1.5E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.4E-06	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	3.7E-06
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M	3.3E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	5.9E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M	2.4E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M	2.0E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M	2.6E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M	4.4E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M	5.4E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M	2.2E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M	3.9E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M	2.5E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										9.1E-06

TABLE 8.4 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M		mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	2.4E-07	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	1.8E-07
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	1.8E-07	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	1.3E-06
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	2.7E-07	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	2.0E-07
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	1.1E-07	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	2.2E-09
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	2.2E-07	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	1.6E-09
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	3.2E-08	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	2.3E-07
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	1.5E-07	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	3.0E-07
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	2.3E-07	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	4.6E-07
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	9.2E-08	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	1.8E-07
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	1.3E-10	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	7.9E-10
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	1.7E-10	mg/kg-day	1.8E+00	(mg/kg-day)$^{-1}$	3.0E-10
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	8.5E-11	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	8.5E-11
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.9E-07	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	4.4E-07
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	2.3E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										3.3E-06
										Total Risk Across All Exposure Routes/Pathways	1.2E-05

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13
PCBs - 0.14
gamma-BHC - 0.04
Other Pesticides - 0.1
Arsenic - 0.03
Cadmium - 0.001
Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 7.4a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	6.4E-09	mg/kg-day	6.0E-02	mg/kg-day	NA	NA	1.1E-07
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M	1.5E-06	mg/kg-day	5.0E-01	mg/kg-day	NA	NA	2.9E-06
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	1.1E-08	mg/kg-day	1.0E-02	mg/kg-day	NA	NA	1.1E-06
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	4.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	3.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	5.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	2.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	4.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	6.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	2.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	4.0E-07	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	2.0E-02
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	1.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	3.1E-10	mg/kg-day		mg/kg-day	NA	NA	
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	4.1E-10	mg/kg-day		mg/kg-day	NA	NA	
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	4.0E-10	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.3E-06
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M	7.0E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	7.0E-03
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M	1.4E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	3.6E-02
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.4E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	7.9E-03
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M	3.2E-05	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.6E-04
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	5.7E-06	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	1.1E-02
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M	2.3E-05	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	7.7E-03
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M	2.0E-06	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	9.8E-05
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M	2.6E-04	mg/kg-day	4.0E-02	mg/kg-day	NA	NA	6.4E-03
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M	4.3E-05	mg/kg-day		mg/kg-day	NA	NA	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M	5.2E-05	mg/kg-day	7.0E-02	mg/kg-day	NA	NA	7.5E-04
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M	2.2E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	7.2E-04
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M	3.8E-05	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	1.9E-03
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M	2.4E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	8.1E-04
	(total)												1.0E-01

TABLE 7.4a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	6.0E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M		mg/kg-day	5.0E-01	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M		mg/kg-day	1.0E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	6.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	5.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	7.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	3.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	6.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	8.8E-09	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	4.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	6.4E-08	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	3.2E-03
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	2.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	3.5E-11	mg/kg-day		mg/kg-day	NA	NA	
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	4.7E-11	mg/kg-day		mg/kg-day	NA	NA	
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	1.8E-11	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.1E-08
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M		mg/kg-day	6.0E-05	mg/kg-day	NA	NA	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	8.1E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.7E-04
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M		mg/kg-day	1.4E-02	mg/kg-day	NA	NA	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	6.5E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.6E-04
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M		mg/kg-day	7.5E-05	mg/kg-day	NA	NA	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M		mg/kg-day	2.0E-02	mg/kg-day	NA	NA	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M		mg/kg-day	4.0E-02	mg/kg-day	NA	NA	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M		mg/kg-day	2.8E-03	mg/kg-day	NA	NA	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M		mg/kg-day	2.1E-05	mg/kg-day	NA	NA	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M		mg/kg-day	8.0E-04	mg/kg-day	NA	NA	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	(total)												3.7E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**1.0E-01**

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13
PCBs - 0.14
gamma-BHC - 0.04
Other Pesticides - 0.1

Arsenic - 0.03
Cadmium - 0.001
Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 8.4a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	6.4E-10	mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	4.8E-12
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M	1.5E-07	mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	1.9E-09
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	1.1E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	4.6E-08	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	3.3E-08
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	3.4E-08	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	2.5E-07
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	5.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	3.7E-08
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	2.1E-08	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	4.1E-10
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	4.2E-08	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	3.0E-10
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	6.0E-09	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	4.3E-08
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	2.6E-08	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	5.2E-08
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	4.0E-08	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	8.0E-08
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	1.6E-08	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	3.2E-08
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	3.1E-11	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	1.9E-10
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	4.1E-11	mg/kg-day	1.8E+00	(mg/kg-day)$^{-1}$	7.4E-11
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	4.0E-11	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	5.2E-11
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M	7.0E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M	1.4E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.4E-07	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	3.6E-07
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M	3.2E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	5.7E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M	2.3E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M	2.0E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M	2.6E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M	4.3E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M	5.2E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M	2.2E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M	3.8E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M	2.4E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										8.9E-07

TABLE 8.4a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M		mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	6.8E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	5.0E-09
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	5.0E-09	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	3.7E-08
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	7.5E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	5.4E-09
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	3.1E-09	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	6.1E-11
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	6.2E-09	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	4.5E-11
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	8.8E-10	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	6.4E-09
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	4.2E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	8.3E-09
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	6.4E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	1.3E-08
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	2.6E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	5.1E-09
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	3.5E-12	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	2.2E-11
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	4.7E-12	mg/kg-day	1.8E+00	(mg/kg-day)$^{-1}$	8.5E-12
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	1.8E-12	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	2.4E-12
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	8.1E-09	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	1.2E-08
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	8.5E-10	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										9.2E-08
										Total Risk Across All Exposure Routes/Pathways	9.8E-07

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13
PCBs - 0.14
gamma-BHC - 0.04
Other Pesticides - 0.1

Arsenic - 0.03
Cadmium - 0.001
Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 4.5
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF FUTURE CHILD RESIDENTS TO SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	200	USEPA Region 4, May 2000	100	USEPA, May 1993	Csoil x IR x FI x EF x ED x CF / BW x AT
	FI	Fraction Ingested	unitless	1	USEPA Region 4, May 2000	1	USEPA, May 1993	U.S. EPA, December 1989
	EF	Exposure Frequency	days/year	350	USEPA Region 4, May 2000	234	USEPA, May 1993	
	ED	Exposure Duration	years	6	USEPA Region 4, May 2000	2	USEPA, May 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	
	BW	Body Weight	kg	15	USEPA Region 4, May 2000	15	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	Csoil x CF x SA x AF x ABS x EF x ED / BW x AT
	SA	Skin Surface Area	cm^2/day	2,800	USEPA, July 2004	2,800	USEPA, July 2004	U.S. EPA, December 1989
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA, July 2004	0.04	USEPA, July 2004	
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA, July 2004	chemical specific	USEPA, July 2004	
	EF	Exposure Frequency	days/year	350	USEPA Region 4, May 2000	234	USEPA, May 1993	
	ED	Exposure Duration	years	6	USEPA Region 4, May 2000	2	USEPA, May 1993	
	BW	Body Weight	kg	15	USEPA Region 4, May 2000	15	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

1 CDI = Chronic Daily Intake

Daily Intake Calculations

Ingestion Intake = (IR x FI x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 1.10E-06
Noncancer Ingestion Intake - RME = 1.28E-05

Cancer Ingestion Intake - CTE = 1.22E-07
Noncancer Ingestion Intake - CTE = 4.27E-06

Cancer Dermal Intake - RME = 3.07E-06
Noncancer Dermal Intake - RME = 3.58E-05

Cancer Dermal Intake - CTE = 1.37E-07
Noncancer Dermal Intake - CTE = 4.79E-06

TABLE 7.5 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	1.8E-07	mg/kg-day	6.0E-02	mg/kg-day	NA	NA	3.0E-06
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M	4.1E-05	mg/kg-day	5.0E-01	mg/kg-day	NA	NA	8.2E-05
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	3.2E-07	mg/kg-day	1.0E-02	mg/kg-day	NA	NA	3.2E-05
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	1.3E-05	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	9.5E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	1.4E-05	mg/kg-day		mg/kg-day	NA	NA	
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	5.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	1.2E-05	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	1.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	7.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	1.1E-05	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	5.6E-01
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	4.5E-06	mg/kg-day		mg/kg-day	NA	NA	
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	8.6E-09	mg/kg-day		mg/kg-day	NA	NA	
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	1.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	1.1E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.7E-05
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M	2.0E-01	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.0E-01
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M	4.0E-04	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.0E+00
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	6.6E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.2E-01
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M	8.9E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	4.4E-03
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	1.6E-04	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	3.2E-01
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M	6.4E-04	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	2.1E-01
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M	5.5E-05	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	2.7E-03
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M	7.1E-03	mg/kg-day	4.0E-02	mg/kg-day	NA	NA	1.8E-01
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M	1.2E-03	mg/kg-day		mg/kg-day	NA	NA	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M	1.5E-03	mg/kg-day	7.0E-02	mg/kg-day	NA	NA	2.1E-02
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M	6.0E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.0E-02
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M	1.1E-03	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	5.4E-02
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M	6.8E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.3E-02
	(total)												2.8E+00

TABLE 7.5 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	6.0E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M		mg/kg-day	5.0E-01	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M		mg/kg-day	1.0E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	4.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	3.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	5.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	2.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	4.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	6.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	2.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	8.70E-01	mg/kg	6.70E-01	mg/kg	M	4.4E-06	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	2.2E-01
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	1.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	2.4E-09	mg/kg-day		mg/kg-day	NA	NA	
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	3.2E-09	mg/kg-day		mg/kg-day	NA	NA	
	GAMMA-BHC (LINDANE)	6.70E-04	mg/kg	6.70E-04	mg/kg	M	1.2E-09	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.2E-06
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M		mg/kg-day	6.0E-05	mg/kg-day	NA	NA	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	5.6E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.9E-02
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M		mg/kg-day	1.4E-02	mg/kg-day	NA	NA	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	4.5E-07	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.8E-02
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M		mg/kg-day	7.5E-05	mg/kg-day	NA	NA	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M		mg/kg-day	2.0E-02	mg/kg-day	NA	NA	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M		mg/kg-day	4.0E-02	mg/kg-day	NA	NA	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M		mg/kg-day	2.8E-03	mg/kg-day	NA	NA	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M		mg/kg-day	2.1E-05	mg/kg-day	NA	NA	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M		mg/kg-day	8.0E-04	mg/kg-day	NA	NA	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	(total)												2.5E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**3.1E+00**

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13
PCBs - 0.14
gamma-BHC - 0.04
Other Pesticides - 0.1

Arsenic - 0.03
Cadmium - 0.001
Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 8.5 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	1.5E-08	mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	1.2E-10
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M	3.5E-06	mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	4.6E-09
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	2.7E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	1.1E-06	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	8.0E-07
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	8.1E-07	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	5.9E-06
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	1.2E-06	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	8.8E-07
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	4.9E-07	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	9.9E-09
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	1.0E-06	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	7.3E-09
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	1.4E-07	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	1.0E-06
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	6.2E-07	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	1.2E-06
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	9.5E-07	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	1.9E-06
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	3.8E-07	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	7.7E-07
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	7.3E-10	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	4.6E-09
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	9.9E-10	mg/kg-day	1.8E+00	(mg/kg-day)$^{-1}$	1.8E-09
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	9.5E-10	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	1.2E-09
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M	1.7E-02	mg/kg-day		(mg/kg-day)$^{-1}$	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M	3.4E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	5.7E-06	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	8.5E-06
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M	7.6E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	1.4E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M	5.5E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M	4.7E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M	6.1E-04	mg/kg-dey		(mg/kg-day)$^{-1}$	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M	1.0E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M	1.2E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M	5.2E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M	9.2E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M	5.8E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										2.1E-05

TABLE 8.5 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M		mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	4.0E-07	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	2.9E-07
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	3.0E-07	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	2.2E-06
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	4.4E-07	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	3.2E-07
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	1.8E-07	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	3.6E-09
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	3.8E-07	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	2.8E-09
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	5.2E-08	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	3.8E-07
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	2.4E-07	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	4.9E-07
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	3.7E-07	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	7.5E-07
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	1.5E-07	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	3.0E-07
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	2.1E-10	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	1.3E-09
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	2.8E-10	mg/kg-day	1.8E+00	(mg/kg-day)$^{-1}$	5.0E-10
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	1.1E-10	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	1.4E-10
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	4.8E-07	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	7.2E-07
	BARIUM	8.95E+01	mg/kg	8.95E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	3.8E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										5.4E-06
										Total Risk Across All Exposure Routes/Pathways	2.7E-05

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13
PCBs - 0.14
gamma-BHC - 0.04
Other Pesticides - 0.1

Arsenic - 0.03
Cadmium - 0.001
Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 7.5a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	6.0E-08	mg/kg-day	6.0E-02	mg/kg-day	NA	NA	1.0E-06
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M	1.4E-05	mg/kg-day	5.0E-01	mg/kg-day	NA	NA	2.7E-05
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	1.1E-07	mg/kg-day	1.0E-02	mg/kg-day	NA	NA	1.1E-05
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	4.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	3.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	4.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	1.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	3.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	5.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	2.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	3.7E-06	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	1.9E-01
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	1.5E-06	mg/kg-day		mg/kg-day	NA	NA	
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	2.9E-09	mg/kg-day		mg/kg-day	NA	NA	
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	3.8E-09	mg/kg-day		mg/kg-day	NA	NA	
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	3.7E-09	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.2E-05
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M	6.5E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.5E-02
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M	1.3E-04	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	3.4E-01
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.2E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	7.4E-02
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M	3.0E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.5E-03
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	5.3E-05	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	1.1E-01
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M	2.2E-04	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	7.2E-02
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M	1.8E-05	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	9.2E-04
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M	2.4E-03	mg/kg-day	4.0E-02	mg/kg-day	NA	NA	6.0E-02
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M	4.0E-04	mg/kg-day		mg/kg-day	NA	NA	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M	4.9E-04	mg/kg-day	7.0E-02	mg/kg-day	NA	NA	7.0E-03
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M	2.0E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.7E-03
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M	3.6E-04	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	1.8E-02
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M	2.3E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	7.6E-03
	(total)												9.4E-01

TABLE 7.5a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	6.0E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M		mg/kg-day	5.0E-01	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M		mg/kg-day	1.0E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	6.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	4.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	6.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	2.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	5.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	8.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	3.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	5.8E-07	mg/kg-day	2.0E-05	mg/kg-day	NA	NA	2.9E-02
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	2.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	3.2E-10	mg/kg-day		mg/kg-day	NA	NA	
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	4.3E-10	mg/kg-day		mg/kg-day	NA	NA	
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	1.7E-10	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.6E-07
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M		mg/kg-day	6.0E-05	mg/kg-day	NA	NA	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	7.5E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.5E-03
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M		mg/kg-day	1.4E-02	mg/kg-day	NA	NA	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	6.0E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.4E-03
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M		mg/kg-day	7.5E-05	mg/kg-day	NA	NA	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M		mg/kg-day	2.0E-02	mg/kg-day	NA	NA	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M		mg/kg-day	4.0E-02	mg/kg-day	NA	NA	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M		mg/kg-day	2.8E-03	mg/kg-day	NA	NA	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M		mg/kg-day	2.1E-05	mg/kg-day	NA	NA	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M		mg/kg-day	8.0E-04	mg/kg-day	NA	NA	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	(total)												3.4E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**9.7E-01**

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13
PCBs - 0.14
gamma-BHC - 0.04
Other Pesticides - 0.1
Arsenic - 0.03
Cadmium - 0.001
Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 8.5a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	1.7E-09	mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	1.3E-11
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M	3.9E-07	mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	5.1E-09
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	3.1E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	1.2E-07	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	8.9E-08
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	9.0E-08	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	6.6E-07
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	1.3E-07	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	9.8E-08
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	5.5E-08	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	1.1E-09
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	1.1E-07	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	8.1E-10
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	1.6E-08	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	1.2E-07
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	7.0E-08	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	1.4E-07
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	1.1E-07	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	2.1E-07
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	4.3E-08	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	8.5E-08
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	8.2E-11	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	5.2E-10
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	1.1E-10	mg/kg-day	1.8E+00	(mg/kg-day)$^{-1}$	2.0E-10
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	1.1E-10	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	1.4E-10
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M	1.9E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M	3.8E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	6.3E-07	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	9.5E-07
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M	8.5E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	1.5E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M	6.2E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M	5.3E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M	6.8E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M	1.1E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M	1.4E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M	5.7E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M	1.0E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M	6.5E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										2.4E-06

TABLE 8.5a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	
	TRICHLOROETHENE	3.20E+00	mg/kg	3.20E+00	mg/kg	M		mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	
	CIS-1,2-DICHLOROETHENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZO(A)ANTHRACENE	1.00E+00	mg/kg	1.00E+00	mg/kg	M	1.8E-08	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	1.3E-08
	BENZO(A)PYRENE	7.40E-01	mg/kg	7.40E-01	mg/kg	M	1.3E-08	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	9.6E-08
	BENZO(B)FLUORANTHENE	1.10E+00	mg/kg	1.10E+00	mg/kg	M	2.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	1.4E-08
	CARBAZOLE	4.50E-01	mg/kg	4.50E-01	mg/kg	M	8.0E-09	mg/kg-day	2.0E-02	(mg/kg-day)$^{-1}$	1.6E-10
	CHRYSENE	9.10E-01	mg/kg	9.10E-01	mg/kg	M	1.6E-08	mg/kg-day	7.3E-03	(mg/kg-day)$^{-1}$	1.2E-10
	DIBENZO(A,H)ANTHRACENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	2.3E-09	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	1.7E-08
	AROCLOR-1248	5.70E-01	mg/kg	5.70E-01	mg/kg	M	1.1E-08	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	2.2E-08
	AROCLOR-1254	8.70E-01	mg/kg	8.70E-01	mg/kg	M	1.7E-08	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	3.3E-08
	AROCLOR-1260	3.50E-01	mg/kg	3.50E-01	mg/kg	M	6.7E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	1.3E-08
	ALPHA-BHC	6.70E-04	mg/kg	6.70E-04	mg/kg	M	9.2E-12	mg/kg-day	6.3E+00	(mg/kg-day)$^{-1}$	5.8E-11
	BETA-BHC	9.00E-04	mg/kg	9.00E-04	mg/kg	M	1.2E-11	mg/kg-day	1.8E+00	(mg/kg-day)$^{-1}$	2.2E-11
	GAMMA-BHC (LINDANE)	8.70E-04	mg/kg	8.70E-04	mg/kg	M	4.8E-12	mg/kg-day	1.3E+00	(mg/kg-day)$^{-1}$	6.2E-12
	ALUMINUM	1.53E+04	mg/kg	1.53E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ANTIMONY	3.14E+01	mg/kg	3.14E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.1E-08	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	3.2E-08
	BARIUM	6.95E+01	mg/kg	6.95E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	1.25E+01	mg/kg	1.25E+01	mg/kg	M	1.7E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	5.04E+01	mg/kg	5.04E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	4.30E+00	mg/kg	4.30E+00	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COPPER	5.57E+02	mg/kg	5.57E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	LEAD	9.40E+01	mg/kg	9.40E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	MANGANESE	1.14E+02	mg/kg	1.14E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	MERCURY	4.70E-01	mg/kg	4.70E-01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	8.37E+01	mg/kg	8.37E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	5.31E+02	mg/kg	5.31E+02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										2.4E-07
										Total Risk Across All Exposure Routes/Pathways	**2.5E-06**

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13
PCBs - 0.14
gamma-BHC - 0.04
Other Pesticides - 0.1

Arsenic - 0.03
Cadmium - 0.001
Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 4.6

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Workers
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical concentration in soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Intake (mg/kg/day) =
	VF	Volatilization factor	m^3/kg	Chemical Specific	USEPA, December 2002	Chemical Specific	USEPA, December 2002	$\frac{CS \times IR \times \left[\frac{1}{VF} + \frac{1}{PEF}\right] \times ET \times EF \times ED}{BW \times AT}$
	PEF	Particulate emission factor	m^3/kg	1.27E+06	USEPA, December 2002	1.27E+06	USEPA, December 2002	
	IR	Inhalation Rate	m^3/hour	2.5	USEPA Region 4, May 2000	1.5	USEPA, August 1997	
	ET	Exposure Time	hours/day	8	USEPA Region 4, May 2000	8	USEPA Region 4, May 2000	
	EF	Exposure Frequency	days/year	30	Professional Judgement	30	Professional Judgement	
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED x (1/PEF)+(1/VF)) / (BW x AT)

Cancer Inhalation Intake(RME) = 3.35E-04
Noncancer Inhalation Intake(RME) = 2.35E-02

Cancer Inhalation Intake(CTE) = 2.01E-04
Noncancer Inhalation Intake(CTE) = 1.41E-02

TABLE 7.6. REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Workers
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chromium	5.04E+01	mg/kg	3.98E-05	mg/m^3	R	9.4E-07	mg/kg-day	3.00E-05	mg/kg-day	1.00E-04	mg/m^3	3.1E-02
	Trichloroethene	3.20E+00	mg/kg	9.17E-04	mg/m^3	R	2.2E-05	mg/kg-day	1.70E-01	mg/kg-day	6.0E-01	mg/m^3	1.3E-04
	(total)												3.1E-02
				1.00E+99	Chromium								
				3.50E+03	VF (TCE)								
												Total Hazard Index Across All Exposure Routes/Pathways	**3.1E-02**

8.6. REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Workers
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chromium	5.04E+01	mg/kg	3.98E-05	mg/m^3	R	1.3E-08	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	5.6E-07
	Trichloroethene	3.20E+00	mg/kg	9.17E-04	mg/m^3	R	3.1E-07	mg/kg-day	7.00E-03	$(mg/kg\text{-}day)^{-1}$	2.2E-09
	(total)										5.6E-07
										Total Risk Across All Exposure Routes/Pathways	**5.6E-07**

TABLE 7.6a. CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Workers
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chromium	5.04E+01	mg/kg	3.96E-05	mg/m^3	R	5.6E-07	mg/kg-day	3.00E-05	mg/kg-day	1.00E-04	mg/m^3	1.9E-02
	Trichloroethene	3.20E+00	mg/kg	9.17E-04	mg/m^3	R	1.3E-05	mg/kg-day	1.70E-01	mg/kg-day	6.0E-01	mg/m^3	7.6E-05
	(total)												1.9E-02
				1.00E+99	Chromium								
				3.50E+03	VF (TCE)								
												Total Hazard Index Across All Exposure Routes/Pathways	**1.9E-02**

8.6a. CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Workers
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chromium	5.04E+01	mg/kg	3.98E-05	mg/m^3	R	8.0E-09	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	3.4E-07
	Trichloroethene	3.20E+00	mg/kg	9.17E-04	mg/m^3	R	1.8E-07	mg/kg-day	7.00E-03	$(mg/kg\text{-}day)^{-1}$	1.3E-09
	(total)										3.4E-07
										Total Risk Across All Exposure Routes/Pathways	**3.4E-07**

TABLE 4.7

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF OCCUPATIONAL WORKERS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Occupational Workers
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical concentration in soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Intake (mg/kg/day) = $\frac{CS \times IR \times \left[\frac{1}{VF} + \frac{1}{PEF}\right] \times ET \times EF \times ED}{BW \times AT}$
	VF	Volatilization factor	m^3/kg	Chemical Specific	FDEP, February 2005	Chemical Specific	FDEP, February 2005	
	PEF	Particulate emission factor	m^3/kg	1.36E+09	USEPA, December 2002	1.36E+09	USEPA, December 2002	
	IR	Inhalation Rate	m^3/hour	2.5	USEPA Region 4, May 2000	2.5	USEPA Region 4, May 2000	
	ET	Exposure Time	hours/day	8	USEPA Region 4, May 2000	8	USEPA Region 4, May 2000	
	EF	Exposure Frequency	days/year	250	USEPA Region 4, May 2000	219	USEPA, May 1993	
	ED	Exposure Duration	years	25	USEPA Region 4, May 2000	9	USEPA, May 1993	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9125	USEPA, December 1989	3285	USEPA, December 1989	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED x (1/PEF)+(1/VF)) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.99E-02
Noncancer Inhalation Intake(RME) = 1.96E-01

Cancer Inhalation Intake(CTE) = 2.20E-02
Noncancer Inhalation Intake(CTE) = 1.71E-01

TABLE 7.7. REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF OCCUPATIONAL WORKERS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Occupational Workers
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chromium	5.04E+01	mg/kg	3.71E-08	mg/m^3	R	7.3E-09	mg/kg-day	3.00E-05	mg/kg-day	1.00E-04	mg/m^3	2.4E-04
	Trichloroethene	3.20E+00	mg/kg	9.14E-04	mg/m^3	R	1.8E-04	mg/kg-day	1.70E-01	mg/kg-day	6.0E-01	mg/m^3	1.1E-03
	(total)												2.4E-04
				1.00E+99	Chromium								
				3.50E+03	VF (TCE)								
												Total Hazard Index Across All Exposure Routes/Pathways	**2.4E-04**

8.7. REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS
EXPOSURE OF OCCUPATIONAL WORKERS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Occupational Workers
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chromium	5.04E+01	mg/kg	3.71E-08	mg/m^3	R	2.6E-09	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	Trichloroethene	3.20E+00	mg/kg	9.14E-04	mg/m^3	R	6.4E-05	mg/kg-day	7.00E-03	$(mg/kg\text{-}day)^{-1}$	4.5E-07
	(total)										5.6E-07
										Total Risk Across All Exposure Routes/Pathways	**5.6E-07**

TABLE 7.7a. CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF OCCUPATIONAL WORKERS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Occupational Workers
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chromium	5.04E+01	mg/kg	3.71E-08	mg/m^3	R	6.4E-09	mg/kg-day	3.00E-05	mg/kg-day	1.00E-04	mg/m^3	2.1E-04
	Trichloroethene	3.20E+00	mg/kg	9.14E-04	mg/m^3	R	1.6E-04	mg/kg-day	1.70E-01	mg/kg-day	6.0E-01	mg/m^3	9.2E-04
	(total)												2.1E-04
				1.00E+09	Chromium								
				3.50E+03	VF (TCE)								
												Total Hazard Index Across All Exposure Routes/Pathways	**2.1E-04**

8.7a. CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS
EXPOSURE OF OCCUPATIONAL WORKERS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Occupational Workers
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chromium	5.04E+01	mg/kg	3.71E-08	mg/m^3	R	8.2E-10	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	3.4E-08
	Trichloroethene	3.20E+00	mg/kg	9.14E-04	mg/m^3	R	2.0E-05	mg/kg-day	7.00E-03	$(mg/kg\text{-}day)^{-1}$	1.4E-07
	(total)										1.8E-07
										Total Risk Across All Exposure Routes/Pathways	**1.8E-07**

TABLE 4.8

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADOLESCENT TRESPASSERS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical concentration in soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Intake (mg/kg/day) = $\frac{CS \times IR \times \left[\frac{1}{VF} + \frac{1}{PEF}\right] \times ET \times EF \times ED}{BW \times AT}$
	VF	Volatilization factor	m^3/kg	Chemical Specific	FDEP, February 2005	Chemical Specific	FDEP, February 2005	
	PEF	Particulate emission factor	m^3/kg	1.36E+09	USEPA, December 2002	1.36E+09	USEPA, December 2002	
	IR	Inhalation Rate	m^3/hour	1.9	USEPA, August 1997	1.2	USEPA, August 1997	
	ET	Exposure Time	hours/day	1.5	USEPA, August 1997	1	USEPA, August 1997	
	EF	Exposure Frequency	days/year	30	Professional Judgment	30	Professional Judgment	
	ED	Exposure Duration	years	10	USEPA Region 4, May 2000	10	USEPA Region 4, May 2000	
	BW	Body Weight	kg	45	USEPA Region 4, May 2000	45	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3650	USEPA, December 1989	3650	USEPA, December 1989	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED x (1/PEF)+(1/VF)) / (BW x AT)

Cancer Inhalation Intake(RME) = 7.44E-04
Noncancer Inhalation Intake(RME) = 5.21E-03

Cancer Inhalation Intake(CTE) = 3.13E-04
Noncancer Inhalation Intake(CTE) = 2.19E-03

TABLE 7.8. REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chromium	5.04E+01	mg/kg	3.71E-08	mg/m^3	R	1.9E-10	mg/kg-day	3.00E-05	mg/kg-day	1.00E-04	mg/m^3	6.4E-06
	Trichloroethene	3.20E+00	mg/kg	9.14E-04	mg/m^3	R	4.8E-06	mg/kg-day	1.70E-01	mg/kg-day	6.0E-01	mg/m^3	2.8E-05
	(total)												6.4E-06
				1.00E+99	Chromium								
				3.50E+03	VF (TCE)								

Total Hazard Index Across All Exposure Routes/Pathways **6.4E-06**

8.8. REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chromium	5.04E+01	mg/kg	3.71E-08	mg/m^3	R	2.6E-11	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	1.2E-09
	Trichloroethene	3.20E+00	mg/kg	9.14E-04	mg/m^3	R	6.8E-07	mg/kg-day	7.00E-03	$(mg/kg\text{-}day)^{-1}$	4.8E-09
	(total)										5.9E-09
										Total Risk Across All Exposure Routes/Pathways	**5.9E-09**

TABLE 7.8a. CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chromium	5.04E+01	mg/kg	3.71E-08	mg/m^3	R	8.1E-11	mg/kg-day	3.00E-05	mg/kg-day	1.00E-04	mg/m^3	2.7E-06
	Trichloroethene	3.20E+00	mg/kg	9.14E-04	mg/m^3	R	2.0E-06	mg/kg-day	1.70E-01	mg/kg-day	6.0E-01	mg/m^3	1.2E-05
	(total)												2.7E-06
				1.00E+99	Chromium								
				3.50E+03	VF (TCE)								
												Total Hazard Index Across All Exposure Routes/Pathways	**2.7E-06**

8.8a. CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chromium	5.04E+01	mg/kg	3.71E-08	mg/m^3	R	1.2E-11	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	4.9E-10
	Trichloroethene	3.20E+00	mg/kg	9.14E-04	mg/m^3	R	2.9E-07	mg/kg-day	7.00E-03	$(mg/kg\text{-}day)^{-1}$	2.0E-09
	(total)										2.5E-09
										Total Risk Across All Exposure Routes/Pathways	**2.5E-09**

TABLE 4.9

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical concentration in soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Intake (mg/kg/day) = $\frac{CS \times IR \times \left[\frac{1}{VF} + \frac{1}{PEF}\right] \times ET \times EF \times ED}{BW \times AT}$
	VF	Volatilization factor	m^3/kg	Chemical Specific	FDEP, February 2005	Chemical Specific	FDEP, February 2005	
	PEF	Particulate emission factor	m^3/kg	1.36E+09	USEPA, December 2002	1.36E+09	USEPA, December 2002	
	IR	Inhalation Rate	m^3/hour	0.83	USEPA Region 4, May 2000	0.83	USEPA Region 4, May 2000	
	ET	Exposure Time	hours/day	24	USEPA Region 4, May 2000	24	USEPA Region 4, May 2000	
	EF	Exposure Frequency	days/year	350	USEPA Region 4, May 2000	234	USEPA, May 1993	
	ED	Exposure Duration	years	24	USEPA Region 4, May 2000	7	USEPA, May 1993	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8760	USEPA, December 1989	2555	USEPA, December 1989	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED x (1/PEF)+(1/VF)) / (BW x AT)

Cancer Inhalation Intake(RME) = 9.36E-02
Noncancer Inhalation Intake(RME) = 2.73E-01

Cancer Inhalation Intake(CTE) = 1.82E-02
Noncancer Inhalation Intake(CTE) = 1.82E-01

TABLE 7.9. REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chromium	5.04E+01	mg/kg	3.71E-08	mg/m^3	R	1.0E-08	mg/kg-day	3.00E-05	mg/kg-day	1.00E-04	mg/m^3	3.4E-04
	Trichloroethene	3.20E+00	mg/kg	9.14E-04	mg/m^3	R	2.5E-04	mg/kg-day	1.70E-01	mg/kg-day	6.0E-01	mg/m^3	1.5E-03
	(total)												3.4E-04
				1.00E+99	Chromium							**Total Hazard Index Across All Exposure Routes/Pathways**	**3.4E-04**
				3.50E+03	VF (TCE)								

8.9. REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chromium	5.04E+01	mg/kg	3.71E-08	mg/m^3	R	3.5E-09	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	1.5E-07
	Trichloroethene	3.20E+00	mg/kg	9.14E-04	mg/m^3	R	8.6E-05	mg/kg-day	7.00E-03	$(mg/kg\text{-}day)^{-1}$	6.0E-07
	(total)										7.4E-07
										Total Risk Across All Exposure Routes/Pathways	**7.4E-07**

TABLE 7.9a. CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chromium	5.04E+01	mg/kg	3.71E-08	mg/m^3	R	6.8E-09	mg/kg-day	3.00E-05	mg/kg-day	1.00E-04	mg/m^3	2.3E-04
	Trichloroethene	3.20E+00	mg/kg	9.14E-04	mg/m^3	R	1.7E-04	mg/kg-day	1.70E-01	mg/kg-day	6.0E-01	mg/m^3	9.8E-04
	(total)												2.3E-04
				1.00E+99	Chromium								
				3.50E+03	VF (TCE)								

Total Hazard Index Across All Exposure Routes/Pathways **2.3E-04**

8.9a. CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chromium	5.04E+01	mg/kg	3.71E-08	mg/m^3	R	6.8E-10	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	2.8E-08
	Trichloroethene	3.20E+00	mg/kg	9.14E-04	mg/m^3	R	1.7E-05	mg/kg-day	7.00E-03	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	(total)										1.5E-07
										Total Risk Across All Exposure Routes/Pathways	**1.5E-07**

TABLE 4.10

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical concentration in soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Intake (mg/kg/day) = $\frac{CS \times IR \times \left[\frac{1}{VF} + \frac{1}{PEF}\right] \times ET \times EF \times ED}{BW \times AT}$
	VF	Volatilization factor	m^3/kg	Chemical Specific	FDEP, February 2005	Chemical Specific	FDEP, February 2005	
	PEF	Particulate emission factor	m^3/kg	1.36E+09	USEPA, December 2002	1.36E+09	USEPA, December 2002	
	IR	Inhalation Rate	m^3/hour	0.625	USEPA Region 4, May 2000	0.625	USEPA Region 4, May 2000	
	ET	Exposure Time	hours/day	24	USEPA Region 4, May 2000	24	USEPA Region 4, May 2000	
	EF	Exposure Frequency	days/year	350	USEPA Region 4, May 2000	234	USEPA, May 1993	
	ED	Exposure Duration	years	6	USEPA Region 4, May 2000	2	USEPA, May 1993	
	BW	Body Weight	kg	15	USEPA Region 4, May 2000	15	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED x (1/PEF)+(1/VF)) / (BW x AT)

Cancer Inhalation Intake(RME) = 8.22E-02
Noncancer Inhalation Intake(RME) = 9.59E-01

Cancer Inhalation Intake(CTE) = 1.83E-02
Noncancer Inhalation Intake(CTE) = 6.41E-01

TABLE 7.10. REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chromium	5.04E+01	mg/kg	3.71E-08	mg/m^3	R	3.6E-08	mg/kg-day	3.00E-05	mg/kg-day	1.00E-04	mg/m^3	1.2E-03
	Trichloroethene	3.20E+00	mg/kg	9.14E-04	mg/m^3	R	8.8E-04	mg/kg-day	1.70E-01	mg/kg-day	6.0E-01	mg/m^3	5.2E-03
	(total)												1.2E-03
				1.00E+99	Chromium								
				3.50E+03	VF (TCE)								
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-03**

8.10. REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chromium	5.04E+01	mg/kg	3.71E-08	mg/m^3	R	3.0E-09	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Trichloroethene	3.20E+00	mg/kg	9.14E-04	mg/m^3	R	7.5E-05	mg/kg-day	7.00E-03	$(mg/kg\text{-}day)^{-1}$	5.3E-07
	(total)										6.5E-07
										Total Risk Across All Exposure Routes/Pathways	**6.5E-07**

TABLE 7.10a. CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chromium	5.04E+01	mg/kg	3.71E-08	mg/m^3	R	2.4E-08	mg/kg-day	3.00E-05	mg/kg-day	1.00E-04	mg/m^3	7.9E-04
	Trichloroethene	3.20E+00	mg/kg	9.14E-04	mg/m^3	R	5.9E-04	mg/kg-day	1.70E-01	mg/kg-day	6.0E-01	mg/m^3	3.4E-03
	(total)												7.9E-04
				1.00E+99	Chromium								
				3.50E+03	VF (TCE)								

Total Hazard Index Across All Exposure Routes/Pathways **7.9E-04**

8.10a. CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS BY INHALATION FROM SURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chromium	5.04E+01	mg/kg	3.71E-08	mg/m^3	R	6.8E-10	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	2.9E-08
	Trichloroethene	3.20E+00	mg/kg	9.14E-04	mg/m^3	R	1.7E-05	mg/kg-day	7.00E-03	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	(total)										1.5E-07
										Total Risk Across All Exposure Routes/Pathways	**1.5E-07**

TABLE 4.11
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	330	USEPA, December 2002	330	USEPA, December 2002	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	unitless	1	USEPA Region 4, May 2000	1	USEPA, May 1993	BW x AT
	EF	Exposure Frequency	days/year	30	Professional Judgement	30	Professional Judgement	U.S. EPA, December 1989
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	---	1.0E-06	---	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,300	USEPA, July 2004	3,300	USEPA, July 2004	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.3	USEPA, July 2004	0.1	USEPA, July 2004	U.S. EPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA, July 2004	chemical specific	USEPA, July 2004	
	EF	Exposure Frequency	days/year	30	USEPA Region 4, May 2000	30	USEPA, May 1993	
	ED	Exposure Duration	years	1	USEPA Region 4, May 2000	1	USEPA, May 1993	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	

1 CDI = Chronic Daily Intake

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 5.54E-09
Noncancer Ingestion Intake - RME = 3.87E-07

Cancer Ingestion Intake - CTE = 5.54E-09
Noncancer Ingestion Intake - CTE = 3.87E-07

Cancer Dermal Intake - RME = 1.66E-08
Noncancer Dermal Intake - RME = 1.16E-06

Cancer Dermal Intake - CTE = 5.54E-09
Noncancer Dermal Intake - CTE = 3.87E-07

TABLE 7.11 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SUBSURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2,2-TETRACHLOROETHAN	2.10E-01	mg/kg	2.10E-01	mg/kg	M	8.1E-08	mg/kg-day	6.0E-02	mg/kg-day	NA	NA	1.4E-06
	1,1,2-TRICHLOROETHANE	2.70E-01	mg/kg	2.70E-01	mg/kg	M	1.0E-07	mg/kg-day	4.0E-03	mg/kg-day	NA	NA	2.6E-05
	1,2-DICHLOROPROPANE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	1.5E-09	mg/kg-day		mg/kg-day	NA	NA	
	ACETONE	9.00E-01	mg/kg	9.00E-01	mg/kg	M	3.5E-07	mg/kg-day	9.0E-01	mg/kg-day	NA	NA	3.9E-07
	BENZENE	2.00E-03	mg/kg	2.00E-03	mg/kg	M	7.7E-10	mg/kg-day	4.0E-03	mg/kg-day	NA	NA	1.9E-07
	BROMODICHLOROMETHANE	1.60E-01	mg/kg	1.60E-01	mg/kg	M	6.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	CARBON TETRACHLORIDE	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.0E-06	mg/kg-day	7.4E-04	mg/kg-day	NA	NA	2.7E-03
	CHLOROFORM	9.10E+00	mg/kg	9.10E+00	mg/kg	M	3.5E-06	mg/kg-day	1.0E-02	mg/kg-day	NA	NA	3.5E-04
	CHLOROMETHANE	8.80E-02	mg/kg	8.80E-02	mg/kg	M	3.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	5.4E-09	mg/kg-day	6.0E-02	mg/kg-day	NA	NA	9.0E-08
	TETRACHLOROETHENE	5.60E-02	mg/kg	5.60E-02	mg/kg	M	2.2E-08	mg/kg-day	1.0E-02	mg/kg-day	NA	NA	2.2E-06
	TRICHLOROETHENE	9.10E+02	mg/kg	9.10E+02	mg/kg	M	3.5E-04	mg/kg-day	5.0E-01	mg/kg-day	NA	NA	7.1E-04
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	1.9E-09	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	6.5E-07
	CIS-1,2-DICHLOROETHENE	1.30E+00	mg/kg	1.30E+00	mg/kg	M	5.0E-07	mg/kg-day	1.0E-02	mg/kg-day	NA	NA	5.0E-05
	2,4-DINITROTOLUENE	5.10E-01	mg/kg	5.10E-01	mg/kg	M	2.0E-07	mg/kg-day	2.0E-03	mg/kg-day	NA	NA	9.9E-05
	2,4,6-TRINITROTOLUENE	3.60E-01	mg/kg	3.50E-01	mg/kg	M	1.4E-07	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	2.7E-04
	PENTACHLOROPHENOL	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.5E-07	mg/kg-day	3.0E-02	mg/kg-day	NA	NA	4.9E-06
	ALUMINUM	2.36E+04	mg/kg	2.36E+04	mg/kg	M	9.1E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	9.1E-03
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.0E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.7E-03
	BARIUM	5.11E+01	mg/kg	5.11E+01	mg/kg	M	2.0E-05	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	9.9E-05
	CADMIUM	5.60E-01	mg/kg	5.60E-01	mg/kg	M	2.2E-07	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	4.3E-04
	CHROMIUM	3.36E+01	mg/kg	3.36E+01	mg/kg	M	1.3E-05	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	4.3E-03
	COBALT	3.00E+00	mg/kg	3.00E+00	mg/kg	M	1.2E-06	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	5.8E-05
	NICKEL	6.80E+00	mg/kg	6.80E+00	mg/kg	M	2.6E-06	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	1.3E-04
	VANADIUM	3.94E+01	mg/kg	3.94E+01	mg/kg	M	1.5E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.5E-02
	ZINC	3.96E+01	mg/kg	3.96E+01	mg/kg	M	1.5E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	5.1E-05
	CYANIDE	5.00E+00	mg/kg	5.00E+00	mg/kg	M	1.9E-06	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	9.7E-05
	(total)												4.1E-02

TABLE 7.11 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SUBSURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1,2,2-TETRACHLOROETHAN	2.10E-01	mg/kg	2.10E-01	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-TRICHLOROETHANE	2.70E-01	mg/kg	2.70E-01	mg/kg	M		mg/kg-day	4.0E-03	mg/kg-day	NA	NA	
	1,2-DICHLOROPROPANE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	ACETONE	9.00E-01	mg/kg	9.00E-01	mg/kg	M		mg/kg-day	9.0E-01	mg/kg-day	NA	NA	
	BENZENE	2.00E-03	mg/kg	2.00E-03	mg/kg	M		mg/kg-day	4.0E-03	mg/kg-day	NA	NA	
	BROMODICHLOROMETHANE	1.60E-01	mg/kg	1.60E-01	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	CARBON TETRACHLORIDE	5.20E+00	mg/kg	5.20E+00	mg/kg	M		mg/kg-day	7.4E-04	mg/kg-day	NA	NA	
	CHLOROFORM	9.10E+00	mg/kg	9.10E+00	mg/kg	M		mg/kg-day	1.0E-02	mg/kg-day	NA	NA	
	CHLOROMETHANE	8.80E-02	mg/kg	8.80E-02	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	6.0E-02	mg/kg-day	NA	NA	
	TETRACHLOROETHENE	5.60E-02	mg/kg	5.60E-02	mg/kg	M		mg/kg-day	1.0E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	9.10E+02	mg/kg	9.10E+02	mg/kg	M		mg/kg-day	5.0E-01	mg/kg-day	NA	NA	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.0E-03	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	1.30E+00	mg/kg	1.30E+00	mg/kg	M		mg/kg-day	1.0E-02	mg/kg-day	NA	NA	
	2,4-DINITROTOLUENE	5.10E-01	mg/kg	5.10E-01	mg/kg	M	6.0E-08	mg/kg-day	2.0E-03	mg/kg-day	NA	NA	3.0E-05
	2,4,6-TRINITROTOLUENE	3.50E-01	mg/kg	3.50E-01	mg/kg	M	1.3E-08	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	2.6E-05
	PENTACHLOROPHENOL	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.1E-07	mg/kg-day	3.0E-02	mg/kg-day	NA	NA	3.7E-06
	ALUMINUM	2.36E+04	mg/kg	2.36E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	1.8E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.0E-04
	BARIUM	5.11E+01	mg/kg	5.11E+01	mg/kg	M		mg/kg-day	1.4E-02	mg/kg-day	NA	NA	
	CADMIUM	5.60E-01	mg/kg	5.60E-01	mg/kg	M	6.5E-10	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.6E-05
	CHROMIUM	3.36E+01	mg/kg	3.36E+01	mg/kg	M		mg/kg-day	7.5E-05	mg/kg-day	NA	NA	
	COBALT	3.00E+00	mg/kg	3.00E+00	mg/kg	M		mg/kg-day	2.0E-02	mg/kg-day	NA	NA	
	NICKEL	6.80E+00	mg/kg	6.80E+00	mg/kg	M		mg/kg-day	8.0E-04	mg/kg-day	NA	NA	
	VANADIUM	3.94E+01	mg/kg	3.94E+01	mg/kg	M		mg/kg-day	2.5E-05	mg/kg-day	NA	NA	
	ZINC	3.96E+01	mg/kg	3.96E+01	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	CYANIDE	5.00E+00	mg/kg	5.00E+00	mg/kg	M	5.9E-07	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	3.0E-05
	(total)												7.2E-04
												Total Hazard Index Across All Exposure Routes/Pathways	4.1E-02

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

2,4-dinitrotoluene - 0.102 Arsenic - 0.03
2,4,6-Trinitrotoluene - 0.032 Cadmium - 0.001
Pentachlorophenol - 0.25 Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 8.11 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SUBSURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2,2-TETRACHLOROETHAN	2.10E-01	mg/kg	2.10E-01	mg/kg	M	1.2E-09	mg/kg-day	2.0E-01	(mg/kg-day)$^{-1}$	2.3E-10
	1,1,2-TRICHLOROETHANE	2.70E-01	mg/kg	2.70E-01	mg/kg	M	1.5E-09	mg/kg-day	5.7E-02	(mg/kg-day)$^{-1}$	8.5E-11
	1,2-DICHLOROPROPANE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	2.2E-11	mg/kg-day	6.8E-02	(mg/kg-day)$^{-1}$	1.5E-12
	ACETONE	9.00E-01	mg/kg	9.00E-01	mg/kg	M	5.0E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZENE	2.00E-03	mg/kg	2.00E-03	mg/kg	M	1.1E-11	mg/kg-day	5.5E-02	(mg/kg-day)$^{-1}$	6.1E-13
	BROMODICHLOROMETHANE	1.60E-01	mg/kg	1.60E-01	mg/kg	M	8.9E-10	mg/kg-day		(mg/kg-day)$^{-1}$	
	CARBON TETRACHLORIDE	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.9E-08	mg/kg-day	1.3E-01	(mg/kg-day)$^{-1}$	3.7E-09
	CHLOROFORM	9.10E+00	mg/kg	9.10E+00	mg/kg	M	5.0E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHLOROMETHANE	8.80E-02	mg/kg	8.80E-02	mg/kg	M	4.9E-10	mg/kg-day		(mg/kg-day)$^{-1}$	
	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	7.7E-11	mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	5.8E-13
	TETRACHLOROETHENE	5.60E-02	mg/kg	5.60E-02	mg/kg	M	3.1E-10	mg/kg-day	5.4E-01	(mg/kg-day)$^{-1}$	1.7E-10
	TRICHLOROETHENE	9.10E+02	mg/kg	9.10E+02	mg/kg	M	5.0E-06	mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	6.5E-08
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	2.8E-11	mg/kg-day	7.2E-01	(mg/kg-day)$^{-1}$	2.0E-11
	CIS-1,2-DICHLOROETHENE	1.30E+00	mg/kg	1.30E+00	mg/kg	M	7.2E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	2,4-DINITROTOLUENE	5.10E-01	mg/kg	5.10E-01	mg/kg	M	2.8E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	2,4,6-TRINITROTOLUENE	3.50E-01	mg/kg	3.50E-01	mg/kg	M	1.9E-09	mg/kg-day	3.0E-02	(mg/kg-day)$^{-1}$	5.8E-11
	PENTACHLOROPHENOL	3.80E-01	mg/kg	3.80E-01	mg/kg	M	2.1E-09	mg/kg-day	2.0E-01	(mg/kg-day)$^{-1}$	4.2E-10
	ALUMINUM	2.36E+04	mg/kg	2.36E+04	mg/kg	M	1.3E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.9E-08	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	4.3E-08
	BARIUM	5.11E+01	mg/kg	5.11E+01	mg/kg	M	2.8E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	5.60E-01	mg/kg	5.60E-01	mg/kg	M	3.1E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	3.36E+01	mg/kg	3.36E+01	mg/kg	M	1.9E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	3.00E+00	mg/kg	3.00E+00	mg/kg	M	1.7E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	6.60E+00	mg/kg	6.60E+00	mg/kg	M	3.8E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	VANADIUM	3.94E+01	mg/kg	3.94E+01	mg/kg	M	2.2E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	3.96E+01	mg/kg	3.96E+01	mg/kg	M	2.2E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	CYANIDE	5.00E+00	mg/kg	5.00E+00	mg/kg	M	2.8E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										1.1E-07

TABLE 8.11 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SUBSURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1,2,2-TETRACHLOROETHAN	2.10E-01	mg/kg	2.10E-01	mg/kg	M		mg/kg-day	2.0E-01	(mg/kg-day)$^{-1}$	
	1,1,2-TRICHLOROETHANE	2.70E-01	mg/kg	2.70E-01	mg/kg	M		mg/kg-day	5.7E-02	(mg/kg-day)$^{-1}$	
	1,2-DICHLOROPROPANE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	6.8E-02	(mg/kg-day)$^{-1}$	
	ACETONE	9.00E-01	mg/kg	9.00E-01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZENE	2.00E-03	mg/kg	2.00E-03	mg/kg	M		mg/kg-day	5.5E-02	(mg/kg-day)$^{-1}$	
	BROMODICHLOROMETHANE	1.60E-01	mg/kg	1.60E-01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	CARBON TETRACHLORIDE	5.20E+00	mg/kg	5.20E+00	mg/kg	M		mg/kg-day	1.3E-01	(mg/kg-day)$^{-1}$	
	CHLOROFORM	9.10E+00	mg/kg	9.10E+00	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	CHLOROMETHANE	8.80E-02	mg/kg	8.80E-02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	
	TETRACHLOROETHENE	5.60E-02	mg/kg	5.60E-02	mg/kg	M		mg/kg-day	5.4E-01	(mg/kg-day)$^{-1}$	
	TRICHLOROETHENE	9.10E+02	mg/kg	9.10E+02	mg/kg	M		mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	7.2E-01	(mg/kg-day)$^{-1}$	
	CIS-1,2-DICHLOROETHENE	1.30E+00	mg/kg	1.30E+00	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	2,4-DINITROTOLUENE	5.10E-01	mg/kg	5.10E-01	mg/kg	M	8.6E-10	mg/kg-day		(mg/kg-day)$^{-1}$	
	2,4,6-TRINITROTOLUENE	3.50E-01	mg/kg	3.50E-01	mg/kg	M	1.9E-10	mg/kg-day	3.0E-02	(mg/kg-day)$^{-1}$	5.6E-12
	PENTACHLOROPHENOL	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.6E-09	mg/kg-day	2.0E-01	(mg/kg-day)$^{-1}$	3.2E-10
	ALUMINUM	2.36E+04	mg/kg	2.36E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.6E-09	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	3.9E-09
	BARIUM	5.11E+01	mg/kg	5.11E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	5.60E-01	mg/kg	5.60E-01	mg/kg	M	9.3E-12	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	3.36E+01	mg/kg	3.36E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	3.00E+00	mg/kg	3.00E+00	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	6.80E+00	mg/kg	6.80E+00	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	VANADIUM	3.94E+01	mg/kg	3.94E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	3.96E+01	mg/kg	3.96E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	CYANIDE	5.00E+00	mg/kg	5.00E+00	mg/kg	M	8.5E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										4.2E-09
										Total Risk Across All Exposure Routes/Pathways	1.2E-07

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

2,4-dinitrotoluene - 0.102 Arsenic - 0.03
2,4,6-Trinitrotoluene - 0.032 Cadmium - 0.001
Pentachlorophenol - 0.25 Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 7.11a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SUBSURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2,2-TETRACHLOROETHAN	2.10E-01	mg/kg	2.10E-01	mg/kg	M	8.1E-08	mg/kg-day	6.0E-02	mg/kg-day	NA	NA	1.4E-06
	1,1,2-TRICHLOROETHANE	2.70E-01	mg/kg	2.70E-01	mg/kg	M	1.0E-07	mg/kg-day	4.0E-03	mg/kg-day	NA	NA	2.8E-05
	1,2-DICHLOROPROPANE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	1.5E-09	mg/kg-day		mg/kg-day	NA	NA	
	ACETONE	9.00E-01	mg/kg	9.00E-01	mg/kg	M	3.5E-07	mg/kg-day	9.0E-01	mg/kg-day	NA	NA	3.9E-07
	BENZENE	2.00E-03	mg/kg	2.00E-03	mg/kg	M	7.7E-10	mg/kg-day	4.0E-03	mg/kg-day	NA	NA	1.9E-07
	BROMODICHLOROMETHANE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	6.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	CARBON TETRACHLORIDE	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.0E-06	mg/kg-day	7.4E-04	mg/kg-day	NA	NA	2.7E-03
	CHLOROFORM	9.10E+00	mg/kg	9.10E+00	mg/kg	M	3.5E-06	mg/kg-day	1.0E-02	mg/kg-day	NA	NA	3.5E-04
	CHLOROMETHANE	8.80E-02	mg/kg	8.80E-02	mg/kg	M	3.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	5.4E-09	mg/kg-day	6.0E-02	mg/kg-day	NA	NA	9.0E-08
	TETRACHLOROETHENE	5.60E-02	mg/kg	5.60E-02	mg/kg	M	2.2E-08	mg/kg-day	1.0E-02	mg/kg-day	NA	NA	2.2E-06
	TRICHLOROETHENE	9.10E+02	mg/kg	9.10E+02	mg/kg	M	3.5E-04	mg/kg-day	5.0E-01	mg/kg-day	NA	NA	7.1E-04
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	1.9E-09	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	6.5E-07
	CIS-1,2-DICHLOROETHENE	1.30E+00	mg/kg	1.30E+00	mg/kg	M	5.0E-07	mg/kg-day	1.0E-02	mg/kg-day	NA	NA	5.0E-05
	2,4-DINITROTOLUENE	5.10E-01	mg/kg	5.10E-01	mg/kg	M	2.0E-07	mg/kg-day	2.0E-03	mg/kg-day	NA	NA	9.9E-05
	2,4,6-TRINITROTOLUENE	3.50E-01	mg/kg	3.50E-01	mg/kg	M	1.4E-07	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	2.7E-04
	PENTACHLOROPHENOL	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.5E-07	mg/kg-day	3.0E-02	mg/kg-day	NA	NA	4.9E-06
	ALUMINUM	2.36E+04	mg/kg	2.36E+04	mg/kg	M	9.1E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	9.1E-03
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.0E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.7E-03
	BARIUM	5.11E+01	mg/kg	5.11E+01	mg/kg	M	2.0E-05	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	9.8E-05
	CADMIUM	5.60E-01	mg/kg	5.60E-01	mg/kg	M	2.2E-07	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	4.3E-04
	CHROMIUM	3.36E+01	mg/kg	3.36E+01	mg/kg	M	1.3E-05	mg/kg-day	3.0E-03	mg/kg-day	NA	NA	4.3E-03
	COBALT	3.00E+00	mg/kg	3.00E+00	mg/kg	M	1.2E-06	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	5.8E-05
	NICKEL	8.60E+00	mg/kg	8.60E+00	mg/kg	M	2.6E-06	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	1.3E-04
	VANADIUM	3.94E+01	mg/kg	3.94E+01	mg/kg	M	1.5E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.5E-02
	ZINC	3.96E+01	mg/kg	3.96E+01	mg/kg	M	1.5E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	5.1E-05
	CYANIDE	5.00E+00	mg/kg	5.00E+00	mg/kg	M	1.9E-06	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	9.7E-05
	(total)												4.1E-02

TABLE 7.11a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SUBSURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1,2,2-TETRACHLOROETHAN	2.10E-01	mg/kg	2.10E-01	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-TRICHLOROETHANE	2.70E-01	mg/kg	2.70E-01	mg/kg	M		mg/kg-day	4.0E-03	mg/kg-day	NA	NA	
	1,2-DICHLOROPROPANE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	ACETONE	9.00E-01	mg/kg	9.00E-01	mg/kg	M		mg/kg-day	9.0E-01	mg/kg-day	NA	NA	
	BENZENE	2.00E-03	mg/kg	2.00E-03	mg/kg	M		mg/kg-day	4.0E-03	mg/kg-day	NA	NA	
	BROMODICHLOROMETHANE	1.60E-01	mg/kg	1.60E-01	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	CARBON TETRACHLORIDE	5.20E+00	mg/kg	5.20E+00	mg/kg	M		mg/kg-day	7.4E-04	mg/kg-day	NA	NA	
	CHLOROFORM	9.10E+00	mg/kg	9.10E+00	mg/kg	M		mg/kg-day	1.0E-02	mg/kg-day	NA	NA	
	CHLOROMETHANE	8.80E-02	mg/kg	8.80E-02	mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	6.0E-02	mg/kg-day	NA	NA	
	TETRACHLOROETHENE	5.60E-02	mg/kg	5.60E-02	mg/kg	M		mg/kg-day	1.0E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	9.10E+02	mg/kg	9.10E+02	mg/kg	M		mg/kg-day	5.0E-01	mg/kg-day	NA	NA	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.0E-03	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	1.30E+00	mg/kg	1.30E+00	mg/kg	M		mg/kg-day	1.0E-02	mg/kg-day	NA	NA	
	2,4-DINITROTOLUENE	5.10E-01	mg/kg	5.10E-01	mg/kg	M	2.0E-08	mg/kg-day	2.0E-03	mg/kg-day	NA	NA	1.0E-05
	2,4,6-TRINITROTOLUENE	3.50E-01	mg/kg	3.50E-01	mg/kg	M	4.3E-09	mg/kg-day	5.0E-04	mg/kg-day	NA	NA	8.7E-06
	PENTACHLOROPHENOL	3.80E-01	mg/kg	3.80E-01	mg/kg	M	3.7E-08	mg/kg-day	3.0E-02	mg/kg-day	NA	NA	1.2E-06
	ALUMINUM	2.36E+04	mg/kg	2.36E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	6.0E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.0E-04
	BARIUM	5.11E+01	mg/kg	5.11E+01	mg/kg	M		mg/kg-day	1.4E-02	mg/kg-day	NA	NA	
	CADMIUM	5.60E-01	mg/kg	5.60E-01	mg/kg	M	2.2E-10	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	8.7E-06
	CHROMIUM	3.36E+01	mg/kg	3.36E+01	mg/kg	M		mg/kg-day	7.5E-05	mg/kg-day	NA	NA	
	COBALT	3.00E+00	mg/kg	3.00E+00	mg/kg	M		mg/kg-day	2.0E-02	mg/kg-day	NA	NA	
	NICKEL	8.80E+00	mg/kg	8.80E+00	mg/kg	M		mg/kg-day	8.0E-04	mg/kg-day	NA	NA	
	VANADIUM	3.94E+01	mg/kg	3.94E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	ZINC	3.96E+01	mg/kg	3.96E+01	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	CYANIDE	5.00E+00	mg/kg	5.00E+00	mg/kg	M	2.0E-07	mg/kg-day	2.0E-02	mg/kg-day	NA	NA	9.9E-06
	(total)												2.4E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**4.1E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

2,4-dinitrotoluene - 0.102 Arsenic - 0.03
2,4,6-Trinitrotoluene - 0.032 Cadmium - 0.001
Pentachlorophenol - 0.25 Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 8.11a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SUBSURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2,2-TETRACHLOROETHAN	2.10E-01	mg/kg	2.10E-01	mg/kg	M	1.2E-09	mg/kg-day	2.0E-01	(mg/kg-day)$^{-1}$	2.3E-10
	1,1,2-TRICHLOROETHANE	2.70E-01	mg/kg	2.70E-01	mg/kg	M	1.5E-09	mg/kg-day	5.7E-02	(mg/kg-day)$^{-1}$	8.5E-11
	1,2-DICHLOROPROPANE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	2.2E-11	mg/kg-day	6.8E-02	(mg/kg-day)$^{-1}$	1.5E-12
	ACETONE	9.00E-01	mg/kg	9.00E-01	mg/kg	M	5.0E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZENE	2.00E-03	mg/kg	2.00E-03	mg/kg	M	1.1E-11	mg/kg-day	5.5E-02	(mg/kg-day)$^{-1}$	6.1E-13
	BROMODICHLOROMETHANE	1.60E-01	mg/kg	1.60E-01	mg/kg	M	8.9E-10	mg/kg-day		(mg/kg-day)$^{-1}$	
	CARBON TETRACHLORIDE	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.9E-08	mg/kg-day	1.3E-01	(mg/kg-day)$^{-1}$	3.7E-09
	CHLOROFORM	9.10E+00	mg/kg	9.10E+00	mg/kg	M	5.0E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHLOROMETHANE	8.80E-02	mg/kg	8.80E-02	mg/kg	M	4.9E-10	mg/kg-day		(mg/kg-day)$^{-1}$	
	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M	7.7E-11	mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	5.8E-13
	TETRACHLOROETHENE	5.60E-02	mg/kg	5.60E-02	mg/kg	M	3.1E-10	mg/kg-day	5.4E-01	(mg/kg-day)$^{-1}$	1.7E-10
	TRICHLOROETHENE	9.10E+02	mg/kg	9.10E+02	mg/kg	M	5.0E-06	mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	6.5E-08
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	2.8E-11	mg/kg-day	7.2E-01	(mg/kg-day)$^{-1}$	2.0E-11
	CIS-1,2-DICHLOROETHENE	1.30E+00	mg/kg	1.30E+00	mg/kg	M	7.2E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	2,4-DINITROTOLUENE	5.10E-01	mg/kg	5.10E-01	mg/kg	M	2.8E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	2,4,6-TRINITROTOLUENE	3.50E-01	mg/kg	3.50E-01	mg/kg	M	1.9E-09	mg/kg-day	3.0E-02	(mg/kg-day)$^{-1}$	5.6E-11
	PENTACHLOROPHENOL	3.80E-01	mg/kg	3.80E-01	mg/kg	M	2.1E-09	mg/kg-day	2.0E-01	(mg/kg-day)$^{-1}$	4.2E-10
	ALUMINUM	2.36E+04	mg/kg	2.36E+04	mg/kg	M	1.3E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	2.9E-08	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	4.3E-08
	BARIUM	5.11E+01	mg/kg	5.11E+01	mg/kg	M	2.8E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	5.60E-01	mg/kg	5.60E-01	mg/kg	M	3.1E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	3.36E+01	mg/kg	3.36E+01	mg/kg	M	1.9E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	3.00E+00	mg/kg	3.00E+00	mg/kg	M	1.7E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	6.80E+00	mg/kg	6.80E+00	mg/kg	M	3.8E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	VANADIUM	3.94E+01	mg/kg	3.94E+01	mg/kg	M	2.2E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	3.96E+01	mg/kg	3.96E+01	mg/kg	M	2.2E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	CYANIDE	5.00E+00	mg/kg	5.00E+00	mg/kg	M	2.8E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										1.1E-07

TABLE 8.11a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO SUBSURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire SWMU 17
Receptor Population: Conetruction/Excavation Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1,2,2-TETRACHLOROETHAN	2.10E-01	mg/kg	2.10E-01	mg/kg	M		mg/kg-day	2.0E-01	(mg/kg-day)$^{-1}$	
	1,1,2-TRICHLOROETHANE	2.70E-01	mg/kg	2.70E-01	mg/kg	M		mg/kg-day	5.7E-02	(mg/kg-day)$^{-1}$	
	1,2-DICHLOROPROPANE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	6.8E-02	(mg/kg-day)$^{-1}$	
	ACETONE	9.00E-01	mg/kg	9.00E-01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	BENZENE	2.00E-03	mg/kg	2.00E-03	mg/kg	M		mg/kg-day	5.5E-02	(mg/kg-day)$^{-1}$	
	BROMODICHLOROMETHANE	1.60E-01	mg/kg	1.60E-01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	CARBON TETRACHLORIDE	5.20E+00	mg/kg	5.20E+00	mg/kg	M		mg/kg-day	1.3E-01	(mg/kg-day)$^{-1}$	
	CHLOROFORM	9.10E+00	mg/kg	9.10E+00	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	CHLOROMETHANE	8.80E-02	mg/kg	8.80E-02	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	METHYLENE CHLORIDE	1.40E-02	mg/kg	1.40E-02	mg/kg	M		mg/kg-day	7.5E-03	(mg/kg-day)$^{-1}$	
	TETRACHLOROETHENE	5.60E-02	mg/kg	5.60E-02	mg/kg	M		mg/kg-day	5.4E-01	(mg/kg-day)$^{-1}$	
	TRICHLOROETHENE	9.10E+02	mg/kg	9.10E+02	mg/kg	M		mg/kg-day	1.3E-02	(mg/kg-day)$^{-1}$	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	7.2E-01	(mg/kg-day)$^{-1}$	
	CIS-1,2-DICHLOROETHENE	1.30E+00	mg/kg	1.30E+00	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	2,4-DINITROTOLUENE	5.10E-01	mg/kg	5.10E-01	mg/kg	M	2.9E-10	mg/kg-day		(mg/kg-day)$^{-1}$	
	2,4,6-TRINITROTOLUENE	3.50E-01	mg/kg	3.50E-01	mg/kg	M	6.2E-11	mg/kg-day	3.0E-02	(mg/kg-day)$^{-1}$	1.9E-12
	PENTACHLOROPHENOL	3.80E-01	mg/kg	3.80E-01	mg/kg	M	5.3E-10	mg/kg-day	2.0E-01	(mg/kg-day)$^{-1}$	1.1E-10
	ALUMINUM	2.36E+04	mg/kg	2.36E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ARSENIC	5.20E+00	mg/kg	5.20E+00	mg/kg	M	8.8E-10	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	1.3E-09
	BARIUM	5.11E+01	mg/kg	5.11E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	CADMIUM	5.60E-01	mg/kg	5.60E-01	mg/kg	M	3.1E-12	mg/kg-day		(mg/kg-day)$^{-1}$	
	CHROMIUM	3.36E+01	mg/kg	3.36E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	COBALT	3.00E+00	mg/kg	3.00E+00	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	NICKEL	6.60E+00	mg/kg	6.60E+00	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	VANADIUM	3.94E+01	mg/kg	3.94E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	ZINC	3.96E+01	mg/kg	3.96E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	CYANIDE	5.00E+00	mg/kg	5.00E+00	mg/kg	M	2.8E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										1.4E-09
										Total Risk Across All Exposure Routes/Pathways	1.1E-07

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

2,4-dinitrotoluene - 0.102 Arsenic - 0.03
2,4,6-Trinitrotoluene - 0.032 Cadmium - 0.001
Pentachlorophenol - 0.25 Other Metals and Volatiles - not evaluated for dermal contact with soil.

TABLE 4.12

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS BY INHALATION FROM SUBSURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Workers
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical concentration in soil	mg/kg	95% UCL or Max	USEPA, December 2002	95% UCL or Max	USEPA, December 2002	Intake (mg/kg/day) = $\frac{CS \times IR \times \left[\frac{1}{VF} + \frac{1}{PEF}\right] \times ET \times EF \times ED}{BW \times AT}$
	VF	Volatilization factor	m^3/kg	Chemical Specific	USEPA, December 2002	Chemical Specific	USEPA, December 2002	
	PEF	Particulate emission factor	m^3/kg	1.27E+06	USEPA, December 2002	1.27E+06	USEPA, December 2002	
	IR	Inhalation Rate	m^3/hour	2.5	USEPA Region 4, May 2000	1.5	USEPA, August 1997	
	ET	Exposure Time	hours/day	8	USEPA Region 4, May 2000	8	USEPA Region 4, May 2000	
	EF	Exposure Frequency	days/year	30	Professional Judgement	30	Professional Judgement	
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED x (1/PEF)+(1/VF)) / (BW x AT)

Cancer Inhalation Intake(RME) = 3.35E-04
Noncancer Inhalation Intake(RME) = 2.35E-02

Cancer Inhalation Intake(CTE) = 2.01E-04
Noncancer Inhalation Intake(CTE) = 1.41E-02

TABLE 7.12. REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS BY INHALATION FROM SUBSURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Workers
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Carbon Tetrachloride	5.20E+00	mg/kg	2.37E-03	mg/m^3	R	5.6E-05	mg/kg-day	5.00E-02	mg/kg-day	1.75E-01	mg/m^3	1.1E-03
	Trichloroethene	9.10E+02	mg/kg	2.61E-01	mg/m^3	R	6.1E-03	mg/kg-day	1.70E-01	mg/kg-day	6.0E-01	mg/m^3	3.6E-02
	(total)												3.7E-02
				2.20E+03	VF (Carbon Tetrachloride)							**Total Hazard Index Across All Exposure Routes/Pathways**	**3.7E-02**
				3.50E+03	VF (TCE)								

8.12. REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS BY INHALATION FROM SUBSURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Workers
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Carbon Tetrachloride	5.20E+00	mg/kg	2.37E-03	mg/m^3	R	7.9E-07	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	4.2E-08
	Trichloroethene	9.10E+02	mg/kg	2.61E-01	mg/m^3	R	8.7E-05	mg/kg-day	7.00E-03	$(mg/kg\text{-}day)^{-1}$	6.1E-07
	(total)										6.5E-07
										Total Risk Across All Exposure Routes/Pathways	**6.5E-07**

TABLE 7.12a. CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS BY INHALATION FROM SUBSURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Workers
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Carbon Tetrachloride	5.20E+00	mg/kg	2.37E-03	mg/m^3	R	3.3E-05	mg/kg-day	5.00E-02	mg/kg-day	1.75E-01	mg/m^3	6.7E-04
	Trichloroethene	9.10E+02	mg/kg	2.61E-01	mg/m^3	R	3.7E-03	mg/kg-day	1.70E-01	mg/kg-day	6.0E-01	mg/m^3	2.2E-02
	(total)												2.2E-02
				2.20E+03	VF (Carbon Tetrachloride)				**Total Hazard Index Across All Exposure Routes/Pathways**				**2.2E-02**
				3.50E+03	VF (TCE)								

8.12a. CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS BY INHALATION FROM SUBSURFACE SOIL
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Workers
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Carbon Tetrachloride	5.20E+00	mg/kg	2.37E-03	mg/m^3	R	4.8E-07	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	2.5E-08
	Trichloroethene	9.10E+02	mg/kg	2.61E-01	mg/m^3	R	5.2E-05	mg/kg-day	7.00E-03	$(mg/kg\text{-}day)^{-1}$	3.7E-07
	(total)										3.9E-07
										Total Risk Across All Exposure Routes/Pathways	**3.9E-07**

TABLE 4.13
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cgw	Chemical Concentration in Groundwater	mg/L	Maximum	USEPA, December 2002	Maximum	USEPA, December 2002	The equations and parameters for for estimating DAevent and the chemical-specific dermally absorbed dose from water (DAD) are provided in Section 6.2.4. of the text.
	A	Skin Surface Area	cm^2	3,300	USEPA, July 2004	3,300	USEPA, July 2004	
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	EF	Exposure Frequency	days/year	30	Professional Judgement	30	Professional Judgement	
	t_{event}	Duration of Event	hour/event	4	Professional Judgement	2	Professional Judgement	USEPA, July 2004
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	T	Lag Time	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	

Daily Intake Calculations

Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 5.54E-02
Noncancer Dermal Intake(RME) = 3.87E+00

Cancer Dermal Intake(CTE) = 5.54E-02
Noncancer Dermal Intake(CTE) = 3.87E+00

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) — CONSTRUCTION/EXCAVATION WORKERS TO GROUNDWATER

SITE NAME: SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
LOCATION: NWS CHARLESTON, SOUTH CAROLINA
DATE: 09/22/05

REFERENCES: U.S. EPA, July 2004

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent	FA	DAevent
1,1,2,2-Tetrachloroethane	1.40E-01	o	2.24E+00	4.00E+00	9.31E-01	6.94E-03	3.46E-02	5.63E-06	1	5.63E-06
1,1,2-Trichloroethane	9.30E-02	o	1.43E+00	4.00E+00	5.96E-01	6.44E-03	2.86E-02	3.06E-06	1	3.06E-06
1,1-Dichloroethene	1.10E-02	o	8.93E-01	4.00E+00	3.72E-01	1.17E-02	4.41E-02	5.91E-07	1	5.91E-07
1,2-Dichloroethane	1.40E-02	o	9.18E-01	4.00E+00	3.82E-01	4.20E-03	1.61E-02	2.77E-07	1	2.77E-07
1,2-Dichloropropane	2.00E-03	o	1.10E+00	4.00E+00	4.58E-01	7.76E-03	3.17E-02	7.49E-08	1	7.49E-08
Benzene	3.50E-02	o	7.00E-01	4.00E+00	2.92E-01	1.49E-02	5.05E-02	2.30E-06	1	2.30E-06
Bromodichloromethane	4.00E-03	o	2.12E+00	4.00E+00	8.83E-01	4.62E-03	2.27E-02	1.06E-07	1	1.06E-07
Carbon Tetrachloride	6.80E-02	o	1.86E+00	4.00E+00	7.76E-01	1.63E-02	7.78E-02	5.97E-06	1	5.97E-06
Chloroform	7.70E-01	o	1.19E+00	4.00E+00	4.98E-01	6.83E-03	2.87E-02	2.58E-05	1	2.58E-05
cis-1,2-Dichloroethene	2.50E+00	o	8.93E-01	4.00E+00	3.72E-01	7.71E-03	2.92E-02	8.97E-05	1	8.97E-05
Dichlorodifluoromethane	3.80E-01	o	1.22E+00	4.00E+00	5.07E-01	8.95E-03	3.79E-02	1.67E-05	1	1.67E-05
Methylene Chloride	1.90E-02	o	7.65E-01	4.00E+00	3.19E-01	3.54E-03	1.26E-02	3.09E-07	1	3.09E-07
Naphthalene	3.00E-03	o	1.34E+00	4.00E+00	5.58E-01	4.66E-02	2.03E-01	6.52E-07	1	6.52E-07
Tetrachloroethene	3.30E-01	o	2.18E+00	4.00E+00	9.06E-01	3.34E-02	1.66E-01	6.11E-05	1	6.11E-05
Toluene	9.80E-02	o	8.39E-01	4.00E+00	3.50E-01	3.11E-02	1.15E-01	1.33E-05	1	1.33E-05
Total 1,2-Dichloroethene	1.00E+00	o	8.93E-01	4.00E+00	3.72E-01	7.71E-03	2.92E-02	3.59E-05	1	3.59E-05
trans-1,2-Dichloroethene	2.50E-02	o	8.93E-01	4.00E+00	3.72E-01	7.71E-03	2.92E-02	8.97E-07	1	8.97E-07
Trichloroethene	1.30E+02	o	1.39E+00	4.00E+00	5.81E-01	1.16E-02	5.13E-02	7.60E-03	1	7.60E-03
Vinyl Chloride	2.10E-02	o	5.73E-01	4.00E+00	2.39E-01	5.60E-03	1.70E-02	5.19E-07	1	5.19E-07
Bis(2-Ethylhexyl)phthalate	5.40E-02	o	3.99E+01	4.00E+00	1.66E+01	2.49E-02	1.90E-01	3.04E-05	0.8	2.43E-05
RDX	2.10E-03	o	4.42E+00	4.00E+00	1.84E+00	3.39E-04	1.94E-03	5.34E-09	1	5.34E-09
Antimony	5.60E-03	i		4.00E+00		1.00E-03		2.24E-08	1	2.24E-08
Arsenic	2.27E-02	i		4.00E+00		1.00E-03		9.08E-08	1	9.08E-08
Barium	1.92E+00	i		4.00E+00		1.00E-03		7.68E-06	1	7.68E-06
Beryllium	4.36E-02	i		4.00E+00		1.00E-03		1.74E-07	1	1.74E-07
Cobalt	9.88E-01	i		4.00E+00		1.00E-03		3.95E-06	1	3.95E-06
Manganese	4.85E+00	i		4.00E+00		1.00E-03		1.94E-05	1	1.94E-05
Nickel	5.08E-01	i		4.00E+00		2.00E-04		4.06E-07	1	4.06E-07
Chloride	2.80E+03	i		4.00E+00		1.00E-03		1.12E-02	1	1.12E-02
Sulfate	3.20E+02	i		4.00E+00		1.00E-03		1.28E-03	1	1.28E-03

TABLE 7.13 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	1.40E-01	mg/L	M	2.2E-05	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	3.6E-04
	1,1,2-Trichloroethane	9.30E-02	mg/L	9.30E-02	mg/L	M	1.2E-05	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	3.0E-03
	1,1-Dichloroethene	1.10E-02	mg/L	1.10E-02	mg/L	M	2.3E-06	mg/kg-day	5.00E-02	mg/kg-day	NA	NA	4.6E-05
	1,2-Dichloroethane	1.40E-02	mg/L	1.40E-02	mg/L	M	1.1E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.4E-05
	1,2-Dichloropropane	2.00E-03	mg/L	2.00E-03	mg/L	M	2.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	3.50E-02	mg/L	3.50E-02	mg/L	M	8.9E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	8.9E-04
	Bromodichloromethane	4.00E-03	mg/L	4.00E-03	mg/L	M	4.1E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.0E-05
	Carbon Tetrachloride	6.80E-02	mg/L	6.80E-02	mg/L	M	2.3E-05	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	3.3E-02
	Chloroform	7.70E-01	mg/L	7.70E-01	mg/L	M	1.0E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.0E-02
	cis-1,2-Dichloroethene	2.50E+00	mg/L	2.50E+00	mg/L	M	3.5E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.5E-02
	Dichlorodifluoromethane	3.80E-01	mg/L	3.80E-01	mg/L	M	6.5E-05	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	3.2E-04
	Methylene Chloride	1.90E-02	mg/L	1.90E-02	mg/L	M	1.2E-06	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	2.0E-05
	Naphthalene	3.00E-03	mg/L	3.00E-03	mg/L	M	2.5E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.3E-04
	Tetrachloroethene	3.30E-01	mg/L	3.30E-01	mg/L	M	2.4E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.4E-02
	Toluene	9.80E-02	mg/L	9.80E-02	mg/L	M	5.2E-05	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	2.6E-04
	Total 1,2-Dichloroethane	1.00E+00	mg/L	1.00E+00	mg/L	M	1.4E-04	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	1.5E-02
	trans-1,2-Dichloroethene	2.50E-02	mg/L	2.50E-02	mg/L	M	3.5E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.7E-04
	Trichloroethene	1.30E+02	mg/L	1.30E+02	mg/L	M	2.9E-02	mg/kg-day	5.00E-01	mg/kg-day	NA	NA	5.9E-02
	Vinyl Chloride	2.10E-02	mg/L	2.10E-02	mg/L	M	2.0E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	6.7E-04
	Bis(2-Ethylhexyl)phthalate	5.40E-02	mg/L	5.40E-02	mg/L	M	9.4E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.7E-03
	RDX	2.10E-03	mg/L	2.10E-03	mg/L	M	2.1E-08	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	6.9E-06
	Antimony	5.60E-03	mg/L	5.60E-03	mg/L	M	8.7E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.4E-03
	Arsenic	2.27E-02	mg/L	2.27E-02	mg/L	M	3.5E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-03
	Barium	1.92E+00	mg/L	1.92E+00	mg/L	M	3.0E-05	mg/kg-day	1.40E-02	mg/kg-day	NA	NA	2.1E-03
	Beryllium	4.36E-02	mg/L	4.36E-02	mg/L	M	6.8E-07	mg/kg-day	1.40E-05	mg/kg-day	NA	NA	4.8E-02
	Cobalt	9.88E-01	mg/L	9.88E-01	mg/L	M	1.5E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.7E-04
	Manganese	4.85E+00	mg/L	4.85E+00	mg/L	M	7.5E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	7.8E-02
	Nickel	5.08E-01	mg/L	5.08E-01	mg/L	M	1.6E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.0E-03
	Chloride	2.80E+03	mg/L	2.80E+03	mg/L	M	4.3E-02	mg/kg-day		mg/kg-day	NA	NA	
	Sulfate	3.20E+02	mg/L	3.20E+02	mg/L	M	5.0E-03	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.2E-01

Total Hazard Index Across All Exposure Routes/Pathways 3.2E-01

TABLE 8.13 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	1.40E-01	mg/L	M	3.1E-07	mg/kg-day	2.00E-01	(mg/kg-day)$^{-1}$	6.2E-08
	1,1,2-Trichloroethane	9.30E-02	mg/L	9.30E-02	mg/L	M	1.7E-07	mg/kg-day	5.70E-02	(mg/kg-day)$^{-1}$	9.7E-09
	1,1-Dichloroethene	1.10E-02	mg/L	1.10E-02	mg/L	M	3.3E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	1,2-Dichloroethane	1.40E-02	mg/L	1.40E-02	mg/L	M	1.5E-08	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	1.4E-09
	1,2-Dichloropropane	2.00E-03	mg/L	2.00E-03	mg/L	M	4.1E-09	mg/kg-day	6.80E-02	(mg/kg-day)$^{-1}$	2.8E-10
	Benzene	3.50E-02	mg/L	3.50E-02	mg/L	M	1.3E-07	mg/kg-day	5.50E-02	(mg/kg-day)$^{-1}$	7.0E-09
	Bromodichloromethane	4.00E-03	mg/L	4.00E-03	mg/L	M	5.8E-09	mg/kg-day	6.20E-02	(mg/kg-day)$^{-1}$	3.6E-10
	Carbon Tetrachloride	6.60E-02	mg/L	6.80E-02	mg/L	M	3.3E-07	mg/kg-day	1.30E-01	(mg/kg-day)$^{-1}$	4.3E-08
	Chloroform	7.70E-01	mg/L	7.70E-01	mg/L	M	1.4E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	cis-1,2-Dichloroethene	2.50E+00	mg/L	2.50E+00	mg/L	M	5.0E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Dichlorodifluoromethane	3.80E-01	mg/L	3.80E-01	mg/L	M	9.2E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Methylene Chloride	1.90E-02	mg/L	1.90E-02	mg/L	M	1.7E-08	mg/kg-day	7.50E-03	(mg/kg-day)$^{-1}$	1.3E-10
	Naphthalene	3.00E-03	mg/L	3.00E-03	mg/L	M	3.6E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Tetrachloroethene	3.30E-01	mg/L	3.30E-01	mg/L	M	3.4E-06	mg/kg-day	5.40E-01	(mg/kg-day)$^{-1}$	1.8E-06
	Toluene	9.80E-02	mg/L	9.80E-02	mg/L	M	7.4E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Total 1,2-Dichloroethene	1.00E+00	mg/L	1.00E+00	mg/L	M	2.0E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	2.50E-02	mg/L	M	5.0E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethene	1.30E+02	mg/L	1.30E+02	mg/L	M	4.2E-04	mg/kg-day	1.30E-02	(mg/kg-day)$^{-1}$	5.5E-06
	Vinyl Chloride	2.10E-02	mg/L	2.10E-02	mg/L	M	2.9E-08	mg/kg-day	7.20E-01	(mg/kg-day)$^{-1}$	2.1E-08
	Bis(2-Ethylhexyl)phthalate	5.40E-02	mg/L	5.40E-02	mg/L	M	1.3E-08	mg/kg-day	1.40E-02	(mg/kg-day)$^{-1}$	1.9E-08
	RDX	2.10E-03	mg/L	2.10E-03	mg/L	M	3.0E-10	mg/kg-day	1.10E-01	(mg/kg-day)$^{-1}$	3.3E-11
	Antimony	5.60E-03	mg/L	5.60E-03	mg/L	M	1.2E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	2.27E-02	mg/L	2.27E-02	mg/L	M	5.0E-09	mg/kg-day	1.50E+00	(mg/kg-day)$^{-1}$	7.5E-09
	Barium	1.92E+00	mg/L	1.92E+00	mg/L	M	4.3E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Beryllium	4.36E-02	mg/L	4.36E-02	mg/L	M	9.7E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	Cobalt	9.88E-01	mg/L	9.88E-01	mg/L	M	2.2E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Manganese	4.85E+00	mg/L	4.85E+00	mg/L	M	1.1E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Nickel	5.08E-01	mg/L	5.08E-01	mg/L	M	2.2E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	Chloride	2.80E+03	mg/L	2.80E+03	mg/L	M	6.2E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Sulfate	3.20E+02	mg/L	3.20E+02	mg/L	M	7.1E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										7.5E-06
										Total Risk Across All Exposure Routes/Pathways	**7.5E-06**

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOURE (CTE) --- CONSTRUCTION/EXCAVATION WORKERS TO GROUNDWATER

SITE NAME: SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
LOCATION: NWS CHARLESTON, SOUTH CAROLINA
DATE: 09/22/05

REFERENCES: U.S. EPA, July 2004

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent	FA	DAevent
1,1,2,2-Tetrachloroethane	1.40E-01	o	2.24E+00	2.00E+00	9.31E-01	6.94E-03	3.46E-02	3.66E-06	1	3.66E-06
1,1,2-Trichloroethane	9.30E-02	o	1.43E+00	2.00E+00	5.96E-01	6.44E-03	2.86E-02	1.90E-06	1	1.90E-06
1,1-Dichloroethene	1.10E-02	o	8.93E-01	2.00E+00	3.72E-01	1.17E-02	4.41E-02	3.45E-07	1	3.45E-07
1,2-Dichloroethane	1.40E-02	o	9.18E-01	2.00E+00	3.82E-01	4.20E-03	1.61E-02	1.61E-07	1	1.61E-07
1,2-Dichloropropane	2.00E-03	o	1.10E+00	2.00E+00	4.58E-01	7.76E-03	3.17E-02	4.48E-08	1	4.48E-08
Benzene	3.50E-02	o	7.00E-01	2.00E+00	2.92E-01	1.49E-02	5.05E-02	1.31E-06	1	1.31E-06
Bromodichloromethane	4.00E-03	o	2.12E+00	2.00E+00	8.83E-01	4.62E-03	2.27E-02	6.79E-08	1	6.79E-08
Carbon Tetrachloride	6.80E-02	o	1.86E+00	2.00E+00	7.76E-01	1.63E-02	7.78E-02	3.91E-06	1	3.91E-06
Chloroform	7.70E-01	o	1.19E+00	2.00E+00	4.98E-01	6.83E-03	2.87E-02	1.56E-05	1	1.56E-05
cis-1,2-Dichloroethene	2.50E+00	o	8.93E-01	2.00E+00	3.72E-01	7.71E-03	2.92E-02	5.22E-05	1	5.22E-05
Dichlorodifluoromethane	3.80E-01	o	1.22E+00	2.00E+00	5.07E-01	8.95E-03	3.79E-02	1.01E-05	1	1.01E-05
Methylene Chloride	1.90E-02	o	7.65E-01	2.00E+00	3.19E-01	3.54E-03	1.26E-02	1.76E-07	1	1.76E-07
Naphthalene	3.00E-03	o	1.34E+00	2.00E+00	5.58E-01	4.66E-02	2.03E-01	4.19E-07	1	4.19E-07
Tetrachloroethene	3.30E-01	o	2.18E+00	2.00E+00	9.06E-01	3.34E-02	1.66E-01	4.11E-05	1	4.11E-05
Toluene	9.80E-02	o	8.39E-01	2.00E+00	3.50E-01	3.11E-02	1.15E-01	7.84E-06	1	7.84E-06
Total 1,2-Dichloroethene	1.00E+00	o	8.93E-01	2.00E+00	3.72E-01	7.71E-03	2.92E-02	2.09E-05	1	2.09E-05
trans-1,2-Dichloroethene	2.50E-02	o	8.93E-01	2.00E+00	3.72E-01	7.71E-03	2.92E-02	5.22E-07	1	5.22E-07
Trichloroethene	1.30E+02	o	1.39E+00	2.00E+00	5.81E-01	1.16E-02	5.13E-02	4.73E-03	1	4.73E-03
Vinyl Chloride	2.10E-02	o	5.73E-01	2.00E+00	2.39E-01	5.60E-03	1.70E-02	2.88E-07	1	2.88E-07
Bis(2-Ethylhexyl)phthalate	5.40E-02	o	3.99E+01	2.00E+00	1.66E+01	2.49E-02	1.90E-01	2.15E-05	0.8	1.72E-05
RDX	2.10E-03	o	4.42E+00	2.00E+00	1.84E+00	3.39E-04	1.94E-03	3.78E-09	1	3.78E-09
Antimony	5.60E-03	i		2.00E+00		1.00E-03		1.12E-08	1	1.12E-08
Arsenic	2.27E-02	i		2.00E+00		1.00E-03		4.54E-08	1	4.54E-08
Barium	1.92E+00	i		2.00E+00		1.00E-03		3.84E-06	1	3.84E-06
Beryllium	4.36E-02	i		2.00E+00		1.00E-03		8.72E-08	1	8.72E-08
Cobalt	9.88E-01	i		2.00E+00		1.00E-03		1.98E-06	1	1.98E-06
Manganese	4.85E+00	i		2.00E+00		1.00E-03		9.70E-06	1	9.70E-06
Nickel	5.08E-01	i		2.00E+00		2.00E-04		2.03E-07	1	2.03E-07
Chloride	2.80E+03	i		2.00E+00		1.00E-03		5.60E-03	1	5.60E-03
Sulfate	3.20E+02	i		2.00E+00		1.00E-03		6.40E-04	1	6.40E-04

TABLE 7.13a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	1.40E-01	mg/L	M	1.4E-05	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	2.4E-04
	1,1,2-Trichloroethane	9.30E-02	mg/L	9.30E-02	mg/L	M	7.4E-06	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	1.8E-03
	1,1-Dichloroethene	1.10E-02	mg/L	1.10E-02	mg/L	M	1.3E-06	mg/kg-day	5.00E-02	mg/kg-day	NA	NA	2.7E-05
	1,2-Dichloroethane	1.40E-02	mg/L	1.40E-02	mg/L	M	6.3E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.1E-05
	1,2-Dichloropropane	2.00E-03	mg/L	2.00E-03	mg/L	M	1.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	3.50E-02	mg/L	3.50E-02	mg/L	M	5.1E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.1E-04
	Bromodichloromethane	4.00E-03	mg/L	4.00E-03	mg/L	M	2.6E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.3E-05
	Carbon Tetrachloride	6.80E-02	mg/L	6.80E-02	mg/L	M	1.5E-05	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	2.2E-02
	Chloroform	7.70E-01	mg/L	7.70E-01	mg/L	M	6.0E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	6.0E-03
	cis-1,2-Dichloroethene	2.50E+00	mg/L	2.50E+00	mg/L	M	2.0E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.0E-02
	Dichlorodifluoromethane	3.80E-01	mg/L	3.80E-01	mg/L	M	3.9E-05	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	2.0E-04
	Methylene Chloride	1.90E-02	mg/L	1.90E-02	mg/L	M	6.8E-07	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	1.1E-05
	Naphthalene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.6E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	8.1E-05
	Tetrachloroethene	3.30E-01	mg/L	3.30E-01	mg/L	M	1.6E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.6E-02
	Toluene	9.80E-02	mg/L	9.80E-02	mg/L	M	3.0E-05	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	1.5E-04
	Total 1,2-Dichloroethene	1.00E+00	mg/L	1.00E+00	mg/L	M	8.1E-05	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	9.0E-03
	trans-1,2-Dichloroethene	2.50E-02	mg/L	2.50E-02	mg/L	M	2.0E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.0E-04
	Trichloroethene	1.30E+02	mg/L	1.30E+02	mg/L	M	1.8E-02	mg/kg-day	5.00E-01	mg/kg-day	NA	NA	3.7E-02
	Vinyl Chloride	2.10E-02	mg/L	2.10E-02	mg/L	M	1.1E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.7E-04
	Bis(2-Ethylhexyl)phthalate	5.40E-02	mg/L	5.40E-02	mg/L	M	6.7E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.3E-03
	RDX	2.10E-03	mg/L	2.10E-03	mg/L	M	1.5E-08	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.9E-06
	Antimony	5.60E-03	mg/L	5.60E-03	mg/L	M	4.3E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	7.2E-04
	Arsenic	2.27E-02	mg/L	2.27E-02	mg/L	M	1.8E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.9E-04
	Barium	1.92E+00	mg/L	1.92E+00	mg/L	M	1.5E-05	mg/kg-day	1.40E-02	mg/kg-day	NA	NA	1.1E-03
	Beryllium	4.36E-02	mg/L	4.36E-02	mg/L	M	3.4E-07	mg/kg-day	1.40E-05	mg/kg-day	NA	NA	2.4E-02
	Cobalt	9.86E-01	mg/L	9.88E-01	mg/L	M	7.7E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.8E-04
	Manganese	4.85E+00	mg/L	4.85E+00	mg/L	M	3.8E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	3.9E-02
	Nickel	5.06E-01	mg/L	5.06E-01	mg/L	M	7.9E-07	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	9.8E-04
	Chloride	2.80E+03	mg/L	2.80E+03	mg/L	M	2.2E-02	mg/kg-day		mg/kg-day	NA	NA	
	Sulfate	3.20E+02	mg/L	3.20E+02	mg/L	M	2.5E-03	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.8E-01

Total Hazard Index Across All Exposure Routes/Pathways **1.8E-01**

TABLE 8.13a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction/Excavation Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	1.40E-01	mg/L	M	2.0E-07	mg/kg-day	2.00E-01	(mg/kg-day)$^{-1}$	4.1E-08
	1,1,2-Trichloroethane	9.30E-02	mg/L	9.30E-02	mg/L	M	1.1E-07	mg/kg-day	5.70E-02	(mg/kg-day)$^{-1}$	6.0E-09
	1,1-Dichloroethene	1.10E-02	mg/L	1.10E-02	mg/L	M	1.9E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	1,2-Dichloroethane	1.40E-02	mg/L	1.40E-02	mg/L	M	8.9E-09	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	8.1E-10
	1,2-Dichloropropane	2.00E-03	mg/L	2.00E-03	mg/L	M	2.5E-09	mg/kg-day	6.80E-02	(mg/kg-day)$^{-1}$	1.7E-10
	Benzene	3.50E-02	mg/L	3.50E-02	mg/L	M	7.2E-08	mg/kg-day	5.50E-02	(mg/kg-day)$^{-1}$	4.0E-09
	Bromodichloromethane	4.00E-03	mg/L	4.00E-03	mg/L	M	3.8E-09	mg/kg-day	6.20E-02	(mg/kg-day)$^{-1}$	2.3E-10
	Carbon Tetrachloride	6.80E-02	mg/L	6.80E-02	mg/L	M	2.2E-07	mg/kg-day	1.30E-01	(mg/kg-day)$^{-1}$	2.8E-08
	Chloroform	7.70E-01	mg/L	7.70E-01	mg/L	M	8.6E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	cis-1,2-Dichloroethene	2.50E+00	mg/L	2.50E+00	mg/L	M	2.9E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Dichlorodifluoromethane	3.80E-01	mg/L	3.80E-01	mg/L	M	5.6E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Methylene Chloride	1.90E-02	mg/L	1.90E-02	mg/L	M	9.8E-09	mg/kg-day	7.50E-03	(mg/kg-day)$^{-1}$	7.3E-11
	Naphthalene	3.00E-03	mg/L	3.00E-03	mg/L	M	2.3E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	Tetrachloroethene	3.30E-01	mg/L	3.30E-01	mg/L	M	2.3E-06	mg/kg-day	5.40E-01	(mg/kg-day)$^{-1}$	1.2E-06
	Toluene	9.80E-02	mg/L	9.80E-02	mg/L	M	4.3E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Total 1,2-Dichloroethene	1.00E+00	mg/L	1.00E+00	mg/L	M	1.2E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	2.50E-02	mg/L	M	2.9E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethene	1.30E+02	mg/L	1.30E+02	mg/L	M	2.6E-04	mg/kg-day	1.30E-02	(mg/kg-day)$^{-1}$	3.4E-06
	Vinyl Chloride	2.10E-02	mg/L	2.10E-02	mg/L	M	1.6E-08	mg/kg-day	7.20E-01	(mg/kg-day)$^{-1}$	1.1E-08
	Bis(2-Ethylhexyl)phthalate	5.40E-02	mg/L	5.40E-02	mg/L	M	9.5E-07	mg/kg-day	1.40E-02	(mg/kg-day)$^{-1}$	1.3E-08
	RDX	2.10E-03	mg/L	2.10E-03	mg/L	M	2.1E-10	mg/kg-day	1.10E-01	(mg/kg-day)$^{-1}$	2.3E-11
	Antimony	5.60E-03	mg/L	5.60E-03	mg/L	M	6.2E-10	mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	2.27E-02	mg/L	2.27E-02	mg/L	M	2.5E-09	mg/kg-day	1.50E+00	(mg/kg-day)$^{-1}$	3.8E-09
	Barium	1.92E+00	mg/L	1.92E+00	mg/L	M	2.1E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Beryllium	4.36E-02	mg/L	4.36E-02	mg/L	M	4.8E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	Cobalt	9.88E-01	mg/L	9.88E-01	mg/L	M	1.1E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Manganese	4.85E+00	mg/L	4.85E+00	mg/L	M	5.4E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Nickel	5.08E-01	mg/L	5.08E-01	mg/L	M	1.1E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	Chloride	2.80E+03	mg/L	2.80E+03	mg/L	M	3.1E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Sulfate	3.20E+02	mg/L	3.20E+02	mg/L	M	3.5E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										4.7E-06
										Total Risk Across All Exposure Routes/Pathways	**4.7E-06**

TABLE 4.14
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cgw	Chemical Concentration in Groundwater	mg/L	Maximum	USEPA, December 2002	Maximum	USEPA, December 2002	Ingestion CDI (mg/kg/day) =
	IRgw	Water Ingestion Rate	L/day	2	USEPA Region 4, May 2000	1.4	USEPA, May 1993	Cgw x IRgw x EF x ED
	EF	Exposure Frequency	days/year	350	USEPA Region 4, May 2000	234	USEPA, May 1993	BW x AT
	ED	Exposure Duration	years	24	USEPA Region 4, May 2000	7	USEPA, May 1993	CDI = Chronic Daily Intake
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	USEPA, December 1989
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	
Dermal	Cgw	Chemical Concentration in Groundwater	mg/L	Maximum	USEPA, December 2002	Maximum	USEPA, December 2002	The equations and parameters for
	A	Skin Surface Area	cm^2	18,000	USEPA, July 2004	18,000	USEPA, July 2004	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.2.4.
	ED	Exposure Duration	years	24	USEPA Region 4, May 2000	7	USEPA, May 1993	of the text.
	EF	Exposure Frequency	days/year	350	USEPA Region 4, May 2000	234	USEPA, May 1993	
	t_{event}	Duration of Event	hour/event	0.33	USEPA, July 2004	0.25	USEPA, July 2004	USEPA, July 2004
	t^*	Time to reach steady state	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	T	Lag Time	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-03
Noncancer Ingestion Intake(RME) = 2.74E-02

Cancer Ingestion Intake(CTE) = 1.28E-03
Noncancer Ingestion Intake(CTE) = 1.28E-02

Cancer Dermal Intake(RME) = 8.45E+01
Noncancer Dermal Intake(RME) = 2.47E+02

Cancer Dermal Intake(CTE) = 1.65E+01
Noncancer Dermal Intake(CTE) = 1.65E+02

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) --- FUTURE ADULT RESIDENTS TO GROUNDWATER

SITE NAME: SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
LOCATION: NWS CHARLESTON, SOUTH CAROLINA
DATE: 09/22/05

REFERENCES: U.S. EPA, July 2004

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent	FA	DAevent
1,1,2,2-Tetrachloroethane	1.40E-01	o	2.24E+00	3.30E-01	9.31E-01	6.94E-03	3.46E-02	1.49E-06	1	1.49E-06
1,1,2-Trichloroethane	9.30E-02	o	1.43E+00	3.30E-01	5.96E-01	6.44E-03	2.86E-02	7.34E-07	1	7.34E-07
1,1-Dichloroethene	1.10E-02	o	8.93E-01	3.30E-01	3.72E-01	1.17E-02	4.41E-02	1.24E-07	1	1.24E-07
1,2-Dichloroethane	1.40E-02	o	9.18E-01	3.30E-01	3.82E-01	4.20E-03	1.61E-02	5.77E-08	1	5.77E-08
1,2-Dichloropropane	2.00E-03	o	1.10E+00	3.30E-01	4.58E-01	7.76E-03	3.17E-02	1.67E-08	1	1.67E-08
Benzene	3.50E-02	o	7.00E-01	3.30E-01	2.92E-01	1.49E-02	5.05E-02	4.46E-07	1	4.46E-07
Bromodichloromethane	4.00E-03	o	2.12E+00	3.30E-01	8.83E-01	4.62E-03	2.27E-02	2.76E-08	1	2.76E-08
Carbon Tetrachloride	6.80E-02	o	1.86E+00	3.30E-01	7.76E-01	1.63E-02	7.78E-02	1.55E-06	1	1.55E-06
Chloroform	7.70E-01	o	1.19E+00	3.30E-01	4.98E-01	6.83E-03	2.87E-02	5.89E-06	1	5.89E-06
cis-1,2-Dichloroethene	2.50E+00	o	8.93E-01	3.30E-01	3.72E-01	7.71E-03	2.92E-02	1.87E-05	1	1.87E-05
Dichlorodifluoromethane	3.80E-01	o	1.22E+00	3.30E-01	5.07E-01	8.95E-03	3.79E-02	3.85E-06	1	3.85E-06
Methylene Chloride	1.90E-02	o	7.65E-01	3.30E-01	3.19E-01	3.54E-03	1.26E-02	6.03E-08	1	6.03E-08
Naphthalene	3.00E-03	o	1.34E+00	3.30E-01	5.58E-01	4.66E-02	2.03E-01	1.66E-07	1	1.66E-07
Tetrachloroethene	3.30E-01	o	2.18E+00	3.30E-01	9.06E-01	3.34E-02	1.66E-01	1.67E-05	1	1.67E-05
Toluene	9.80E-02	o	8.39E-01	3.30E-01	3.50E-01	3.11E-02	1.15E-01	2.86E-06	1	2.86E-06
Total 1,2-Dichloroethene	1.00E+00	o	8.93E-01	3.30E-01	3.72E-01	7.71E-03	2.92E-02	7.47E-06	1	7.47E-06
trans-1,2-Dichloroethene	2.50E-02	o	8.93E-01	3.30E-01	3.72E-01	7.71E-03	2.92E-02	1.87E-07	1	1.87E-07
Trichloroethene	1.30E+02	o	1.39E+00	3.30E-01	5.81E-01	1.16E-02	5.13E-02	1.83E-03	1	1.83E-03
Vinyl Chloride	2.10E-02	o	5.73E-01	3.30E-01	2.39E-01	5.60E-03	1.70E-02	9.12E-08	1	9.12E-08
Bis(2-Ethylhexyl)phthalate	5.40E-02	o	3.99E+01	3.30E-01	1.66E+01	2.49E-02	1.90E-01	8.72E-06	0.8	6.98E-06
RDX	2.10E-03	o	4.42E+00	3.30E-01	1.84E+00	3.39E-04	1.94E-03	1.53E-09	1	1.53E-09
Antimony	5.60E-03	i		3.30E-01		1.00E-03		1.85E-09	1	1.85E-09
Arsenic	2.27E-02	i		3.30E-01		1.00E-03		7.49E-09	1	7.49E-09
Barium	1.92E+00	i		3.30E-01		1.00E-03		6.34E-07	1	6.34E-07
Beryllium	4.36E-02	i		3.30E-01		1.00E-03		1.44E-08	1	1.44E-08
Cobalt	9.88E-01	i		3.30E-01		1.00E-03		3.26E-07	1	3.26E-07
Manganese	4.85E+00	i		3.30E-01		1.00E-03		1.60E-06	1	1.60E-06
Nickel	5.08E-01	i		3.30E-01		2.00E-04		3.35E-08	1	3.35E-08
Chloride	2.80E+03	i		3.30E-01		1.00E-03		9.24E-04	1	9.24E-04
Sulfate	3.20E+02	i		3.30E-01		1.00E-03		1.06E-04	1	1.06E-04

TABLE 7.14 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RESIDENTS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	1.40E-01	mg/L	M	3.8E-03	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	6.4E-02
	1,1,2-Trichloroethane	9.30E-02	mg/L	9.30E-02	mg/L	M	2.5E-03	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	6.4E-01
	1,1-Dichloroethene	1.10E-02	mg/L	1.10E-02	mg/L	M	3.0E-04	mg/kg-day	5.00E-02	mg/kg-day	NA	NA	6.0E-03
	1,2-Dichloroethane	1.40E-02	mg/L	1.40E-02	mg/L	M	3.8E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.9E-02
	1,2-Dichloropropane	2.00E-03	mg/L	2.00E-03	mg/L	M	5.5E-05	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	3.50E-02	mg/L	3.50E-02	mg/L	M	9.6E-04	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	2.4E-01
	Bromodichloromethane	4.00E-03	mg/L	4.00E-03	mg/L	M	1.1E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.5E-03
	Carbon Tetrachloride	6.80E-02	mg/L	6.80E-02	mg/L	M	1.9E-03	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	2.7E+00
	Chloroform	7.70E-01	mg/L	7.70E-01	mg/L	M	2.1E-02	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.1E+00
	cis-1,2-Dichloroethene	2.50E+00	mg/L	2.50E+00	mg/L	M	6.8E-02	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	6.8E+00
	Dichlorodifluoromethane	3.80E-01	mg/L	3.80E-01	mg/L	M	1.0E-02	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	5.2E-02
	Methylene Chloride	1.90E-02	mg/L	1.90E-02	mg/L	M	5.2E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	8.7E-03
	Naphthalene	3.00E-03	mg/L	3.00E-03	mg/L	M	8.2E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.1E-03
	Tetrachloroethene	3.30E-01	mg/L	3.30E-01	mg/L	M	9.0E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	9.0E-01
	Toluene	9.80E-02	mg/L	9.80E-02	mg/L	M	2.7E-03	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	1.3E-02
	Total 1,2-Dichloroethene	1.00E+00	mg/L	1.00E+00	mg/L	M	2.7E-02	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	3.0E+00
	trans-1,2-Dichloroethene	2.50E-02	mg/L	2.50E-02	mg/L	M	6.8E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.4E-02
	Trichloroethene	1.30E+02	mg/L	1.30E+02	mg/L	M	3.6E+00	mg/kg-day	5.00E-01	mg/kg-day	NA	NA	7.1E+00
	Vinyl Chloride	2.10E-02	mg/L	2.10E-02	mg/L	M	5.8E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.9E-01
	Bis(2-Ethylhexyl)phthalate	5.40E-02	mg/L	5.40E-02	mg/L	M	1.5E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.4E-02
	RDX	2.10E-03	mg/L	2.10E-03	mg/L	M	5.8E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.9E-02
	Antimony	5.60E-03	mg/L	5.60E-03	mg/L	M	1.5E-04	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	3.8E-01
	Arsenic	2.27E-02	mg/L	2.27E-02	mg/L	M	6.2E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.1E+00
	Barium	1.92E+00	mg/L	1.92E+00	mg/L	M	5.3E-02	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	2.6E-01
	Beryllium	4.36E-02	mg/L	4.36E-02	mg/L	M	1.2E-03	mg/kg-day	2.00E-03	mg/kg-day	NA	NA	6.0E-01
	Cobalt	9.88E-01	mg/L	9.88E-01	mg/L	M	2.7E-02	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.4E+00
	Manganese	4.85E+00	mg/L	4.85E+00	mg/L	M	1.3E-01	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	5.5E+00
	Nickel	5.08E-01	mg/L	5.08E-01	mg/L	M	1.4E-02	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.0E-01
	Chloride	2.80E+03	mg/L	2.80E+03	mg/L	M	7.7E+01	mg/kg-day		mg/kg-day	NA	NA	
	Sulfate	3.20E+02	mg/L	3.20E+02	mg/L	M	8.8E+00	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.5E+01

TABLE 7.14 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RESIDENTS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	1.40E-01	mg/L	M	3.7E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	6.1E-03
	1,1,2-Trichloroethane	9.30E-02	mg/L	9.30E-02	mg/L	M	1.8E-04	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	4.5E-02
	1,1-Dichloroethene	1.10E-02	mg/L	1.10E-02	mg/L	M	3.1E-05	mg/kg-day	5.00E-02	mg/kg-day	NA	NA	6.1E-04
	1,2-Dichloroethane	1.40E-02	mg/L	1.40E-02	mg/L	M	1.4E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.1E-04
	1,2-Dichloropropane	2.00E-03	mg/L	2.00E-03	mg/L	M	4.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	3.50E-02	mg/L	3.50E-02	mg/L	M	1.1E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.1E-02
	Bromodichloromethane	4.00E-03	mg/L	4.00E-03	mg/L	M	6.8E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.4E-04
	Carbon Tetrachloride	6.80E-02	mg/L	6.80E-02	mg/L	M	3.8E-04	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	5.5E-01
	Chloroform	7.70E-01	mg/L	7.70E-01	mg/L	M	1.5E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.5E-01
	cis-1,2-Dichloroethene	2.50E+00	mg/L	2.50E+00	mg/L	M	4.6E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.6E-01
	Dichlorodifluoromethane	3.80E-01	mg/L	3.80E-01	mg/L	M	9.5E-04	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	4.7E-03
	Methylene Chloride	1.90E-02	mg/L	1.90E-02	mg/L	M	1.5E-05	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	2.5E-04
	Naphthalene	3.00E-03	mg/L	3.00E-03	mg/L	M	4.1E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.0E-03
	Tetrachloroethene	3.30E-01	mg/L	3.30E-01	mg/L	M	4.1E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.1E-01
	Toluene	9.80E-02	mg/L	9.80E-02	mg/L	M	7.1E-04	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	3.5E-03
	Total 1,2-Dichloroethene	1.00E+00	mg/L	1.00E+00	mg/L	M	1.8E-03	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	2.0E-01
	trans-1,2-Dichloroethene	2.50E-02	mg/L	2.50E-02	mg/L	M	4.6E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.3E-03
	Trichloroethene	1.30E+02	mg/L	1.30E+02	mg/L	M	4.5E-01	mg/kg-day	5.00E-01	mg/kg-day	NA	NA	9.0E-01
	Vinyl Chloride	2.10E-02	mg/L	2.10E-02	mg/L	M	2.2E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	7.5E-03
	Bis(2-Ethylhexyl)phthalate	5.40E-02	mg/L	5.40E-02	mg/L	M	1.7E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	8.6E-02
	RDX	2.10E-03	mg/L	2.10E-03	mg/L	M	3.8E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.3E-04
	Antimony	5.60E-03	mg/L	5.60E-03	mg/L	M	4.6E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	7.6E-03
	Arsenic	2.27E-02	mg/L	2.27E-02	mg/L	M	1.8E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.2E-03
	Barium	1.92E+00	mg/L	1.92E+00	mg/L	M	1.6E-04	mg/kg-day	1.40E-02	mg/kg-day	NA	NA	1.1E-02
	Beryllium	4.36E-02	mg/L	4.36E-02	mg/L	M	3.5E-06	mg/kg-day	1.40E-05	mg/kg-day	NA	NA	2.5E-01
	Cobalt	9.88E-01	mg/L	9.88E-01	mg/L	M	8.0E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.0E-03
	Manganese	4.85E+00	mg/L	4.85E+00	mg/L	M	3.9E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	4.1E-01
	Nickel	5.08E-01	mg/L	5.08E-01	mg/L	M	8.3E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.0E-02
	Chloride	2.80E+03	mg/L	2.80E+03	mg/L	M	2.3E-01	mg/kg-day		mg/kg-day	NA	NA	
	Sulfate	3.20E+02	mg/L	3.20E+02	mg/L	M	2.6E-02	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.5E+00
												Total Hazard Index Across All Exposure Routes/Pathways	3.9E+01

TABLE 8.14 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RESIDENTS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	1.40E-01	mg/L	M	1.3E-03	mg/kg-day	2.00E-01	(mg/kg-day)$^{-1}$	2.6E-04
	1,1,2-Trichloroethane	9.30E-02	mg/L	9.30E-02	mg/L	M	8.7E-04	mg/kg-day	5.70E-02	(mg/kg-day)$^{-1}$	5.0E-05
	1,1-Dichloroethene	1.10E-02	mg/L	1.10E-02	mg/L	M	1.0E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	1,2-Dichloroethane	1.40E-02	mg/L	1.40E-02	mg/L	M	1.3E-04	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	1.2E-05
	1,2-Dichloropropane	2.00E-03	mg/L	2.00E-03	mg/L	M	1.9E-05	mg/kg-day	6.80E-02	(mg/kg-day)$^{-1}$	1.3E-06
	Benzene	3.50E-02	mg/L	3.50E-02	mg/L	M	3.3E-04	mg/kg-day	5.50E-02	(mg/kg-day)$^{-1}$	1.8E-05
	Bromodichloromethane	4.00E-03	mg/L	4.00E-03	mg/L	M	3.8E-05	mg/kg-day	6.20E-02	(mg/kg-day)$^{-1}$	2.3E-06
	Carbon Tetrachloride	6.80E-02	mg/L	6.80E-02	mg/L	M	6.4E-04	mg/kg-day	1.30E-01	(mg/kg-day)$^{-1}$	8.3E-05
	Chloroform	7.70E-01	mg/L	7.70E-01	mg/L	M	7.2E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	cis-1,2-Dichloroethene	2.50E+00	mg/L	2.50E+00	mg/L	M	2.3E-02	mg/kg-day		(mg/kg-day)$^{-1}$	
	Dichlorodifluoromethane	3.80E-01	mg/L	3.80E-01	mg/L	M	3.6E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	Methylene Chloride	1.90E-02	mg/L	1.90E-02	mg/L	M	1.8E-04	mg/kg-day	7.50E-03	(mg/kg-day)$^{-1}$	1.3E-06
	Naphthalene	3.00E-03	mg/L	3.00E-03	mg/L	M	2.8E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Tetrachloroethene	3.30E-01	mg/L	3.30E-01	mg/L	M	3.1E-03	mg/kg-day	5.40E-01	(mg/kg-day)$^{-1}$	1.7E-03
	Toluene	9.80E-02	mg/L	9.80E-02	mg/L	M	9.2E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Total 1,2-Dichloroethene	1.00E+00	mg/L	1.00E+00	mg/L	M	9.4E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	2.50E-02	mg/L	M	2.3E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethene	1.30E+02	mg/L	1.30E+02	mg/L	M	1.2E+00	mg/kg-day	1.30E-02	(mg/kg-day)$^{-1}$	1.6E-02
	Vinyl Chloride	2.10E-02	mg/L	2.10E-02	mg/L	M	2.0E-04	mg/kg-day	7.20E-01	(mg/kg-day)$^{-1}$	1.4E-04
	Bis(2-Ethylhexyl)phthalate	5.40E-02	mg/L	5.40E-02	mg/L	M	5.1E-04	mg/kg-day	1.40E-02	(mg/kg-day)$^{-1}$	7.1E-06
	RDX	2.10E-03	mg/L	2.10E-03	mg/L	M	2.0E-05	mg/kg-day	1.10E-01	(mg/kg-day)$^{-1}$	2.2E-06
	Antimony	5.60E-03	mg/L	5.60E-03	mg/L	M	5.3E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	2.27E-02	mg/L	2.27E-02	mg/L	M	2.1E-04	mg/kg-day	1.50E+00	(mg/kg-day)$^{-1}$	3.2E-04
	Barium	1.92E+00	mg/L	1.92E+00	mg/L	M	1.8E-02	mg/kg-day		(mg/kg-day)$^{-1}$	
	Beryllium	4.36E-02	mg/L	4.36E-02	mg/L	M	4.1E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Cobalt	9.88E-01	mg/L	9.88E-01	mg/L	M	9.3E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	Manganese	4.85E+00	mg/L	4.85E+00	mg/L	M	4.6E-02	mg/kg-day		(mg/kg-day)$^{-1}$	
	Nickel	5.08E-01	mg/L	5.08E-01	mg/L	M	4.8E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	Chloride	2.80E+03	mg/L	2.80E+03	mg/L	M	2.6E+01	mg/kg-day		(mg/kg-day)$^{-1}$	
	Sulfate	3.20E+02	mg/L	3.20E+02	mg/L	M	3.0E+00	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										1.8E-02

TABLE 8.14 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RESIDENTS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	1.40E-01	mg/L	M	1.3E-04	mg/kg-day	2.00E-01	(mg/kg-day)$^{-1}$	2.5E-05
	1,1,2-Trichloroethane	9.30E-02	mg/L	9.30E-02	mg/L	M	6.2E-05	mg/kg-day	5.70E-02	(mg/kg-day)$^{-1}$	3.5E-06
	1,1-Dichloroethene	1.10E-02	mg/L	1.10E-02	mg/L	M	1.1E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	1,2-Dichloroethane	1.40E-02	mg/L	1.40E-02	mg/L	M	4.9E-06	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	4.4E-07
	1,2-Dichloropropane	2.00E-03	mg/L	2.00E-03	mg/L	M	1.4E-06	mg/kg-day	6.80E-02	(mg/kg-day)$^{-1}$	9.6E-08
	Benzene	3.50E-02	mg/L	3.50E-02	mg/L	M	3.8E-05	mg/kg-day	5.50E-02	(mg/kg-day)$^{-1}$	2.1E-08
	Bromodichloromethane	4.00E-03	mg/L	4.00E-03	mg/L	M	2.3E-06	mg/kg-day	6.20E-02	(mg/kg-day)$^{-1}$	1.4E-07
	Carbon Tetrachloride	6.80E-02	mg/L	6.80E-02	mg/L	M	1.3E-04	mg/kg-day	1.30E-01	(mg/kg-day)$^{-1}$	1.7E-05
	Chloroform	7.70E-01	mg/L	7.70E-01	mg/L	M	5.0E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	cis-1,2-Dichloroethene	2.50E+00	mg/L	2.50E+00	mg/L	M	1.6E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	Dichlorodifluoromethane	3.80E-01	mg/L	3.80E-01	mg/L	M	3.3E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Methylene Chloride	1.90E-02	mg/L	1.90E-02	mg/L	M	5.1E-06	mg/kg-day	7.50E-03	(mg/kg-day)$^{-1}$	3.8E-08
	Naphthalene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.4E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Tetrachloroethene	3.30E-01	mg/L	3.30E-01	mg/L	M	1.4E-03	mg/kg-day	5.40E-01	(mg/kg-day)$^{-1}$	7.6E-04
	Toluene	9.80E-02	mg/L	9.80E-02	mg/L	M	2.4E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Total 1,2-Dichloroethene	1.00E+00	mg/L	1.00E+00	mg/L	M	6.3E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	2.50E-02	mg/L	M	1.6E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethene	1.30E+02	mg/L	1.30E+02	mg/L	M	1.5E-01	mg/kg-day	1.30E-02	(mg/kg-day)$^{-1}$	2.0E-03
	Vinyl Chloride	2.10E-02	mg/L	2.10E-02	mg/L	M	7.7E-06	mg/kg-day	7.20E-01	(mg/kg-day)$^{-1}$	5.5E-06
	Bis(2-Ethylhexyl)phthalate	5.40E-02	mg/L	5.40E-02	mg/L	M	5.9E-04	mg/kg-day	1.40E-02	(mg/kg-day)$^{-1}$	8.3E-06
	RDX	2.10E-03	mg/L	2.10E-03	mg/L	M	1.3E-07	mg/kg-day	1.10E-01	(mg/kg-day)$^{-1}$	1.4E-08
	Antimony	5.60E-03	mg/L	5.60E-03	mg/L	M	1.5E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	2.27E-02	mg/L	2.27E-02	mg/L	M	6.3E-07	mg/kg-day	1.50E+00	(mg/kg-day)$^{-1}$	9.5E-07
	Barium	1.92E+00	mg/L	1.92E+00	mg/L	M	5.4E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Beryllium	4.36E-02	mg/L	4.36E-02	mg/L	M	1.2E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Cobalt	9.88E-01	mg/L	9.88E-01	mg/L	M	2.8E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Manganese	4.85E+00	mg/L	4.85E+00	mg/L	M	1.4E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Nickel	5.08E-01	mg/L	5.08E-01	mg/L	M	2.8E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Chloride	2.80E+03	mg/L	2.80E+03	mg/L	M	7.8E-02	mg/kg-day		(mg/kg-day)$^{-1}$	
	Sulfate	3.20E+02	mg/L	3.20E+02	mg/L	M	8.9E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										2.8E-03
										Total Risk Across All Exposure Routes/Pathways	**2.1E-02**

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOURE (CTE) --- FUTURE ADULT RESIDENTS TO GROUNDWATER

SITE NAME: SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
LOCATION: NWS CHARLESTON, SOUTH CAROLINA
DATE: 09/22/05

REFERENCES: U.S. EPA, July 2004

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent	FA	DAevent
1,1,2,2-Tetrachloroethane	1.40E-01	o	2.24E+00	2.50E-01	9.31E-01	6.94E-03	3.46E-02	1.30E-06	1	1.30E-06
1,1,2-Trichloroethane	9.30E-02	o	1.43E+00	2.50E-01	5.96E-01	6.44E-03	2.86E-02	6.39E-07	1	6.39E-07
1,1-Dichloroethene	1.10E-02	o	8.93E-01	2.50E-01	3.72E-01	1.17E-02	4.41E-02	1.08E-07	1	1.08E-07
1,2-Dichloroethane	1.40E-02	o	9.18E-01	2.50E-01	3.82E-01	4.20E-03	1.61E-02	5.02E-08	1	5.02E-08
1,2-Dichloropropane	2.00E-03	o	1.10E+00	2.50E-01	4.58E-01	7.76E-03	3.17E-02	1.45E-08	1	1.45E-08
Benzene	3.50E-02	o	7.00E-01	2.50E-01	2.92E-01	1.49E-02	5.05E-02	3.88E-07	1	3.88E-07
Bromodichloromethane	4.00E-03	o	2.12E+00	2.50E-01	8.83E-01	4.62E-03	2.27E-02	2.40E-08	1	2.40E-08
Carbon Tetrachloride	6.80E-02	o	1.86E+00	2.50E-01	7.76E-01	1.63E-02	7.78E-02	1.35E-06	1	1.35E-06
Chloroform	7.70E-01	o	1.19E+00	2.50E-01	4.98E-01	6.83E-03	2.87E-02	5.12E-06	1	5.12E-06
cis-1,2-Dichloroethene	2.50E+00	o	8.93E-01	2.50E-01	3.72E-01	7.71E-03	2.92E-02	1.63E-05	1	1.63E-05
Dichlorodifluoromethane	3.80E-01	o	1.22E+00	2.50E-01	5.07E-01	8.95E-03	3.79E-02	3.35E-06	1	3.35E-06
Methylene Chloride	1.90E-02	o	7.65E-01	2.50E-01	3.19E-01	3.54E-03	1.26E-02	5.25E-08	1	5.25E-08
Naphthalene	3.00E-03	o	1.34E+00	2.50E-01	5.58E-01	4.66E-02	2.03E-01	1.44E-07	1	1.44E-07
Tetrachloroethene	3.30E-01	o	2.18E+00	2.50E-01	9.06E-01	3.34E-02	1.66E-01	1.45E-05	1	1.45E-05
Toluene	9.80E-02	o	8.39E-01	2.50E-01	3.50E-01	3.11E-02	1.15E-01	2.49E-06	1	2.49E-06
Total 1,2-Dichloroethene	1.00E+00	o	8.93E-01	2.50E-01	3.72E-01	7.71E-03	2.92E-02	6.50E-06	1	6.50E-06
trans-1,2-Dichloroethene	2.50E-02	o	8.93E-01	2.50E-01	3.72E-01	7.71E-03	2.92E-02	1.63E-07	1	1.63E-07
Trichloroethene	1.30E+02	o	1.39E+00	2.50E-01	5.81E-01	1.16E-02	5.13E-02	1.59E-03	1	1.59E-03
Vinyl Chloride	2.10E-02	o	5.73E-01	2.50E-01	2.39E-01	5.60E-03	1.70E-02	7.94E-08	1	7.94E-08
Bis(2-Ethylhexyl)phthalate	5.40E-02	o	3.99E+01	2.50E-01	1.66E+01	2.49E-02	1.90E-01	7.59E-06	0.8	6.07E-06
RDX	2.10E-03	o	4.42E+00	2.50E-01	1.84E+00	3.39E-04	1.94E-03	1.34E-09	1	1.34E-09
Antimony	5.60E-03	i		2.50E-01		1.00E-03		1.40E-09	1	1.40E-09
Arsenic	2.27E-02	i		2.50E-01		1.00E-03		5.68E-09	1	5.68E-09
Barium	1.92E+00	i		2.50E-01		1.00E-03		4.80E-07	1	4.80E-07
Beryllium	4.36E-02	i		2.50E-01		1.00E-03		1.09E-08	1	1.09E-08
Cobalt	9.88E-01	i		2.50E-01		1.00E-03		2.47E-07	1	2.47E-07
Manganese	4.85E+00	i		2.50E-01		1.00E-03		1.21E-06	1	1.21E-06
Nickel	5.08E-01	i		2.50E-01		2.00E-04		2.54E-08	1	2.54E-08
Chloride	2.80E+03	i		2.50E-01		1.00E-03		7.00E-04	1	7.00E-04
Sulfate	3.20E+02	i		2.50E-01		1.00E-03		8.00E-05	1	8.00E-05

TABLE 7.14a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RESIDENTS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	1.40E-01	mg/L	M	1.8E-03	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	3.0E-02
	1,1,2-Trichloroethane	9.30E-02	mg/L	9.30E-02	mg/L	M	1.2E-03	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	3.0E-01
	1,1-Dichloroethene	1.10E-02	mg/L	1.10E-02	mg/L	M	1.4E-04	mg/kg-day	5.00E-02	mg/kg-day	NA	NA	2.8E-03
	1,2-Dichloroethane	1.40E-02	mg/L	1.40E-02	mg/L	M	1.8E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	9.0E-03
	1,2-Dichloropropane	2.00E-03	mg/L	2.00E-03	mg/L	M	2.6E-05	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	3.50E-02	mg/L	3.50E-02	mg/L	M	4.5E-04	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	1.1E-01
	Bromodichloromethane	4.00E-03	mg/L	4.00E-03	mg/L	M	5.1E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.6E-03
	Carbon Tetrachloride	6.80E-02	mg/L	6.80E-02	mg/L	M	8.7E-04	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	1.2E+00
	Chloroform	7.70E-01	mg/L	7.70E-01	mg/L	M	9.9E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	9.9E-01
	cis-1,2-Dichloroethene	2.50E+00	mg/L	2.50E+00	mg/L	M	3.2E-02	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.2E+00
	Dichlorodifluoromethane	3.80E-01	mg/L	3.80E-01	mg/L	M	4.9E-03	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	2.4E-02
	Methylene Chloride	1.90E-02	mg/L	1.90E-02	mg/L	M	2.4E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	4.1E-03
	Naphthalene	3.00E-03	mg/L	3.00E-03	mg/L	M	3.8E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.9E-03
	Tetrachloroethene	3.30E-01	mg/L	3.30E-01	mg/L	M	4.2E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.2E-01
	Toluene	9.80E-02	mg/L	9.80E-02	mg/L	M	1.3E-03	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	6.3E-03
	Total 1,2-Dichloroethene	1.00E+00	mg/L	1.00E+00	mg/L	M	1.3E-02	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	1.4E+00
	trans-1,2-Dichloroethene	2.50E-02	mg/L	2.50E-02	mg/L	M	3.2E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.6E-02
	Trichloroethene	1.30E+02	mg/L	1.30E+02	mg/L	M	1.7E+00	mg/kg-day	5.00E-01	mg/kg-day	NA	NA	3.3E+00
	Vinyl Chloride	2.10E-02	mg/L	2.10E-02	mg/L	M	2.7E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	9.0E-02
	Bis(2-Ethylhexyl)phthalate	5.40E-02	mg/L	5.40E-02	mg/L	M	6.9E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.5E-02
	RDX	2.10E-03	mg/L	2.10E-03	mg/L	M	2.7E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	9.0E-03
	Antimony	5.60E-03	mg/L	5.60E-03	mg/L	M	7.2E-05	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	1.8E-01
	Arsenic	2.27E-02	mg/L	2.27E-02	mg/L	M	2.9E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.7E-01
	Barium	1.92E+00	mg/L	1.92E+00	mg/L	M	2.5E-02	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	1.2E-01
	Beryllium	4.36E-02	mg/L	4.36E-02	mg/L	M	5.6E-04	mg/kg-day	2.00E-03	mg/kg-day	NA	NA	2.8E-01
	Cobalt	9.88E-01	mg/L	9.88E-01	mg/L	M	1.3E-02	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	6.3E-01
	Manganese	4.85E+00	mg/L	4.85E+00	mg/L	M	6.2E-02	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	2.6E+00
	Nickel	5.08E-01	mg/L	5.08E-01	mg/L	M	6.5E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.3E-01
	Chloride	2.80E+03	mg/L	2.80E+03	mg/L	M	3.6E+01	mg/kg-day		mg/kg-day	NA	NA	
	Sulfate	3.20E+02	mg/L	3.20E+02	mg/L	M	4.1E+00	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.6E+01

TABLE 7.14a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RESIDENTS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	1.40E-01	mg/L	M	2.1E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	3.6E-03
	1,1,2-Trichloroethane	9.30E-02	mg/L	9.30E-02	mg/L	M	1.1E-04	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	2.6E-02
	1,1-Dichloroethene	1.10E-02	mg/L	1.10E-02	mg/L	M	1.8E-05	mg/kg-day	5.00E-02	mg/kg-day	NA	NA	3.6E-04
	1,2-Dichloroethane	1.40E-02	mg/L	1.40E-02	mg/L	M	8.3E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.1E-04
	1,2-Dichloropropane	2.00E-03	mg/L	2.00E-03	mg/L	M	2.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	3.50E-02	mg/L	3.50E-02	mg/L	M	6.4E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	6.4E-03
	Bromodichloromethane	4.00E-03	mg/L	4.00E-03	mg/L	M	4.0E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.0E-04
	Carbon Tetrachloride	6.80E-02	mg/L	6.80E-02	mg/L	M	2.2E-04	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	3.2E-01
	Chloroform	7.70E-01	mg/L	7.70E-01	mg/L	M	8.4E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	8.4E-02
	cis-1,2-Dichloroethene	2.50E+00	mg/L	2.50E+00	mg/L	M	2.7E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.7E-01
	Dichlorodifluoromethane	3.80E-01	mg/L	3.80E-01	mg/L	M	5.5E-04	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	2.8E-03
	Methylene Chloride	1.90E-02	mg/L	1.90E-02	mg/L	M	6.7E-06	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	1.4E-04
	Naphthalene	3.00E-03	mg/L	3.00E-03	mg/L	M	2.4E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.2E-03
	Tetrachloroethene	3.30E-01	mg/L	3.30E-01	mg/L	M	2.4E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.4E-01
	Toluene	9.80E-02	mg/L	9.80E-02	mg/L	M	4.1E-04	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	2.1E-03
	Total 1,2-Dichloroethene	1.00E+00	mg/L	1.00E+00	mg/L	M	1.1E-03	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	1.2E-01
	trans-1,2-Dichloroethene	2.50E-02	mg/L	2.50E-02	mg/L	M	2.7E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.3E-03
	Trichloroethene	1.30E+02	mg/L	1.30E+02	mg/L	M	2.6E-01	mg/kg-day	5.00E-01	mg/kg-day	NA	NA	5.3E-01
	Vinyl Chloride	2.10E-02	mg/L	2.10E-02	mg/L	M	1.3E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.4E-03
	Bis(2-Ethylhexyl)phthalate	5.40E-02	mg/L	5.40E-02	mg/L	M	1.0E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.0E-02
	RDX	2.10E-03	mg/L	2.10E-03	mg/L	M	2.2E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	7.3E-05
	Antimony	5.60E-03	mg/L	5.60E-03	mg/L	M	2.3E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.8E-03
	Arsenic	2.27E-02	mg/L	2.27E-02	mg/L	M	9.4E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.1E-03
	Barium	1.92E+00	mg/L	1.92E+00	mg/L	M	7.9E-05	mg/kg-day	1.40E-02	mg/kg-day	NA	NA	5.7E-03
	Beryllium	4.36E-02	mg/L	4.36E-02	mg/L	M	1.8E-06	mg/kg-day	1.40E-05	mg/kg-day	NA	NA	1.3E-01
	Cobalt	9.88E-01	mg/L	9.88E-01	mg/L	M	4.1E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.0E-03
	Manganese	4.85E+00	mg/L	4.85E+00	mg/L	M	2.0E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	2.1E-01
	Nickel	5.08E-01	mg/L	5.08E-01	mg/L	M	4.2E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	5.2E-03
	Chloride	2.80E+03	mg/L	2.80E+03	mg/L	M	1.2E-01	mg/kg-day		mg/kg-day	NA	NA	
	Sulfate	3.20E+02	mg/L	3.20E+02	mg/L	M	1.3E-02	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.0E+00
												Total Hazard Index Across All Exposure Routes/Pathways	**1.8E+01**

TABLE 8.14a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RESIDENTS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	1.40E-01	mg/L	M	1.8E-04	mg/kg-day	2.00E-01	(mg/kg-day)$^{-1}$	3.6E-05
	1,1,2-Trichloroethane	9.30E-02	mg/L	9.30E-02	mg/L	M	1.2E-04	mg/kg-day	5.70E-02	(mg/kg-day)$^{-1}$	6.8E-06
	1,1-Dichloroethene	1.10E-02	mg/L	1.10E-02	mg/L	M	1.4E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	1,2-Dichloroethane	1.40E-02	mg/L	1.40E-02	mg/L	M	1.8E-05	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	1.6E-06
	1,2-Dichloropropane	2.00E-03	mg/L	2.00E-03	mg/L	M	2.6E-06	mg/kg-day	6.80E-02	(mg/kg-day)$^{-1}$	1.7E-07
	Benzene	3.50E-02	mg/L	3.50E-02	mg/L	M	4.5E-05	mg/kg-day	5.50E-02	(mg/kg-day)$^{-1}$	2.5E-06
	Bromodichloromethane	4.00E-03	mg/L	4.00E-03	mg/L	M	5.1E-06	mg/kg-day	6.20E-02	(mg/kg-day)$^{-1}$	3.2E-07
	Carbon Tetrachloride	6.80E-02	mg/L	6.80E-02	mg/L	M	6.7E-05	mg/kg-day	1.30E-01	(mg/kg-day)$^{-1}$	1.1E-05
	Chloroform	7.70E-01	mg/L	7.70E-01	mg/L	M	9.9E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	cis-1,2-Dichloroethene	2.50E+00	mg/L	2.50E+00	mg/L	M	3.2E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	Dichlorodifluoromethane	3.80E-01	mg/L	3.80E-01	mg/L	M	4.9E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Methylene Chloride	1.90E-02	mg/L	1.90E-02	mg/L	M	2.4E-05	mg/kg-day	7.50E-03	(mg/kg-day)$^{-1}$	1.8E-07
	Naphthalene	3.00E-03	mg/L	3.00E-03	mg/L	M	3.8E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Tetrachloroethene	3.30E-01	mg/L	3.30E-01	mg/L	M	4.2E-04	mg/kg-day	5.40E-01	(mg/kg-day)$^{-1}$	2.3E-04
	Toluene	9.80E-02	mg/L	9.80E-02	mg/L	M	1.3E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Total 1,2-Dichloroethene	1.00E+00	mg/L	1.00E+00	mg/L	M	1.3E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	2.50E-02	mg/L	M	3.2E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethene	1.30E+02	mg/L	1.30E+02	mg/L	M	1.7E-01	mg/kg-day	1.30E-02	(mg/kg-day)$^{-1}$	2.2E-03
	Vinyl Chloride	2.10E-02	mg/L	2.10E-02	mg/L	M	2.7E-05	mg/kg-day	7.20E-01	(mg/kg-day)$^{-1}$	1.9E-05
	Bis(2-Ethylhexyl)phthalate	5.40E-02	mg/L	5.40E-02	mg/L	M	6.9E-05	mg/kg-day	1.40E-02	(mg/kg-day)$^{-1}$	9.7E-07
	RDX	2.10E-03	mg/L	2.10E-03	mg/L	M	2.7E-06	mg/kg-day	1.10E-01	(mg/kg-day)$^{-1}$	3.0E-07
	Antimony	5.80E-03	mg/L	5.80E-03	mg/L	M	7.2E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	2.27E-02	mg/L	2.27E-02	mg/L	M	2.9E-05	mg/kg-day	1.50E+00	(mg/kg-day)$^{-1}$	4.4E-05
	Barium	1.92E+00	mg/L	1.92E+00	mg/L	M	2.5E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	Beryllium	4.36E-02	mg/L	4.36E-02	mg/L	M	5.6E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Cobalt	9.88E-01	mg/L	9.88E-01	mg/L	M	1.3E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	Manganese	4.85E+00	mg/L	4.85E+00	mg/L	M	6.2E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	Nickel	5.08E-01	mg/L	5.08E-01	mg/L	M	6.5E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Chloride	2.80E+03	mg/L	2.80E+03	mg/L	M	3.6E+00	mg/kg-day		(mg/kg-day)$^{-1}$	
	Sulfate	3.20E+02	mg/L	3.20E+02	mg/L	M	4.1E-01	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										2.5E-03

TABLE 8.14a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RESIDENTS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	1.40E-01	mg/L	M	2.1E-05	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	4.3E-06
	1,1,2-Trichloroethane	9.30E-02	mg/L	9.30E-02	mg/L	M	1.1E-05	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	6.0E-07
	1,1-Dichloroethene	1.10E-02	mg/L	1.10E-02	mg/L	M	1.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	1,2-Dichloroethane	1.40E-02	mg/L	1.40E-02	mg/L	M	8.3E-07	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	7.5E-08
	1,2-Dichloropropane	2.00E-03	mg/L	2.00E-03	mg/L	M	2.4E-07	mg/kg-day	6.80E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-08
	Benzene	3.50E-02	mg/L	3.50E-02	mg/L	M	6.4E-08	mg/kg-day	5.50E-02	$(mg/kg\text{-}day)^{-1}$	3.5E-07
	Bromodichloromethane	4.00E-03	mg/L	4.00E-03	mg/L	M	4.0E-07	mg/kg-day	6.20E-02	$(mg/kg\text{-}day)^{-1}$	2.5E-08
	Carbon Tetrachloride	6.80E-02	mg/L	6.80E-02	mg/L	M	2.2E-05	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	2.9E-06
	Chloroform	7.70E-01	mg/L	7.70E-01	mg/L	M	8.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	cis-1,2-Dichloroethene	2.50E+00	mg/L	2.50E+00	mg/L	M	2.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Dichlorodifluoromethane	3.80E-01	mg/L	3.80E-01	mg/L	M	5.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Methylene Chloride	1.90E-02	mg/L	1.90E-02	mg/L	M	8.7E-07	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	6.5E-09
	Naphthalene	3.00E-03	mg/L	3.00E-03	mg/L	M	2.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Tetrachloroethene	3.30E-01	mg/L	3.30E-01	mg/L	M	2.4E-04	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-04
	Toluene	9.80E-02	mg/L	9.80E-02	mg/L	M	4.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Total 1,2-Dichloroethene	1.00E+00	mg/L	1.00E+00	mg/L	M	1.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	2.50E-02	mg/L	M	2.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.30E+02	mg/L	1.30E+02	mg/L	M	2.6E-02	mg/kg-day	1.30E-02	$(mg/kg\text{-}day)^{-1}$	3.4E-04
	Vinyl Chloride	2.10E-02	mg/L	2.10E-02	mg/L	M	1.3E-06	mg/kg-day	7.20E-01	$(mg/kg\text{-}day)^{-1}$	9.4E-07
	Bis(2-Ethylhexyl)phthalate	5.40E-02	mg/L	5.40E-02	mg/L	M	1.0E-04	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-06
	RDX	2.10E-03	mg/L	2.10E-03	mg/L	M	2.2E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.4E-09
	Antimony	5.60E-03	mg/L	5.60E-03	mg/L	M	2.3E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.27E-02	mg/L	2.27E-02	mg/L	M	9.4E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-07
	Barium	1.92E+00	mg/L	1.92E+00	mg/L	M	7.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Beryllium	4.36E-02	mg/L	4.36E-02	mg/L	M	1.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	9.86E-01	mg/L	9.88E-01	mg/L	M	4.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	4.85E+00	mg/L	4.85E+00	mg/L	M	2.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	5.08E-01	mg/L	5.08E-01	mg/L	M	4.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloride	2.80E+03	mg/L	2.80E+03	mg/L	M	1.2E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Sulfate	3.20E+02	mg/L	3.20E+02	mg/L	M	1.3E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.8E-04
										Total Risk Across All Exposure Routes/Pathways	**3.0E-03**

TABLE 4.15
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cgw	Chemical Concentration in Groundwater	mg/L	Maximum	USEPA, December 2002	Maximum	USEPA, December 2002	Ingestion CDI (mg/kg/day) =
	IRgw	Water Ingestion Rate	L/day	1	USEPA Region 4, May 2000	0.56	USEPA, August 1997	Cgw x IRgw x EF x ED
	EF	Exposure Frequency	days/year	350	USEPA Region 4, May 2000	234	USEPA, May 1993	BW x AT
	ED	Exposure Duration	years	6	USEPA Region 4, May 2000	2	USEPA, May 1993	CDI = Chronic Daily Intake
	BW	Body Weight	kg	15	USEPA Region 4, May 2000	15	USEPA Region 4, May 2000	USEPA, December 1989
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	
Dermal	Cgw	Chemical Concentration in Groundwater	mg/L	Maximum	USEPA, December 2002	Maximum	USEPA, December 2002	The equations and parameters for
	A	Skin Surface Area	cm^2	6,600	USEPA, July 2004	6,600	USEPA, July 2004	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.2.4.
	ED	Exposure Duration	years	6	USEPA Region 4, May 2000	2	USEPA, May 1993	of the text.
	EF	Exposure Frequency	days/year	350	USEPA Region 4, May 2000	234	USEPA, May 1993	
	t_{event}	Duration of Event	hour/event	0.33	USEPA, July 2004	0.25	USEPA, July 2004	USEPA, July 2004
	t^*	Time to reach steady state	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	T	Lag Time	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	BW	Body Weight	kg	15	USEPA Region 4, May 2000	15	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 5.48E-03
Noncancer Ingestion Intake(RME) = 6.39E-02

Cancer Ingestion Intake(CTE) = 8.06E-04
Noncancer Ingestion Intake(CTE) = 2.82E-02

Cancer Dermal Intake(RME) = 3.62E+01
Noncancer Dermal Intake(RME) = 4.22E+02

Cancer Dermal Intake(CTE) = 8.06E+00
Noncancer Dermal Intake(CTE) = 2.82E+02

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) --- FUTURE CHILD RESIDENTS TO GROUNDWATER

SITE NAME: SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
LOCATION: NWS CHARLESTON, SOUTH CAROLINA
DATE: 09/22/05

REFERENCES: U.S. EPA, July 2004

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent	FA	DAevent
1,1,2,2-Tetrachloroethane	1.40E-01	o	2.24E+00	3.30E-01	9.31E-01	6.94E-03	3.46E-02	1.49E-06	1	1.49E-06
1,1,2-Trichloroethane	9.30E-02	o	1.43E+00	3.30E-01	5.96E-01	6.44E-03	2.86E-02	7.34E-07	1	7.34E-07
1,1-Dichloroethene	1.10E-02	o	8.93E-01	3.30E-01	3.72E-01	1.17E-02	4.41E-02	1.24E-07	1	1.24E-07
1,2-Dichloroethane	1.40E-02	o	9.18E-01	3.30E-01	3.82E-01	4.20E-03	1.61E-02	5.77E-08	1	5.77E-08
1,2-Dichloropropane	2.00E-03	o	1.10E+00	3.30E-01	4.58E-01	7.76E-03	3.17E-02	1.67E-08	1	1.67E-08
Benzene	3.50E-02	o	7.00E-01	3.30E-01	2.92E-01	1.49E-02	5.05E-02	4.46E-07	1	4.46E-07
Bromodichloromethane	4.00E-03	o	2.12E+00	3.30E-01	8.83E-01	4.62E-03	2.27E-02	2.76E-08	1	2.76E-08
Carbon Tetrachloride	6.80E-02	o	1.86E+00	3.30E-01	7.76E-01	1.63E-02	7.78E-02	1.55E-06	1	1.55E-06
Chloroform	7.70E-01	o	1.19E+00	3.30E-01	4.98E-01	6.83E-03	2.87E-02	5.89E-06	1	5.89E-06
cis-1,2-Dichloroethene	2.50E+00	o	8.93E-01	3.30E-01	3.72E-01	7.71E-03	2.92E-02	1.87E-05	1	1.87E-05
Dichlorodifluoromethane	3.80E-01	o	1.22E+00	3.30E-01	5.07E-01	8.95E-03	3.79E-02	3.85E-06	1	3.85E-06
Methylene Chloride	1.90E-02	o	7.65E-01	3.30E-01	3.19E-01	3.54E-03	1.26E-02	6.03E-08	1	6.03E-08
Naphthalene	3.00E-03	o	1.34E+00	3.30E-01	5.58E-01	4.66E-02	2.03E-01	1.66E-07	1	1.66E-07
Tetrachloroethene	3.30E-01	o	2.18E+00	3.30E-01	9.06E-01	3.34E-02	1.66E-01	1.67E-05	1	1.67E-05
Toluene	9.80E-02	o	8.39E-01	3.30E-01	3.50E-01	3.11E-02	1.15E-01	2.86E-06	1	2.86E-06
Total 1,2-Dichloroethene	1.00E+00	o	8.93E-01	3.30E-01	3.72E-01	7.71E-03	2.92E-02	7.47E-06	1	7.47E-06
trans-1,2-Dichloroethene	2.50E-02	o	8.93E-01	3.30E-01	3.72E-01	7.71E-03	2.92E-02	1.87E-07	1	1.87E-07
Trichloroethene	1.30E+02	o	1.39E+00	3.30E-01	5.81E-01	1.16E-02	5.13E-02	1.83E-03	1	1.83E-03
Vinyl Chloride	2.10E-02	o	5.73E-01	3.30E-01	2.39E-01	5.60E-03	1.70E-02	9.12E-08	1	9.12E-08
Bis(2-Ethylhexyl)phthalate	5.40E-02	o	3.99E+01	3.30E-01	1.66E+01	2.49E-02	1.90E-01	8.72E-06	0.8	6.98E-06
RDX	2.10E-03	o	4.42E+00	3.30E-01	1.84E+00	3.39E-04	1.94E-03	1.53E-09	1	1.53E-09
Antimony	5.60E-03	i		3.30E-01		1.00E-03		1.85E-09	1	1.85E-09
Arsenic	2.27E-02	i		3.30E-01		1.00E-03		7.49E-09	1	7.49E-09
Barium	1.92E+00	i		3.30E-01		1.00E-03		6.34E-07	1	6.34E-07
Beryllium	4.36E-02	i		3.30E-01		1.00E-03		1.44E-08	1	1.44E-08
Cobalt	9.88E-01	i		3.30E-01		1.00E-03		3.26E-07	1	3.26E-07
Manganese	4.85E+00	i		3.30E-01		1.00E-03		1.60E-06	1	1.60E-06
Nickel	5.08E-01	i		3.30E-01		2.00E-04		3.35E-08	1	3.35E-08
Chloride	2.80E+03	i		3.30E-01		1.00E-03		9.24E-04	1	9.24E-04
Sulfate	3.20E+02	i		3.30E-01		1.00E-03		1.06E-04	1	1.06E-04

TABLE 7.15 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CHILD RESIDENTS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	1.40E-01	mg/L	M	8.9E-03	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	1.5E-01
	1,1,2-Trichloroethane	9.30E-02	mg/L	9.30E-02	mg/L	M	5.9E-03	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	1.5E+00
	1,1-Dichloroethene	1.10E-02	mg/L	1.10E-02	mg/L	M	7.0E-04	mg/kg-day	5.00E-02	mg/kg-day	NA	NA	1.4E-02
	1,2-Dichloroethane	1.40E-02	mg/L	1.40E-02	mg/L	M	8.9E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.5E-02
	1,2-Dichloropropane	2.00E-03	mg/L	2.00E-03	mg/L	M	1.3E-04	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	3.50E-02	mg/L	3.50E-02	mg/L	M	2.2E-03	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	5.6E-01
	Bromodichloromethane	4.00E-03	mg/L	4.00E-03	mg/L	M	2.6E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.3E-02
	Carbon Tetrachloride	6.80E-02	mg/L	6.80E-02	mg/L	M	4.3E-03	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	6.2E+00
	Chloroform	7.70E-01	mg/L	7.70E-01	mg/L	M	4.9E-02	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.9E+00
	cis-1,2-Dichloroethene	2.50E+00	mg/L	2.50E+00	mg/L	M	1.6E-01	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.6E+01
	Dichlorodifluoromethane	3.80E-01	mg/L	3.80E-01	mg/L	M	2.4E-02	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	1.2E-01
	Methylene Chloride	1.90E-02	mg/L	1.90E-02	mg/L	M	1.2E-03	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	2.0E-02
	Naphthalene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.9E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	9.6E-03
	Tetrachloroethene	3.30E-01	mg/L	3.30E-01	mg/L	M	2.1E-02	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.1E+00
	Toluene	9.80E-02	mg/L	9.80E-02	mg/L	M	6.3E-03	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	3.1E-02
	Total 1,2-Dichloroethene	1.00E+00	mg/L	1.00E+00	mg/L	M	6.4E-02	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	7.1E+00
	trans-1,2-Dichloroethene	2.50E-02	mg/L	2.50E-02	mg/L	M	1.6E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	8.0E-02
	Trichloroethene	1.30E+02	mg/L	1.30E+02	mg/L	M	8.3E+00	mg/kg-day	5.00E-01	mg/kg-day	NA	NA	1.7E+01
	Vinyl Chloride	2.10E-02	mg/L	2.10E-02	mg/L	M	1.3E-03	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.5E-01
	Bis(2-Ethylhexyl)phthalate	5.40E-02	mg/L	5.40E-02	mg/L	M	3.5E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.7E-01
	RDX	2.10E-03	mg/L	2.10E-03	mg/L	M	1.3E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.5E-02
	Antimony	5.60E-03	mg/L	5.60E-03	mg/L	M	3.6E-04	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	8.9E-01
	Arsenic	2.27E-02	mg/L	2.27E-02	mg/L	M	1.5E-03	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.8E+00
	Barium	1.92E+00	mg/L	1.92E+00	mg/L	M	1.2E-01	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	6.1E-01
	Beryllium	4.36E-02	mg/L	4.36E-02	mg/L	M	2.8E-03	mg/kg-day	2.00E-03	mg/kg-day	NA	NA	1.4E+00
	Cobalt	9.88E-01	mg/L	9.66E-01	mg/L	M	6.3E-02	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.2E+00
	Manganese	4.85E+00	mg/L	4.85E+00	mg/L	M	3.1E-01	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.3E+01
	Nickel	5.08E-01	mg/L	5.08E-01	mg/L	M	3.2E-02	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.6E+00
	Chloride	2.80E+03	mg/L	2.80E+03	mg/L	M	1.8E+02	mg/kg-day		mg/kg-day	NA	NA	
	Sulfate	3.20E+02	mg/L	3.20E+02	mg/L	M	2.0E+01	mg/kg-day		mg/kg-day	NA	NA	
	(total)												8.2E+01

TABLE 7.15 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CHILD RESIDENTS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	1.40E-01	mg/L	M	6.3E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	1.0E-02
	1,1,2-Trichloroethane	9.30E-02	mg/L	9.30E-02	mg/L	M	3.1E-04	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	7.7E-02
	1,1-Dichloroethene	1.10E-02	mg/L	1.10E-02	mg/L	M	5.2E-05	mg/kg-day	5.00E-02	mg/kg-day	NA	NA	1.0E-03
	1,2-Dichloroethane	1.40E-02	mg/L	1.40E-02	mg/L	M	2.4E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.2E-03
	1,2-Dichloropropane	2.00E-03	mg/L	2.00E-03	mg/L	M	7.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	3.50E-02	mg/L	3.50E-02	mg/L	M	1.9E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.9E-02
	Bromodichloromethane	4.00E-03	mg/L	4.00E-03	mg/L	M	1.2E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.8E-04
	Carbon Tetrachloride	6.80E-02	mg/L	6.80E-02	mg/L	M	6.5E-04	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	9.4E-01
	Chloroform	7.70E-01	mg/L	7.70E-01	mg/L	M	2.5E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.5E-01
	cis-1,2-Dichloroethene	2.50E+00	mg/L	2.50E+00	mg/L	M	7.9E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	7.9E-01
	Dichlorodifluoromethane	3.80E-01	mg/L	3.80E-01	mg/L	M	1.6E-03	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	8.1E-03
	Methylene Chloride	1.90E-02	mg/L	1.90E-02	mg/L	M	2.5E-05	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	4.2E-04
	Naphthalene	3.00E-03	mg/L	3.00E-03	mg/L	M	7.0E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.5E-03
	Tetrachloroethene	3.30E-01	mg/L	3.30E-01	mg/L	M	7.0E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	7.0E-01
	Toluene	9.80E-02	mg/L	9.80E-02	mg/L	M	1.2E-03	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	6.0E-03
	Total 1,2-Dichloroethene	1.00E+00	mg/L	1.00E+00	mg/L	M	3.2E-03	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	3.5E-01
	trans-1,2-Dichloroethene	2.50E-02	mg/L	2.50E-02	mg/L	M	7.9E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.9E-03
	Trichloroethene	1.30E+02	mg/L	1.30E+02	mg/L	M	7.7E-01	mg/kg-day	5.00E-01	mg/kg-day	NA	NA	1.5E+00
	Vinyl Chloride	2.10E-02	mg/L	2.10E-02	mg/L	M	3.8E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.3E-02
	Bis(2-Ethylhexyl)phthalate	5.40E-02	mg/L	5.40E-02	mg/L	M	2.9E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.5E-01
	RDX	2.10E-03	mg/L	2.10E-03	mg/L	M	6.5E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.2E-04
	Antimony	5.60E-03	mg/L	5.60E-03	mg/L	M	7.8E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.3E-02
	Arsenic	2.27E-02	mg/L	2.27E-02	mg/L	M	3.2E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E-02
	Barium	1.92E+00	mg/L	1.92E+00	mg/L	M	2.7E-04	mg/kg-day	1.40E-02	mg/kg-day	NA	NA	1.9E-02
	Beryllium	4.36E-02	mg/L	4.36E-02	mg/L	M	6.1E-06	mg/kg-day	1.40E-05	mg/kg-day	NA	NA	4.3E-01
	Cobalt	9.88E-01	mg/L	9.88E-01	mg/L	M	1.4E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	6.9E-03
	Manganese	4.85E+00	mg/L	4.85E+00	mg/L	M	6.8E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	7.0E-01
	Nickel	5.08E-01	mg/L	5.08E-01	mg/L	M	1.4E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.8E-02
	Chloride	2.80E+03	mg/L	2.80E+03	mg/L	M	3.9E-01	mg/kg-day		mg/kg-day	NA	NA	
	Sulfate	3.20E+02	mg/L	3.20E+02	mg/L	M	4.5E-02	mg/kg-day		mg/kg-day	NA	NA	
	(total)												6.1E+00

Total Hazard Index Across All Exposure Routes/Pathways 8.8E+01

TABLE 8.15 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CHILD RESIDENTS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	1.40E-01	mg/L	M	7.7E-04	mg/kg-day	2.00E-01	(mg/kg-day)$^{-1}$	1.5E-04
	1,1,2-Trichloroethane	9.30E-02	mg/L	9.30E-02	mg/L	M	5.1E-04	mg/kg-day	5.70E-02	(mg/kg-day)$^{-1}$	2.9E-05
	1,1-Dichloroethene	1.10E-02	mg/L	1.10E-02	mg/L	M	6.0E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	1,2-Dichloroethane	1.40E-02	mg/L	1.40E-02	mg/L	M	7.7E-05	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	7.0E-06
	1,2-Dichloropropane	2.00E-03	mg/L	2.00E-03	mg/L	M	1.1E-05	mg/kg-day	6.80E-02	(mg/kg-day)$^{-1}$	7.5E-07
	Benzene	3.50E-02	mg/L	3.50E-02	mg/L	M	1.9E-04	mg/kg-day	5.50E-02	(mg/kg-day)$^{-1}$	1.1E-05
	Bromodichloromethane	4.00E-03	mg/L	4.00E-03	mg/L	M	2.2E-05	mg/kg-day	6.20E-02	(mg/kg-day)$^{-1}$	1.4E-06
	Carbon Tetrachloride	6.80E-02	mg/L	6.80E-02	mg/L	M	3.7E-04	mg/kg-day	1.30E-01	(mg/kg-day)$^{-1}$	4.8E-05
	Chloroform	7.70E-01	mg/L	7.70E-01	mg/L	M	4.2E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	cis-1,2-Dichloroethene	2.50E+00	mg/L	2.50E+00	mg/L	M	1.4E-02	mg/kg-day		(mg/kg-day)$^{-1}$	
	Dichlorodifluoromethane	3.80E-01	mg/L	3.80E-01	mg/L	M	2.1E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	Methylene Chloride	1.90E-02	mg/L	1.90E-02	mg/L	M	1.0E-04	mg/kg-day	7.50E-03	(mg/kg-day)$^{-1}$	7.8E-07
	Naphthalene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.6E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Tetrachloroethene	3.30E-01	mg/L	3.30E-01	mg/L	M	1.8E-03	mg/kg-day	5.40E-01	(mg/kg-day)$^{-1}$	9.8E-04
	Toluene	9.80E-02	mg/L	9.80E-02	mg/L	M	5.4E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Total 1,2-Dichloroethene	1.00E+00	mg/L	1.00E+00	mg/L	M	5.5E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	2.50E-02	mg/L	M	1.4E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethene	1.30E+02	mg/L	1.30E+02	mg/L	M	7.1E-01	mg/kg-day	1.30E-02	(mg/kg-day)$^{-1}$	9.3E-03
	Vinyl Chloride	2.10E-02	mg/L	2.10E-02	mg/L	M	1.2E-04	mg/kg-day	1.50E+00	(mg/kg-day)$^{-1}$	1.7E-04
	Bis(2-Ethylhexyl)phthalate	5.40E-02	mg/L	5.40E-02	mg/L	M	3.0E-04	mg/kg-day	1.40E-02	(mg/kg-day)$^{-1}$	4.1E-06
	RDX	2.10E-03	mg/L	2.10E-03	mg/L	M	1.2E-05	mg/kg-day	1.10E-01	(mg/kg-day)$^{-1}$	1.3E-06
	Antimony	5.60E-03	mg/L	5.60E-03	mg/L	M	3.1E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	2.27E-02	mg/L	2.27E-02	mg/L	M	1.2E-04	mg/kg-day	1.50E+00	(mg/kg-day)$^{-1}$	1.9E-04
	Barium	1.92E+00	mg/L	1.92E+00	mg/L	M	1.1E-02	mg/kg-day		(mg/kg-day)$^{-1}$	
	Beryllium	4.36E-02	mg/L	4.36E-02	mg/L	M	2.4E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Cobalt	9.88E-01	mg/L	9.88E-01	mg/L	M	5.4E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	Manganese	4.85E+00	mg/L	4.85E+00	mg/L	M	2.7E-02	mg/kg-day		(mg/kg-day)$^{-1}$	
	Nickel	5.08E-01	mg/L	5.08E-01	mg/L	M	2.8E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	Chloride	2.80E+03	mg/L	2.80E+03	mg/L	M	1.5E+01	mg/kg-day		(mg/kg-day)$^{-1}$	
	Sulfate	3.20E+02	mg/L	3.20E+02	mg/L	M	1.8E+00	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										1.1E-02

TABLE 8.15 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CHILD RESIDENTS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	1.40E-01	mg/L	M	5.4E-05	mg/kg-day	2.00E-01	(mg/kg-day)$^{-1}$	1.1E-05
	1,1,2-Trichloroethane	9.30E-02	mg/L	9.30E-02	mg/L	M	2.7E-05	mg/kg-day	5.70E-02	(mg/kg-day)$^{-1}$	1.5E-06
	1,1-Dichloroethene	1.10E-02	mg/L	1.10E-02	mg/L	M	4.5E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	1,2-Dichloroethane	1.40E-02	mg/L	1.40E-02	mg/L	M	2.1E-06	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	1.9E-07
	1,2-Dichloropropane	2.00E-03	mg/L	2.00E-03	mg/L	M	6.0E-07	mg/kg-day	6.80E-02	(mg/kg-day)$^{-1}$	4.1E-08
	Benzene	3.50E-02	mg/L	3.50E-02	mg/L	M	1.6E-05	mg/kg-day	5.50E-02	(mg/kg-day)$^{-1}$	8.9E-07
	Bromodichloromethane	4.00E-03	mg/L	4.00E-03	mg/L	M	1.0E-06	mg/kg-day	6.20E-02	(mg/kg-day)$^{-1}$	6.2E-08
	Carbon Tetrachloride	6.80E-02	mg/L	6.80E-02	mg/L	M	5.6E-05	mg/kg-day	1.30E-01	(mg/kg-day)$^{-1}$	7.3E-06
	Chloroform	7.70E-01	mg/L	7.70E-01	mg/L	M	2.1E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	cis-1,2-Dichloroethene	2.50E+00	mg/L	2.50E+00	mg/L	M	6.8E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Dichlorodifluoromethane	3.80E-01	mg/L	3.80E-01	mg/L	M	1.4E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Methylene Chloride	1.90E-02	mg/L	1.90E-02	mg/L	M	2.2E-06	mg/kg-day	7.50E-03	(mg/kg-day)$^{-1}$	1.6E-08
	Naphthalene	3.00E-03	mg/L	3.00E-03	mg/L	M	6.0E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	Tetrachloroethene	3.30E-01	mg/L	3.30E-01	mg/L	M	6.0E-04	mg/kg-day	5.40E-01	(mg/kg-day)$^{-1}$	3.3E-04
	Toluene	9.60E-02	mg/L	9.80E-02	mg/L	M	1.0E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Total 1,2-Dichloroethene	1.00E+00	mg/L	1.00E+00	mg/L	M	2.7E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	2.50E-02	mg/L	M	6.8E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethene	1.30E+02	mg/L	1.30E+02	mg/L	M	6.6E-02	mg/kg-day	1.30E-02	(mg/kg-day)$^{-1}$	8.6E-04
	Vinyl Chloride	2.10E-02	mg/L	2.10E-02	mg/L	M	3.3E-06	mg/kg-day	1.50E+00	(mg/kg-day)$^{-1}$	4.9E-06
	Bis(2-Ethylhexyl)phthalate	5.40E-02	mg/L	5.40E-02	mg/L	M	2.6E-04	mg/kg-day	1.40E-02	(mg/kg-day)$^{-1}$	3.5E-06
	RDX	2.10E-03	mg/L	2.10E-03	mg/L	M	5.5E-08	mg/kg-day	1.10E-01	(mg/kg-day)$^{-1}$	6.1E-09
	Antimony	5.80E-03	mg/L	5.80E-03	mg/L	M	6.7E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	2.27E-02	mg/L	2.27E-02	mg/L	M	2.7E-07	mg/kg-day	1.50E+00	(mg/kg-day)$^{-1}$	4.1E-07
	Barium	1.92E+00	mg/L	1.92E+00	mg/L	M	2.3E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Beryllium	4.36E-02	mg/L	4.36E-02	mg/L	M	5.2E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Cobalt	9.88E-01	mg/L	9.88E-01	mg/L	M	1.2E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Manganese	4.85E+00	mg/L	4.85E+00	mg/L	M	5.8E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Nickel	5.08E-01	mg/L	5.08E-01	mg/L	M	1.2E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Chloride	2.80E+03	mg/L	2.80E+03	mg/L	M	3.3E-02	mg/kg-day		(mg/kg-day)$^{-1}$	
	Sulfate	3.20E+02	mg/L	3.20E+02	mg/L	M	3.8E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										1.2E-03
										Total Risk Across All Exposure Routes/Pathways	**1.2E-02**

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOURE (CTE) — FUTURE CHILD RESIDENTS TO GROUNDWATER

SITE NAME: SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
LOCATION: NWS CHARLESTON, SOUTH CAROLINA
DATE: 09/22/05

REFERENCES: U.S. EPA, July 2004

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent	FA	DAevent
1,1,2,2-Tetrachloroethane	1.40E-01	o	2.24E+00	2.50E-01	9.31E-01	6.94E-03	3.46E-02	1.30E-06	1	1.30E-06
1,1,2-Trichloroethane	9.30E-02	o	1.43E+00	2.50E-01	5.96E-01	6.44E-03	2.86E-02	6.39E-07	1	6.39E-07
1,1-Dichloroethene	1.10E-02	o	8.93E-01	2.50E-01	3.72E-01	1.17E-02	4.41E-02	1.08E-07	1	1.08E-07
1,2-Dichloroethane	1.40E-02	o	9.18E-01	2.50E-01	3.82E-01	4.20E-03	1.61E-02	5.02E-08	1	5.02E-08
1,2-Dichloropropane	2.00E-03	o	1.10E+00	2.50E-01	4.58E-01	7.76E-03	3.17E-02	1.45E-08	1	1.45E-08
Benzene	3.50E-02	o	7.00E-01	2.50E-01	2.92E-01	1.49E-02	5.05E-02	3.88E-07	1	3.88E-07
Bromodichloromethane	4.00E-03	o	2.12E+00	2.50E-01	8.83E-01	4.62E-03	2.27E-02	2.40E-08	1	2.40E-08
Carbon Tetrachloride	6.80E-02	o	1.86E+00	2.50E-01	7.76E-01	1.63E-02	7.78E-02	1.35E-06	1	1.35E-06
Chloroform	7.70E-01	o	1.19E+00	2.50E-01	4.98E-01	6.83E-03	2.87E-02	5.12E-06	1	5.12E-06
cis-1,2-Dichloroethene	2.50E+00	o	8.93E-01	2.50E-01	3.72E-01	7.71E-03	2.92E-02	1.63E-05	1	1.63E-05
Dichlorodifluoromethane	3.80E-01	o	1.22E+00	2.50E-01	5.07E-01	8.95E-03	3.79E-02	3.35E-06	1	3.35E-06
Methylene Chloride	1.90E-02	o	7.65E-01	2.50E-01	3.19E-01	3.54E-03	1.26E-02	5.25E-08	1	5.25E-08
Naphthalene	3.00E-03	o	1.34E+00	2.50E-01	5.58E-01	4.66E-02	2.03E-01	1.44E-07	1	1.44E-07
Tetrachloroethene	3.30E-01	o	2.18E+00	2.50E-01	9.06E-01	3.34E-02	1.66E-01	1.45E-05	1	1.45E-05
Toluene	9.80E-02	o	8.39E-01	2.50E-01	3.50E-01	3.11E-02	1.15E-01	2.49E-06	1	2.49E-06
Total 1,2-Dichloroethene	1.00E+00	o	8.93E-01	2.50E-01	3.72E-01	7.71E-03	2.92E-02	6.50E-06	1	6.50E-06
trans-1,2-Dichloroethene	2.50E-02	o	8.93E-01	2.50E-01	3.72E-01	7.71E-03	2.92E-02	1.63E-07	1	1.63E-07
Trichloroethene	1.30E+02	o	1.39E+00	2.50E-01	5.81E-01	1.16E-02	5.13E-02	1.59E-03	1	1.59E-03
Vinyl Chloride	2.10E-02	o	5.73E-01	2.50E-01	2.39E-01	5.60E-03	1.70E-02	7.94E-08	1	7.94E-08
Bis(2-Ethylhexyl)phthalate	5.40E-02	o	3.99E+01	2.50E-01	1.66E+01	2.49E-02	1.90E-01	7.59E-06	0.8	6.07E-06
RDX	2.10E-03	o	4.42E+00	2.50E-01	1.84E+00	3.39E-04	1.94E-03	1.34E-09	1	1.34E-09
Antimony	5.60E-03	i		2.50E-01		1.00E-03		1.40E-09	1	1.40E-09
Arsenic	2.27E-02	i		2.50E-01		1.00E-03		5.68E-09	1	5.68E-09
Barium	1.92E+00	i		2.50E-01		1.00E-03		4.80E-07	1	4.80E-07
Beryllium	4.36E-02	i		2.50E-01		1.00E-03		1.09E-08	1	1.09E-08
Cobalt	9.88E-01	i		2.50E-01		1.00E-03		2.47E-07	1	2.47E-07
Manganese	4.85E+00	i		2.50E-01		1.00E-03		1.21E-06	1	1.21E-06
Nickel	5.08E-01	i		2.50E-01		2.00E-04		2.54E-08	1	2.54E-08
Chloride	2.80E+03	i		2.50E-01		1.00E-03		7.00E-04	1	7.00E-04
Sulfate	3.20E+02	i		2.50E-01		1.00E-03		8.00E-05	1	8.00E-05

TABLE 7.15a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CHILD RESIDENTS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	1.40E-01	mg/L	M	3.9E-03	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	6.6E-02
	1,1,2-Trichloroethane	9.30E-02	mg/L	9.30E-02	mg/L	M	2.6E-03	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	6.6E-01
	1,1-Dichloroethene	1.10E-02	mg/L	1.10E-02	mg/L	M	3.1E-04	mg/kg-day	5.00E-02	mg/kg-day	NA	NA	6.2E-03
	1,2-Dichloroethane	1.40E-02	mg/L	1.40E-02	mg/L	M	3.9E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.0E-02
	1,2-Dichloropropane	2.00E-03	mg/L	2.00E-03	mg/L	M	5.6E-05	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	3.50E-02	mg/L	3.50E-02	mg/L	M	9.9E-04	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	2.5E-01
	Bromodichloromethane	4.00E-03	mg/L	4.00E-03	mg/L	M	1.1E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.6E-03
	Carbon Tetrachloride	6.80E-02	mg/L	6.80E-02	mg/L	M	1.9E-03	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	2.7E+00
	Chloroform	7.70E-01	mg/L	7.70E-01	mg/L	M	2.2E-02	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.2E+00
	cis-1,2-Dichloroethene	2.50E+00	mg/L	2.50E+00	mg/L	M	7.1E-02	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	7.1E+00
	Dichlorodifluoromethane	3.80E-01	mg/L	3.80E-01	mg/L	M	1.1E-02	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	5.4E-02
	Methylene Chloride	1.90E-02	mg/L	1.90E-02	mg/L	M	5.4E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	8.9E-03
	Naphthalene	3.00E-03	mg/L	3.00E-03	mg/L	M	8.5E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.2E-03
	Tetrachloroethene	3.30E-01	mg/L	3.30E-01	mg/L	M	9.3E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	9.3E-01
	Toluene	9.80E-02	mg/L	9.80E-02	mg/L	M	2.8E-03	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	1.4E-02
	Total 1,2-Dichloroethene	1.00E+00	mg/L	1.00E+00	mg/L	M	2.8E-02	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	3.1E+00
	trans-1,2-Dichloroethene	2.50E-02	mg/L	2.50E-02	mg/L	M	7.1E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.5E-02
	Trichloroethene	1.30E+02	mg/L	1.30E+02	mg/L	M	3.7E+00	mg/kg-day	5.00E-01	mg/kg-day	NA	NA	7.3E+00
	Vinyl Chloride	2.10E-02	mg/L	2.10E-02	mg/L	M	5.9E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.0E-01
	Bis(2-Ethylhexyl)phthalate	5.40E-02	mg/L	5.40E-02	mg/L	M	1.5E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.6E-02
	RDX	2.10E-03	mg/L	2.10E-03	mg/L	M	5.9E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.0E-02
	Antimony	5.60E-03	mg/L	5.60E-03	mg/L	M	1.6E-04	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	3.9E-01
	Arsenic	2.27E-02	mg/L	2.27E-02	mg/L	M	6.4E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.1E+00
	Barium	1.92E+00	mg/L	1.92E+00	mg/L	M	5.4E-02	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	2.7E-01
	Beryllium	4.36E-02	mg/L	4.36E-02	mg/L	M	1.2E-03	mg/kg-day	2.00E-03	mg/kg-day	NA	NA	6.1E-01
	Cobalt	9.88E-01	mg/L	9.88E-01	mg/L	M	2.8E-02	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.4E+00
	Manganese	4.85E+00	mg/L	4.85E+00	mg/L	M	1.4E-01	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	5.7E+00
	Nickel	5.08E-01	mg/L	5.08E-01	mg/L	M	1.4E-02	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.2E-01
	Chloride	2.80E+03	mg/L	2.80E+03	mg/L	M	7.9E+01	mg/kg-day		mg/kg-day	NA	NA	
	Sulfate	3.20E+02	mg/L	3.20E+02	mg/L	M	9.0E+00	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.6E+01

TABLE 7.15a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CHILD RESIDENTS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	1.40E-01	mg/L	M	3.7E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	6.1E-03
	1,1,2-Trichloroethane	9.30E-02	mg/L	9.30E-02	mg/L	M	1.8E-04	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	4.5E-02
	1,1-Dichloroethene	1.10E-02	mg/L	1.10E-02	mg/L	M	3.1E-05	mg/kg-day	5.00E-02	mg/kg-day	NA	NA	6.1E-04
	1,2-Dichloroethane	1.40E-02	mg/L	1.40E-02	mg/L	M	1.4E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.1E-04
	1,2-Dichloropropane	2.00E-03	mg/L	2.00E-03	mg/L	M	4.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	3.50E-02	mg/L	3.50E-02	mg/L	M	1.1E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.1E-02
	Bromodichloromethane	4.00E-03	mg/L	4.00E-03	mg/L	M	6.8E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.4E-04
	Carbon Tetrachloride	6.80E-02	mg/L	6.80E-02	mg/L	M	3.8E-04	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	5.4E-01
	Chloroform	7.70E-01	mg/L	7.70E-01	mg/L	M	1.4E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.4E-01
	cis-1,2-Dichloroethene	2.50E+00	mg/L	2.50E+00	mg/L	M	4.6E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.6E-01
	Dichlorodifluoromethane	3.80E-01	mg/L	3.80E-01	mg/L	M	9.4E-04	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	4.7E-03
	Methylene Chloride	1.90E-02	mg/L	1.90E-02	mg/L	M	1.5E-05	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	2.5E-04
	Naphthalene	3.00E-03	mg/L	3.00E-03	mg/L	M	4.1E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.0E-03
	Tetrachloroethene	3.30E-01	mg/L	3.30E-01	mg/L	M	4.1E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.1E-01
	Toluene	9.80E-02	mg/L	9.80E-02	mg/L	M	7.0E-04	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	3.5E-03
	Total 1,2-Dichloroethene	1.00E+00	mg/L	1.00E+00	mg/L	M	1.8E-03	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	2.0E-01
	trans-1,2-Dichloroethene	2.50E-02	mg/L	2.50E-02	mg/L	M	4.6E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.3E-03
	Trichloroethene	1.30E+02	mg/L	1.30E+02	mg/L	M	4.5E-01	mg/kg-day	5.00E-01	mg/kg-day	NA	NA	9.0E-01
	Vinyl Chloride	2.10E-02	mg/L	2.10E-02	mg/L	M	2.2E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	7.5E-03
	Bis(2-Ethylhexyl)phthalate	5.40E-02	mg/L	5.40E-02	mg/L	M	1.7E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	8.6E-02
	RDX	2.10E-03	mg/L	2.10E-03	mg/L	M	3.8E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.3E-04
	Antimony	5.60E-03	mg/L	5.80E-03	mg/L	M	3.9E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	6.6E-03
	Arsenic	2.27E-02	mg/L	2.27E-02	mg/L	M	1.6E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.3E-03
	Barium	1.92E+00	mg/L	1.92E+00	mg/L	M	1.4E-04	mg/kg-day	1.40E-02	mg/kg-day	NA	NA	9.7E-03
	Beryllium	4.36E-02	mg/L	4.36E-02	mg/L	M	3.1E-06	mg/kg-day	1.40E-05	mg/kg-day	NA	NA	2.2E-01
	Cobalt	9.88E-01	mg/L	9.88E-01	mg/L	M	7.0E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.5E-03
	Manganese	4.85E+00	mg/L	4.85E+00	mg/L	M	3.4E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	3.6E-01
	Nickel	5.08E-01	mg/L	5.08E-01	mg/L	M	7.2E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	9.0E-03
	Chloride	2.80E+03	mg/L	2.80E+03	mg/L	M	2.0E-01	mg/kg-day		mg/kg-day	NA	NA	
	Sulfate	3.20E+02	mg/L	3.20E+02	mg/L	M	2.3E-02	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.4E+00
												Total Hazard Index Across All Exposure Routes/Pathways	**3.9E+01**

TABLE 8.15e - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CHILD RESIDENTS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	1.40E-01	mg/L	M	1.1E-04	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	2.3E-05
	1,1,2-Trichloroethane	9.30E-02	mg/L	9.30E-02	mg/L	M	7.5E-05	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	4.3E-06
	1,1-Dichloroethene	1.10E-02	mg/L	1.10E-02	mg/L	M	8.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	1,2-Dichloroethane	1.40E-02	mg/L	1.40E-02	mg/L	M	1.1E-05	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-06
	1,2-Dichloropropane	2.00E-03	mg/L	2.00E-03	mg/L	M	1.6E-06	mg/kg-day	6.80E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	Benzene	3.50E-02	mg/L	3.50E-02	mg/L	M	2.8E-05	mg/kg-day	5.50E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-06
	Bromodichloromethane	4.00E-03	mg/L	4.00E-03	mg/L	M	3.2E-06	mg/kg-day	6.20E-02	$(mg/kg\text{-}day)^{-1}$	2.0E-07
	Carbon Tetrachloride	6.80E-02	mg/L	6.80E-02	mg/L	M	5.5E-05	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	7.1E-06
	Chloroform	7.70E-01	mg/L	7.70E-01	mg/L	M	6.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	cis-1,2-Dichloroethene	2.50E+00	mg/L	2.50E+00	mg/L	M	2.0E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Dichlorodifluoromethane	3.80E-01	mg/L	3.80E-01	mg/L	M	3.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Methylene Chloride	1.90E-02	mg/L	1.90E-02	mg/L	M	1.5E-05	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	Naphthalene	3.00E-03	mg/L	3.00E-03	mg/L	M	2.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Tetrachloroethene	3.30E-01	mg/L	3.30E-01	mg/L	M	2.7E-04	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-04
	Toluene	9.60E-02	mg/L	9.80E-02	mg/L	M	7.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Total 1,2-Dichloroethene	1.00E+00	mg/L	1.00E+00	mg/L	M	8.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	2.50E-02	mg/L	M	2.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.30E+02	mg/L	1.30E+02	mg/L	M	1.0E-01	mg/kg-day	1.30E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-03
	Vinyl Chloride	2.10E-02	mg/L	2.10E-02	mg/L	M	1.7E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-05
	Bis(2-Ethylhexyl)phthalate	5.40E-02	mg/L	5.40E-02	mg/L	M	4.4E-05	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	6.1E-07
	RDX	2.10E-03	mg/L	2.10E-03	mg/L	M	1.7E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.9E-07
	Antimony	5.60E-03	mg/L	5.60E-03	mg/L	M	4.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.27E-02	mg/L	2.27E-02	mg/L	M	1.8E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-05
	Barium	1.92E+00	mg/L	1.92E+00	mg/L	M	1.5E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Beryllium	4.36E-02	mg/L	4.36E-02	mg/L	M	3.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	9.88E-01	mg/L	9.88E-01	mg/L	M	8.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	4.85E+00	mg/L	4.85E+00	mg/L	M	3.9E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	5.08E-01	mg/L	5.08E-01	mg/L	M	4.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloride	2.80E+03	mg/L	2.80E+03	mg/L	M	2.3E+00	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Sulfate	3.20E+02	mg/L	3.20E+02	mg/L	M	2.6E-01	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.6E-03

TABLE 8.15a - CENTRAL TENDENCY EXPOURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CHILD RESIDENTS TO GROUNDWATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	1.40E-01	mg/L	M	1.0E-05	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	2.1E-06
	1,1,2-Trichloroethane	9.30E-02	mg/L	9.30E-02	mg/L	M	5.1E-06	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	2.9E-07
	1,1-Dichloroethene	1.10E-02	mg/L	1.10E-02	mg/L	M	6.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	1,2-Dichloroethane	1.40E-02	mg/L	1.40E-02	mg/L	M	4.0E-07	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	3.7E-08
	1,2-Dichloropropane	2.00E-03	mg/L	2.00E-03	mg/L	M	1.2E-07	mg/kg-day	6.80E-02	$(mg/kg\text{-}day)^{-1}$	8.0E-09
	Benzene	3.50E-02	mg/L	3.50E-02	mg/L	M	3.1E-06	mg/kg-day	5.50E-02	$(mg/kg\text{-}day)^{-1}$	1.7E-07
	Bromodichloromethane	4.00E-03	mg/L	4.00E-03	mg/L	M	1.9E-07	mg/kg-day	6.20E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Carbon Tetrachloride	8.80E-02	mg/L	8.80E-02	mg/L	M	1.1E-05	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-06
	Chloroform	7.70E-01	mg/L	7.70E-01	mg/L	M	4.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	cis-1,2-Dichloroethene	2.50E+00	mg/L	2.50E+00	mg/L	M	1.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Dichlorodifluoromethane	3.80E-01	mg/L	3.80E-01	mg/L	M	2.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Methylene Chloride	1.90E-02	mg/L	1.90E-02	mg/L	M	4.2E-07	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	3.2E-09
	Naphthalene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Tetrachloroethene	3.30E-01	mg/L	3.30E-01	mg/L	M	1.2E-04	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	6.3E-05
	Toluene	9.80E-02	mg/L	9.80E-02	mg/L	M	2.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Total 1,2-Dichloroethene	1.00E+00	mg/L	1.00E+00	mg/L	M	5.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	2.50E-02	mg/L	M	1.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.30E+02	mg/L	1.30E+02	mg/L	M	1.3E-02	mg/kg-day	1.30E-02	$(mg/kg\text{-}day)^{-1}$	1.7E-04
	Vinyl Chloride	2.10E-02	mg/L	2.10E-02	mg/L	M	6.4E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	9.6E-07
	Bis(2-Ethylhexyl)phthalate	5.40E-02	mg/L	5.40E-02	mg/L	M	4.9E-05	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	6.9E-07
	RDX	2.10E-03	mg/L	2.10E-03	mg/L	M	1.1E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-09
	Antimony	5.60E-03	mg/L	5.60E-03	mg/L	M	1.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.27E-02	mg/L	2.27E-02	mg/L	M	4.6E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	6.9E-08
	Barium	1.92E+00	mg/L	1.92E+00	mg/L	M	3.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Beryllium	4.36E-02	mg/L	4.36E-02	mg/L	M	8.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	9.88E-01	mg/L	9.88E-01	mg/L	M	2.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	4.85E+00	mg/L	4.85E+00	mg/L	M	9.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	5.08E-01	mg/L	5.08E-01	mg/L	M	2.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloride	2.80E+03	mg/L	2.80E+03	mg/L	M	5.6E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Sulfate	3.20E+02	mg/L	3.20E+02	mg/L	M	6.4E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.4E-04
										Total Risk Across All Exposure Routes/Pathways	**1.8E-03**

TABLE 4.16

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF OCCUPATIONAL WORKERS TO INDOOR AIR
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Occupational Workers
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	USEPA, Feburary 2004	Derived	USEPA, Feburary 2004	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	2.5	USEPA Region 4, May 2000	2.5	USEPA Region 4, May 2000	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	USEPA Region 4, May 2000	219	USEPA, May 1993	
	ED	Exposure Duration	(years)	25	USEPA Region 4, May 2000	9	USEPA, May 1993	
	ET	Exposure Time	(hr/day)	8	USEPA Region 4, May 2000	8	USEPA Region 4, May 2000	
	BW	Body Weight	(kg)	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	USEPA, December 1989	3,285	USEPA, December 1989	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Inhalation Intake(RME) = 9.78E-02
Noncancer Inhalation Intake(RME) = 2.74E-01

Cancer Inhalation Intake(CTE) = 2.20E-02
Noncancer Inhalation Intake(CTE) = 1.71E-01

TABLE 7.16. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF OCCUPATIONAL WORKERS TO INDOOR AIR
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Occupational Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	5.70E-07	mg/m³	R	1.6E-07	mg/kg-day	6.00E-02	mg/kg-day	2.1E-01	mg/m³	2.6E-06
	1,1,2-Trichloroethane	9.30E-02	mg/L	1.09E-06	mg/m³	R	3.0E-07	mg/kg-day	4.00E-03	mg/kg-day	1.4E-02	mg/m³	7.4E-05
	1,1-Dichloroethene	1.10E-02	mg/L	4.20E-06	mg/m³	R	1.2E-06	mg/kg-day	5.71E-02	mg/kg-day	2.0E-01	mg/m³	2.0E-05
	1,2-Dichloroethane	1.40E-02	mg/L	1.93E-07	mg/m³	R	5.3E-08	mg/kg-day	7.00E-01	mg/kg-day	2.50E+00	mg/m³	7.5E-08
	1,2-Dichloropropane	2.00E-03	mg/L	7.58E-08	mg/m³	R	2.1E-08	mg/kg-day	1.14E-03	mg/kg-day	4.0E-03	mg/m³	1.8E-05
	Benzene	3.50E-02	mg/L	2.69E-06	mg/m³	R	7.4E-07	mg/kg-day	8.57E-03	mg/kg-day	3.0E-02	mg/m³	8.6E-05
	Bromodichloromethane	4.00E-03	mg/L	8.74E-08	mg/m³	R	2.4E-08	mg/kg-day	2.00E-02	mg/kg-day	7.0E-02	mg/m³	1.2E-06
	Carbon Tetrachloride	6.80E-02	mg/L	2.58E-05	mg/m³	R	7.1E-06	mg/kg-day	5.00E-02	mg/kg-day	1.8E-01	mg/m³	1.4E-04
	Chloroform	7.70E-01	mg/L	4.19E-05	mg/m³	R	1.1E-05	mg/kg-day	1.40E-02	mg/kg-day	4.9E-02	mg/m³	8.2E-04
	cis-1,2-Dichloroethene	2.50E+00	mg/L	1.48E-04	mg/m³	R	4.1E-05	mg/kg-day	1.00E-02	mg/kg-day	3.5E-02	mg/m³	4.1E-03
	Dichlorodifluoromethane	3.80E-01	mg/L	1.37E-03	mg/m³	R	3.7E-04	mg/kg-day	5.71E-02	mg/kg-day	2.0E-01	mg/m³	6.6E-03
	Methylene Chloride	1.90E-02	mg/L	6.58E-07	mg/m³	R	1.8E-07	mg/kg-day	3.00E-01	mg/kg-day	1.1E+00	mg/m³	6.0E-07
	Naphthalene	3.00E-03	mg/L	1.38E-08	mg/m³	R	3.8E-09	mg/kg-day	8.57E-04	mg/kg-day	3.0E-03	mg/m³	4.4E-06
	Tetrachloroethene	3.30E-01	mg/L	6.76E-05	mg/m³	R	1.9E-05	mg/kg-day	1.40E-01	mg/kg-day	4.9E-01	mg/m³	1.3E-04
	Toluene	9.80E-02	mg/L	8.11E-06	mg/m³	R	2.2E-06	mg/kg-day	1.14E-01	mg/kg-day	4.0E-01	mg/m³	1.9E-05
	Total 1,2-Dichloroethene	1.00E+00	mg/L	5.94E-05	mg/m³	R	1.6E-05	mg/kg-day		mg/kg-day		mg/m³	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	3.44E-06	mg/m³	R	9.4E-07	mg/kg-day	2.00E-02	mg/kg-day	7.0E-02	mg/m³	4.7E-05
	Trichloroethene	1.30E+02	mg/L	1.71E-02	mg/m³	R	4.7E-03	mg/kg-day	1.70E-01	mg/kg-day	6.0E-01	mg/m³	2.8E-02
	Vinyl Chloride	2.10E-02	mg/L	9.54E-06	mg/m³	R	2.6E-06	mg/kg-day	2.88E-02	mg/kg-day	1.0E-01	mg/m³	9.1E-05
	(total)												4.0E-02

Total Hazard Index Across All Exposure Routes/Pathways **4.0E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 8.16. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF OCCUPATIONAL WORKERS TO INDOOR AIR
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Occupational Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	5.70E-07	mg/m^3	R	5.6E-08	mg/kg-day	2.00E-01	(mg/kg-day)$^{-1}$	1.1E-08
	1,1,2-Trichloroethane	9.30E-02	mg/L	1.09E-06	mg/m^3	R	1.1E-07	mg/kg-day	5.60E-02	(mg/kg-day)$^{-1}$	5.9E-09
	1,1-Dichloroethene	1.10E-02	mg/L	4.20E-06	mg/m^3	R	4.1E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	1,2-Dichloroethane	1.40E-02	mg/L	1.93E-07	mg/m^3	R	1.9E-08	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	1.7E-09
	1,2-Dichloropropane	2.00E-03	mg/L	7.58E-08	mg/m^3	R	7.4E-09	mg/kg-day	6.79E-02	(mg/kg-day)$^{-1}$	5.0E-10
	Benzene	3.50E-02	mg/L	2.69E-06	mg/m^3	R	2.6E-07	mg/kg-day	2.70E-02	(mg/kg-day)$^{-1}$	7.1E-09
	Bromodichloromethane	4.00E-03	mg/L	8.74E-08	mg/m^3	R	8.6E-09	mg/kg-day	6.20E-02	(mg/kg-day)$^{-1}$	5.3E-10
	Carbon Tetrachloride	6.80E-02	mg/L	2.58E-05	mg/m^3	R	2.5E-06	mg/kg-day	5.30E-02	(mg/kg-day)$^{-1}$	1.3E-07
	Chloroform	7.70E-01	mg/L	4.19E-05	mg/m^3	R	4.1E-06	mg/kg-day	8.10E-02	(mg/kg-day)$^{-1}$	3.3E-07
	cis-1,2-Dichloroethene	2.50E+00	mg/L	1.48E-04	mg/m^3	R	1.5E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Dichlorodifluoromethane	3.80E-01	mg/L	1.37E-03	mg/m^3	R	1.3E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Methylene Chloride	1.90E-02	mg/L	6.58E-07	mg/m^3	R	6.4E-08	mg/kg-day	1.65E-03	(mg/kg-day)$^{-1}$	1.1E-10
	Naphthalene	3.00E-03	mg/L	1.38E-08	mg/m^3	R	1.4E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	Tetrachloroethene	3.30E-01	mg/L	6.76E-05	mg/m^3	R	6.6E-06	mg/kg-day	2.00E-02	(mg/kg-day)$^{-1}$	1.3E-07
	Toluene	9.80E-02	mg/L	8.11E-06	mg/m^3	R	7.9E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Total 1,2-Dichloroethene	1.00E+00	mg/L	5.94E-05	mg/m^3	R	5.8E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	3.44E-06	mg/m^3	R	3.4E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethene	1.30E+02	mg/L	1.71E-02	mg/m^3	R	1.7E-03	mg/kg-day	7.00E-03	(mg/kg-day)$^{-1}$	1.2E-05
	Vinyl Chloride	2.10E-02	mg/L	9.54E-06	mg/m^3	R	9.3E-07	mg/kg-day	1.50E-02	(mg/kg-day)$^{-1}$	1.4E-08
											1.2E-05
										Total Risk Across All Exposure Routes/Pathways	**1.2E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 7.16a. CENTRAL TENDENCY EXPOURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF OCCUPATIONAL WORKERS TO INDOOR AIR
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Occupational Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	5.70E-07	mg/m^3	R	9.8E-08	mg/kg-day	6.00E-02	mg/kg-day	2.1E-01	mg/m^3	1.6E-06
	1,1,2-Trichloroethane	9.30E-02	mg/L	1.09E-06	mg/m^3	R	1.9E-07	mg/kg-day	4.00E-03	mg/kg-day	1.4E-02	mg/m^3	4.7E-05
	1,1-Dichloroethene	1.10E-02	mg/L	4.20E-06	mg/m^3	R	7.2E-07	mg/kg-day	5.71E-02	mg/kg-day	2.0E-01	mg/m^3	1.3E-05
	1,2-Dichloroethane	1.40E-02	mg/L	1.93E-07	mg/m^3	R	3.3E-08	mg/kg-day	7.00E-01	mg/kg-day	2.50E+00	mg/m^3	4.7E-08
	1,2-Dichloropropane	2.00E-03	mg/L	7.58E-08	mg/m^3	R	1.3E-08	mg/kg-day	1.14E-03	mg/kg-day	4.0E-03	mg/m^3	1.1E-05
	Benzene	3.50E-02	mg/L	2.69E-06	mg/m^3	R	4.6E-07	mg/kg-day	8.57E-03	mg/kg-day	3.0E-02	mg/m^3	5.4E-05
	Bromodichloromethane	4.00E-03	mg/L	8.74E-08	mg/m^3	R	1.5E-08	mg/kg-day	2.00E-02	mg/kg-day	7.0E-02	mg/m^3	7.5E-07
	Carbon Tetrachloride	6.80E-02	mg/L	2.58E-05	mg/m^3	R	4.4E-06	mg/kg-day	5.00E-02	mg/kg-day	1.8E-01	mg/m^3	8.9E-05
	Chloroform	7.70E-01	mg/L	4.19E-05	mg/m^3	R	7.2E-06	mg/kg-day	1.40E-02	mg/kg-day	4.9E-02	mg/m^3	5.1E-04
	cis-1,2-Dichloroethene	2.50E+00	mg/L	1.48E-04	mg/m^3	R	2.5E-05	mg/kg-day	1.00E-02	mg/kg-day	3.5E-02	mg/m^3	2.5E-03
	Dichlorodifluoromethane	3.80E-01	mg/L	1.37E-03	mg/m^3	R	2.3E-04	mg/kg-day	5.71E-02	mg/kg-day	2.0E-01	mg/m^3	4.1E-03
	Methylene Chloride	1.90E-02	mg/L	6.58E-07	mg/m^3	R	1.1E-07	mg/kg-day	3.00E-01	mg/kg-day	1.1E+00	mg/m^3	3.8E-07
	Naphthalene	3.00E-03	mg/L	1.38E-08	mg/m^3	R	2.4E-09	mg/kg-day	8.57E-04	mg/kg-day	3.0E-03	mg/m^3	2.8E-06
	Tetrachloroethene	3.30E-01	mg/L	6.76E-05	mg/m^3	R	1.2E-05	mg/kg-day	1.40E-01	mg/kg-day	4.9E-01	mg/m^3	8.3E-05
	Toluene	9.80E-02	mg/L	8.11E-06	mg/m^3	R	1.4E-06	mg/kg-day	1.14E-01	mg/kg-day	4.0E-01	mg/m^3	1.2E-05
	Total 1,2-Dichloroethene	1.00E+00	mg/L	5.94E-05	mg/m^3	R	1.0E-05	mg/kg-day		mg/kg-day		mg/m^3	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	3.44E-06	mg/m^3	R	5.9E-07	mg/kg-day	2.00E-02	mg/kg-day	7.0E-02	mg/m^3	2.9E-05
	Trichloroethene	1.30E+02	mg/L	1.71E-02	mg/m^3	R	2.9E-03	mg/kg-day	1.70E-01	mg/kg-day	6.0E-01	mg/m^3	1.7E-02
	Vinyl Chloride	2.10E-02	mg/L	9.54E-06	mg/m^3	R	1.6E-06	mg/kg-day	2.86E-02	mg/kg-day	1.0E-01	mg/m^3	5.7E-05
	(total)												2.5E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**2.5E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 8.16a. CENTRAL TENDENCY EXPOURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF OCCUPATIONAL WORKERS TO INDOOR AIR
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Occupational Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	5.70E-07	mg/m^3	R	1.3E-08	mg/kg-day	2.00E-01	(mg/kg-day)$^{-1}$	2.5E-09
	1,1,2-Trichloroethane	9.30E-02	mg/L	1.09E-06	mg/m^3	R	2.4E-08	mg/kg-day	5.60E-02	(mg/kg-day)$^{-1}$	1.3E-09
	1,1-Dichloroethene	1.10E-02	mg/L	4.20E-06	mg/m^3	R	9.3E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	1,2-Dichloroethane	1.40E-02	mg/L	1.93E-07	mg/m^3	R	4.2E-09	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	3.9E-10
	1,2-Dichloropropane	2.00E-03	mg/L	7.58E-08	mg/m^3	R	1.7E-09	mg/kg-day	6.79E-02	(mg/kg-day)$^{-1}$	1.1E-10
	Benzene	3.50E-02	mg/L	2.69E-06	mg/m^3	R	5.9E-08	mg/kg-day	2.70E-02	(mg/kg-day)$^{-1}$	1.6E-09
	Bromodichloromethane	4.00E-03	mg/L	8.74E-08	mg/m^3	R	1.9E-09	mg/kg-day	6.20E-02	(mg/kg-day)$^{-1}$	1.2E-10
	Carbon Tetrachloride	6.80E-02	mg/L	2.58E-05	mg/m^3	R	5.7E-07	mg/kg-day	5.30E-02	(mg/kg-day)$^{-1}$	3.0E-08
	Chloroform	7.70E-01	mg/L	4.19E-05	mg/m^3	R	9.2E-07	mg/kg-day	8.10E-02	(mg/kg-day)$^{-1}$	7.5E-08
	cis-1,2-Dichloroethene	2.50E+00	mg/L	1.48E-04	mg/m^3	R	3.3E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Dichlorodifluoromethane	3.80E-01	mg/L	1.37E-03	mg/m^3	R	3.0E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Methylene Chloride	1.90E-02	mg/L	6.58E-07	mg/m^3	R	1.5E-08	mg/kg-day	1.65E-03	(mg/kg-day)$^{-1}$	2.4E-11
	Naphthalene	3.00E-03	mg/L	1.38E-08	mg/m^3	R	3.0E-10	mg/kg-day		(mg/kg-day)$^{-1}$	
	Tetrachloroethene	3.30E-01	mg/L	6.76E-05	mg/m^3	R	1.5E-06	mg/kg-day	2.00E-02	(mg/kg-day)$^{-1}$	3.0E-08
	Toluene	9.80E-02	mg/L	8.11E-06	mg/m^3	R	1.8E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Total 1,2-Dichloroethene	1.00E+00	mg/L	5.94E-05	mg/m^3	R	1.3E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	3.44E-06	mg/m^3	R	7.6E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethene	1.30E+02	mg/L	1.71E-02	mg/m^3	R	3.8E-04	mg/kg-day	7.00E-03	(mg/kg-day)$^{-1}$	2.6E-06
	Vinyl Chloride	2.10E-02	mg/L	9.54E-06	mg/m^3	R	2.1E-07	mg/kg-day	1.50E-02	(mg/kg-day)$^{-1}$	3.2E-09
											2.8E-06
										Total Risk Across All Exposure Routes/Pathways	**2.8E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 4.17

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	USEPA, Feburary 2004	Derived	USEPA, Feburary 2004	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	0.833	USEPA Region 4, May 2000	0.833	USEPA Region 4, May 2000	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	USEPA Region 4, May 2000	234	USEPA, May 1993	
	ED	Exposure Duration	(years)	24	USEPA Region 4, May 2000	7	USEPA, May 1993	
	ET	Exposure Time	(hr/day)	24	USEPA Region 4, May 2000	24	USEPA Region 4, May 2000	
	BW	Body Weight	(kg)	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Inhalation Intake(RME) = 9.39E-02
Noncancer Inhalation Intake(RME) = 2.74E-01

Cancer Inhalation Intake(CTE) = 1.83E-02
Noncancer Inhalation Intake(CTE) = 1.83E-01

TABLE 7.17. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	2.68E-04	mg/m^3	R	7.4E-05	mg/kg-day	6.00E-02	mg/kg-day	2.1E-01	mg/m^3	1.2E-03
	1,1,2-Trichloroethane	9.30E-02	mg/L	3.04E-04	mg/m^3	R	8.3E-05	mg/kg-day	4.00E-03	mg/kg-day	1.4E-02	mg/m^3	2.1E-02
	1,1-Dichloroethene	1.10E-02	mg/L	1.40E-04	mg/m^3	R	3.9E-05	mg/kg-day	5.71E-02	mg/kg-day	2.0E-01	mg/m^3	6.7E-04
	1,2-Dichloroethane	1.40E-02	mg/L	5.60E-05	mg/m^3	R	1.5E-05	mg/kg-day	7.00E-01	mg/kg-day	2.50E+00	mg/m^3	2.2E-05
	1,2-Dichloropropane	2.00E-03	mg/L	8.83E-06	mg/m^3	R	2.4E-06	mg/kg-day	1.14E-03	mg/kg-day	4.0E-03	mg/m^3	2.1E-03
	Benzene	3.50E-02	mg/L	2.07E-04	mg/m^3	R	5.7E-05	mg/kg-day	8.57E-03	mg/kg-day	3.0E-02	mg/m^3	6.6E-03
	Bromodichloromethane	4.00E-03	mg/L	1.38E-05	mg/m^3	R	3.8E-06	mg/kg-day	2.00E-02	mg/kg-day	7.0E-02	mg/m^3	1.9E-04
	Carbon Tetrachloride	8.80E-02	mg/L	7.54E-04	mg/m^3	R	2.1E-04	mg/kg-day	5.00E-02	mg/kg-day	1.8E-01	mg/m^3	4.1E-03
	Chloroform	7.70E-01	mg/L	4.37E-03	mg/m^3	R	1.2E-03	mg/kg-day	1.40E-02	mg/kg-day	4.9E-02	mg/m^3	8.5E-02
	cis-1,2-Dichloroethene	2.50E+00	mg/L	1.48E-02	mg/m^3	R	4.0E-03	mg/kg-day	1.00E-02	mg/kg-day	3.5E-02	mg/m^3	4.0E-01
	Dichlorodifluoromethane	3.80E-01	mg/L	2.58E-02	mg/m^3	R	7.0E-03	mg/kg-day	5.71E-02	mg/kg-day	2.0E-01	mg/m^3	1.2E-01
	Methylene Chloride	1.90E-02	mg/L	1.08E-04	mg/m^3	R	3.0E-05	mg/kg-day	3.00E-01	mg/kg-day	1.1E+00	mg/m^3	9.9E-05
	Naphthalene	3.00E-03	mg/L	5.53E-06	mg/m^3	R	1.5E-06	mg/kg-day	8.57E-04	mg/kg-day	3.0E-03	mg/m^3	1.9E-03
	Tetrachloroethene	3.30E-01	mg/L	2.38E-03	mg/m^3	R	6.5E-04	mg/kg-day	1.40E-01	mg/kg-day	4.9E-01	mg/m^3	4.7E-03
	Toluene	9.80E-02	mg/L	5.39E-04	mg/m^3	R	1.5E-04	mg/kg-day	1.14E-01	mg/kg-day	4.0E-01	mg/m^3	1.3E-03
	Total 1,2-Dichloroethene	1.00E+00	mg/L	5.90E-03	mg/m^3	R	1.6E-03	mg/kg-day		mg/kg-day		mg/m^3	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	1.90E-04	mg/m^3	R	5.2E-05	mg/kg-day	2.00E-02	mg/kg-day	7.0E-02	mg/m^3	2.6E-03
	Trichloroethene	1.30E+02	mg/L	8.47E-01	mg/m^3	R	2.3E-01	mg/kg-day	1.70E-01	mg/kg-day	6.0E-01	mg/m^3	1.4E+00
	Vinyl Chloride	2.10E-02	mg/L	3.48E-04	mg/m^3	R	9.5E-05	mg/kg-day	2.86E-02	mg/kg-day	1.0E-01	mg/m^3	3.3E-03
	(total)												2.0E+00
												Total Hazard Index Across All Exposure Routes/Pathways	**2.0E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 8.17. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	2.68E-04	mg/m^3	R	2.5E-05	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	5.0E-06
	1,1,2-Trichloroethane	9.30E-02	mg/L	3.04E-04	mg/m^3	R	2.9E-05	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-06
	1,1-Dichloroethene	1.10E-02	mg/L	1.40E-04	mg/m^3	R	1.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	1,2-Dichloroethane	1.40E-02	mg/L	5.60E-05	mg/m^3	R	5.3E-06	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	4.8E-07
	1,2-Dichloropropane	2.00E-03	mg/L	8.83E-06	mg/m^3	R	8.3E-07	mg/kg-day	6.79E-02	$(mg/kg\text{-}day)^{-1}$	5.6E-08
	Benzene	3.50E-02	mg/L	2.07E-04	mg/m^3	R	1.9E-05	mg/kg-day	2.70E-02	$(mg/kg\text{-}day)^{-1}$	5.2E-07
	Bromodichloromethane	4.00E-03	mg/L	1.38E-05	mg/m^3	R	1.3E-06	mg/kg-day	6.20E-02	$(mg/kg\text{-}day)^{-1}$	8.0E-08
	Carbon Tetrachloride	6.80E-02	mg/L	7.54E-04	mg/m^3	R	7.1E-05	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	3.8E-06
	Chloroform	7.70E-01	mg/L	4.37E-03	mg/m^3	R	4.1E-04	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	3.3E-05
	cis-1,2-Dichloroethene	2.50E+00	mg/L	1.48E-02	mg/m^3	R	1.4E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Dichlorodifluoromethane	3.80E-01	mg/L	2.56E-02	mg/m^3	R	2.4E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Methylene Chloride	1.90E-02	mg/L	1.08E-04	mg/m^3	R	1.0E-05	mg/kg-day	1.65E-03	$(mg/kg\text{-}day)^{-1}$	1.7E-08
	Naphthalene	3.00E-03	mg/L	5.53E-06	mg/m^3	R	5.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Tetrachloroethene	3.30E-01	mg/L	2.38E-03	mg/m^3	R	2.2E-04	mg/kg-day	2.00E-02	$(mg/kg\text{-}day)^{-1}$	4.5E-06
	Toluene	9.80E-02	mg/L	5.39E-04	mg/m^3	R	5.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Total 1,2-Dichloroethene	1.00E+00	mg/L	5.90E-03	mg/m^3	R	5.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	1.90E-04	mg/m^3	R	1.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.30E+02	mg/L	8.47E-01	mg/m^3	R	8.0E-02	mg/kg-day	7.00E-03	$(mg/kg\text{-}day)^{-1}$	5.6E-04
	Vinyl Chloride	2.10E-02	mg/L	3.48E-04	mg/m^3	R	3.3E-05	mg/kg-day	1.50E-02	$(mg/kg\text{-}day)^{-1}$	4.9E-07
											6.1E-04
										Total Risk Across All Exposure Routes/Pathways	**6.1E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 7.17a. CENTRAL TENDENCY EXPOURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	2.68E-04	mg/m^3	R	4.9E-05	mg/kg-day	6.00E-02	mg/kg-day	2.1E-01	mg/m^3	8.2E-04
	1,1,2-Trichloroethane	9.30E-02	mg/L	3.04E-04	mg/m^3	R	5.6E-05	mg/kg-day	4.00E-03	mg/kg-day	1.4E-02	mg/m^3	1.4E-02
	1,1-Dichloroethene	1.10E-02	mg/L	1.40E-04	mg/m^3	R	2.6E-05	mg/kg-day	5.71E-02	mg/kg-day	2.0E-01	mg/m^3	4.5E-04
	1,2-Dichloroethane	1.40E-02	mg/L	5.60E-05	mg/m^3	R	1.0E-05	mg/kg-day	7.00E-01	mg/kg-day	2.50E+00	mg/m^3	1.5E-05
	1,2-Dichloropropane	2.00E-03	mg/L	8.83E-06	mg/m^3	R	1.6E-06	mg/kg-day	1.14E-03	mg/kg-day	4.0E-03	mg/m^3	1.4E-03
	Benzene	3.50E-02	mg/L	2.07E-04	mg/m^3	R	3.8E-05	mg/kg-day	8.57E-03	mg/kg-day	3.0E-02	mg/m^3	4.4E-03
	Bromodichloromethane	4.00E-03	mg/L	1.38E-05	mg/m^3	R	2.5E-06	mg/kg-day	2.00E-02	mg/kg-day	7.0E-02	mg/m^3	1.3E-04
	Carbon Tetrachloride	6.80E-02	mg/L	7.54E-04	mg/m^3	R	1.4E-04	mg/kg-day	5.00E-02	mg/kg-day	1.8E-01	mg/m^3	2.8E-03
	Chloroform	7.70E-01	mg/L	4.37E-03	mg/m^3	R	8.0E-04	mg/kg-day	1.40E-02	mg/kg-day	4.9E-02	mg/m^3	5.7E-02
	cis-1,2-Dichloroethene	2.50E+00	mg/L	1.48E-02	mg/m^3	R	2.7E-03	mg/kg-day	1.00E-02	mg/kg-day	3.5E-02	mg/m^3	2.7E-01
	Dichlorodifluoromethane	3.80E-01	mg/L	2.56E-02	mg/m^3	R	4.7E-03	mg/kg-day	5.71E-02	mg/kg-day	2.0E-01	mg/m^3	8.2E-02
	Methylene Chloride	1.90E-02	mg/L	1.08E-04	mg/m^3	R	2.0E-05	mg/kg-day	3.00E-01	mg/kg-day	1.1E+00	mg/m^3	6.6E-05
	Naphthalene	3.00E-03	mg/L	5.53E-06	mg/m^3	R	1.0E-06	mg/kg-day	8.57E-04	mg/kg-day	3.0E-03	mg/m^3	1.2E-03
	Tetrachloroethene	3.30E-01	mg/L	2.38E-03	mg/m^3	R	4.4E-04	mg/kg-day	1.40E-01	mg/kg-day	4.9E-01	mg/m^3	3.1E-03
	Toluene	9.80E-02	mg/L	5.39E-04	mg/m^3	R	9.9E-05	mg/kg-day	1.14E-01	mg/kg-day	4.0E-01	mg/m^3	8.6E-04
	Total 1,2-Dichloroethene	1.00E+00	mg/L	5.90E-03	mg/m^3	R	1.1E-03	mg/kg-day		mg/kg-day		mg/m^3	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	1.90E-04	mg/m^3	R	3.5E-05	mg/kg-day	2.00E-02	mg/kg-day	7.0E-02	mg/m^3	1.7E-03
	Trichloroethene	1.30E+02	mg/L	8.47E-01	mg/m^3	R	1.6E-01	mg/kg-day	1.70E-01	mg/kg-day	6.0E-01	mg/m^3	9.1E-01
	Vinyl Chloride	2.10E-02	mg/L	3.48E-04	mg/m^3	R	6.4E-05	mg/kg-day	2.86E-02	mg/kg-day	1.0E-01	mg/m^3	2.2E-03
	(total)												1.4E+00
												Total Hazard Index Across All Exposure Routes/Pathways	**1.4E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 8.17a. CENTRAL TENDENCY EXPOURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	2.68E-04	mg/m^3	R	4.8E-06	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	9.8E-07
	1,1,2-Trichloroethane	9.30E-02	mg/L	3.04E-04	mg/m^3	R	5.6E-06	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	3.1E-07
	1,1-Dichloroethene	1.10E-02	mg/L	1.40E-04	mg/m^3	R	2.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	1,2-Dichloroethane	1.40E-02	mg/L	5.60E-05	mg/m^3	R	1.0E-06	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	9.3E-08
	1,2-Dichloropropane	2.00E-03	mg/L	8.83E-06	mg/m^3	R	1.6E-07	mg/kg-day	6.79E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	Benzene	3.50E-02	mg/L	2.07E-04	mg/m^3	R	3.8E-06	mg/kg-day	2.70E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-07
	Bromodichloromethane	4.00E-03	mg/L	1.38E-05	mg/m^3	R	2.5E-07	mg/kg-day	6.20E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-08
	Carbon Tetrachloride	6.80E-02	mg/L	7.54E-04	mg/m^3	R	1.4E-05	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	7.3E-07
	Chloroform	7.70E-01	mg/L	4.37E-03	mg/m^3	R	8.0E-05	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	6.5E-06
	cis-1,2-Dichloroethene	2.50E+00	mg/L	1.48E-02	mg/m^3	R	2.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Dichlorodifluoromethane	3.80E-01	mg/L	2.56E-02	mg/m^3	R	4.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Methylene Chloride	1.90E-02	mg/L	1.08E-04	mg/m^3	R	2.0E-06	mg/kg-day	1.65E-03	$(mg/kg\text{-}day)^{-1}$	3.3E-09
	Naphthalene	3.00E-03	mg/L	5.53E-06	mg/m^3	R	1.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Tetrachloroethene	3.30E-01	mg/L	2.36E-03	mg/m^3	R	4.4E-05	mg/kg-day	2.00E-02	$(mg/kg\text{-}day)^{-1}$	8.7E-07
	Toluene	9.80E-02	mg/L	5.39E-04	mg/m^3	R	9.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Total 1,2-Dichloroethene	1.00E+00	mg/L	5.90E-03	mg/m^3	R	1.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	1.90E-04	mg/m^3	R	3.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.30E+02	mg/L	8.47E-01	mg/m^3	R	1.6E-02	mg/kg-day	7.00E-03	$(mg/kg\text{-}day)^{-1}$	1.1E-04
	Vinyl Chloride	2.10E-02	mg/L	3.48E-04	mg/m^3	R	6.4E-06	mg/kg-day	1.50E-02	$(mg/kg\text{-}day)^{-1}$	9.6E-08
											1.2E-04
										Total Risk Across All Exposure Routes/Pathways	**1.2E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 4.18

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	USEPA, Feburary 2004	Derived	USEPA, Feburary 2004	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	0.625	USEPA Region 4, May 2000	0.625	USEPA Region 4, May 2000	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	USEPA Region 4, May 2000	234	USEPA, May 1993	
	ED	Exposure Duration	(years)	6	USEPA Region 4, May 2000	2	USEPA, May 1993	
	ET	Exposure Time	(hr/day)	24	USEPA Region 4, May 2000	24	USEPA Region 4, May 2000	
	BW	Body Weight	(kg)	15	USEPA Region 4, May 2000	15	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Inhalation Intake(RME) = 8.22E-02
Noncancer Inhalation Intake(RME) = 9.59E-01

Cancer Inhalation Intake(CTE) = 1.83E-02
Noncancer Inhalation Intake(CTE) = 6.41E-01

TABLE 7.18. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	2.68E-04	mg/m³	R	2.6E-04	mg/kg-day	6.00E-02	mg/kg-day	2.1E-01	mg/m³	4.3E-03
	1,1,2-Trichloroethane	9.30E-02	mg/L	3.04E-04	mg/m³	R	2.9E-04	mg/kg-day	4.00E-03	mg/kg-day	1.4E-02	mg/m³	7.3E-02
	1,1-Dichloroethene	1.10E-02	mg/L	1.40E-04	mg/m³	R	1.3E-04	mg/kg-day	5.71E-02	mg/kg-day	2.0E-01	mg/m³	2.4E-03
	1,2-Dichloroethane	1.40E-02	mg/L	5.60E-05	mg/m³	R	5.4E-05	mg/kg-day	7.00E-01	mg/kg-day	2.50E+00	mg/m³	7.7E-05
	1,2-Dichloropropane	2.00E-03	mg/L	8.83E-06	mg/m³	R	8.5E-06	mg/kg-day	1.14E-03	mg/kg-day	4.0E-03	mg/m³	7.4E-03
	Benzene	3.50E-02	mg/L	2.07E-04	mg/m³	R	2.0E-04	mg/kg-day	8.57E-03	mg/kg-day	3.0E-02	mg/m³	2.3E-02
	Bromodichloromethane	4.00E-03	mg/L	1.38E-05	mg/m³	R	1.3E-05	mg/kg-day	2.00E-02	mg/kg-day	7.0E-02	mg/m³	6.6E-04
	Carbon Tetrachloride	6.80E-02	mg/L	7.54E-04	mg/m³	R	7.2E-04	mg/kg-day	5.00E-02	mg/kg-day	1.8E-01	mg/m³	1.4E-02
	Chloroform	7.70E-01	mg/L	4.37E-03	mg/m³	R	4.2E-03	mg/kg-day	1.40E-02	mg/kg-day	4.9E-02	mg/m³	3.0E-01
	cis-1,2-Dichloroethene	2.50E+00	mg/L	1.48E-02	mg/m³	R	1.4E-02	mg/kg-day	1.00E-02	mg/kg-day	3.5E-02	mg/m³	1.4E+00
	Dichlorodifluoromethane	3.80E-01	mg/L	2.56E-02	mg/m³	R	2.5E-02	mg/kg-day	5.71E-02	mg/kg-day	2.0E-01	mg/m³	4.3E-01
	Methylene Chloride	1.90E-02	mg/L	1.08E-04	mg/m³	R	1.0E-04	mg/kg-day	3.00E-01	mg/kg-day	1.1E+00	mg/m³	3.5E-04
	Naphthalene	3.00E-03	mg/L	5.53E-06	mg/m³	R	5.3E-06	mg/kg-day	8.57E-04	mg/kg-day	3.0E-03	mg/m³	6.2E-03
	Tetrachloroethene	3.30E-01	mg/L	2.38E-03	mg/m³	R	2.3E-03	mg/kg-day	1.40E-01	mg/kg-day	4.9E-01	mg/m³	1.6E-02
	Toluene	9.80E-02	mg/L	5.39E-04	mg/m³	R	5.2E-04	mg/kg-day	1.14E-01	mg/kg-day	4.0E-01	mg/m³	4.5E-03
	Total 1,2-Dichloroethene	1.00E+00	mg/L	5.90E-03	mg/m³	R	5.7E-03	mg/kg-day		mg/kg-day		mg/m³	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	1.90E-04	mg/m³	R	1.8E-04	mg/kg-day	2.00E-02	mg/kg-day	7.0E-02	mg/m³	9.1E-03
	Trichloroethene	1.30E+02	mg/L	8.47E-01	mg/m³	R	8.1E-01	mg/kg-day	1.70E-01	mg/kg-day	6.0E-01	mg/m³	4.8E+00
	Vinyl Chloride	2.10E-02	mg/L	3.48E-04	mg/m³	R	3.3E-04	mg/kg-day	2.86E-02	mg/kg-day	1.0E-01	mg/m³	1.2E-02
	(total)												7.1E+00

Total Hazard Index Across All Exposure Routes/Pathways **7.1E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 8.18. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	2.68E-04	mg/m^3	R	2.2E-05	mg/kg-day	2.00E-01	(mg/kg-day)$^{-1}$	4.4E-06
	1,1,2-Trichloroethane	9.30E-02	mg/L	3.04E-04	mg/m^3	R	2.5E-05	mg/kg-day	5.60E-02	(mg/kg-day)$^{-1}$	1.4E-06
	1,1-Dichloroethene	1.10E-02	mg/L	1.40E-04	mg/m^3	R	1.2E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	1,2-Dichloroethane	1.40E-02	mg/L	5.60E-05	mg/m^3	R	4.6E-06	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	4.2E-07
	1,2-Dichloropropane	2.00E-03	mg/L	8.83E-06	mg/m^3	R	7.3E-07	mg/kg-day	6.79E-02	(mg/kg-day)$^{-1}$	4.9E-08
	Benzene	3.50E-02	mg/L	2.07E-04	mg/m^3	R	1.7E-05	mg/kg-day	2.70E-02	(mg/kg-day)$^{-1}$	4.6E-07
	Bromodichloromethane	4.00E-03	mg/L	1.38E-05	mg/m^3	R	1.1E-06	mg/kg-day	6.20E-02	(mg/kg-day)$^{-1}$	7.0E-08
	Carbon Tetrachloride	6.80E-02	mg/L	7.54E-04	mg/m^3	R	6.2E-05	mg/kg-day	5.30E-02	(mg/kg-day)$^{-1}$	3.3E-06
	Chloroform	7.70E-01	mg/L	4.37E-03	mg/m^3	R	3.6E-04	mg/kg-day	8.10E-02	(mg/kg-day)$^{-1}$	2.9E-05
	cis-1,2-Dichloroethene	2.50E+00	mg/L	1.48E-02	mg/m^3	R	1.2E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	Dichlorodifluoromethane	3.60E-01	mg/L	2.56E-02	mg/m^3	R	2.1E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	Methylene Chloride	1.90E-02	mg/L	1.08E-04	mg/m^3	R	8.9E-06	mg/kg-day	1.65E-03	(mg/kg-day)$^{-1}$	1.5E-08
	Naphthalene	3.00E-03	mg/L	5.53E-06	mg/m^3	R	4.5E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Tetrachloroethene	3.30E-01	mg/L	2.38E-03	mg/m^3	R	2.0E-04	mg/kg-day	2.00E-02	(mg/kg-day)$^{-1}$	3.9E-06
	Toluene	9.80E-02	mg/L	5.39E-04	mg/m^3	R	4.4E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Total 1,2-Dichloroethene	1.00E+00	mg/L	5.90E-03	mg/m^3	R	4.9E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	1.90E-04	mg/m^3	R	1.6E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethene	1.30E+02	mg/L	8.47E-01	mg/m^3	R	7.0E-02	mg/kg-day	7.00E-03	(mg/kg-day)$^{-1}$	4.9E-04
	Vinyl Chloride	2.10E-02	mg/L	3.48E-04	mg/m^3	R	2.9E-05	mg/kg-day	3.00E-02	(mg/kg-day)$^{-1}$	8.6E-07
											5.3E-04
										Total Risk Across All Exposure Routes/Pathways	**5.3E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 7.18a. CENTRAL TENDENCY EXPOURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	2.68E-04	mg/m^3	R	1.7E-04	mg/kg-day	6.00E-02	mg/kg-day	2.1E-01	mg/m^3	2.9E-03
	1,1,2-Trichloroethane	9.30E-02	mg/L	3.04E-04	mg/m^3	R	2.0E-04	mg/kg-day	4.00E-03	mg/kg-day	1.4E-02	mg/m^3	4.9E-02
	1,1-Dichloroethene	1.10E-02	mg/L	1.40E-04	mg/m^3	R	9.0E-05	mg/kg-day	5.71E-02	mg/kg-day	2.0E-01	mg/m^3	1.6E-03
	1,2-Dichloroethane	1.40E-02	mg/L	5.60E-05	mg/m^3	R	3.6E-05	mg/kg-day	7.00E-01	mg/kg-day	2.50E+00	mg/m^3	5.1E-05
	1,2-Dichloropropane	2.00E-03	mg/L	8.83E-06	mg/m^3	R	5.7E-06	mg/kg-day	1.14E-03	mg/kg-day	4.0E-03	mg/m^3	5.0E-03
	Benzene	3.50E-02	mg/L	2.07E-04	mg/m^3	R	1.3E-04	mg/kg-day	8.57E-03	mg/kg-day	3.0E-02	mg/m^3	1.5E-02
	Bromodichloromethane	4.00E-03	mg/L	1.38E-05	mg/m^3	R	8.9E-06	mg/kg-day	2.00E-02	mg/kg-day	7.0E-02	mg/m^3	4.4E-04
	Carbon Tetrachloride	6.80E-02	mg/L	7.54E-04	mg/m^3	R	4.8E-04	mg/kg-day	5.00E-02	mg/kg-day	1.6E-01	mg/m^3	9.7E-03
	Chloroform	7.70E-01	mg/L	4.37E-03	mg/m^3	R	2.8E-03	mg/kg-day	1.40E-02	mg/kg-day	4.9E-02	mg/m^3	2.0E-01
	cis-1,2-Dichloroethene	2.50E+00	mg/L	1.48E-02	mg/m^3	R	9.5E-03	mg/kg-day	1.00E-02	mg/kg-day	3.5E-02	mg/m^3	9.5E-01
	Dichlorodifluoromethane	3.80E-01	mg/L	2.58E-02	mg/m^3	R	1.8E-02	mg/kg-day	5.71E-02	mg/kg-day	2.0E-01	mg/m^3	2.9E-01
	Methylene Chloride	1.90E-02	mg/L	1.08E-04	mg/m^3	R	6.9E-05	mg/kg-day	3.00E-01	mg/kg-day	1.1E+00	mg/m^3	2.3E-04
	Naphthalene	3.00E-03	mg/L	5.53E-06	mg/m^3	R	3.5E-06	mg/kg-day	8.57E-04	mg/kg-day	3.0E-03	mg/m^3	4.1E-03
	Tetrachloroethene	3.30E-01	mg/L	2.38E-03	mg/m^3	R	1.5E-03	mg/kg-day	1.40E-01	mg/kg-day	4.9E-01	mg/m^3	1.1E-02
	Toluene	9.80E-02	mg/L	5.39E-04	mg/m^3	R	3.5E-04	mg/kg-day	1.14E-01	mg/kg-day	4.0E-01	mg/m^3	3.0E-03
	Total 1,2-Dichloroethene	1.00E+00	mg/L	5.90E-03	mg/m^3	R	3.8E-03	mg/kg-day		mg/kg-day		mg/m^3	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	1.90E-04	mg/m^3	R	1.2E-04	mg/kg-day	2.00E-02	mg/kg-day	7.0E-02	mg/m^3	6.1E-03
	Trichloroethene	1.30E+02	mg/L	8.47E-01	mg/m^3	R	5.4E-01	mg/kg-day	1.70E-01	mg/kg-day	6.0E-01	mg/m^3	3.2E+00
	Vinyl Chloride	2.10E-02	mg/L	3.48E-04	mg/m^3	R	2.2E-04	mg/kg-day	2.86E-02	mg/kg-day	1.0E-01	mg/m^3	7.8E-03
	(total)												4.7E+00

Total Hazard Index Across All Exposure Routes/Pathways **4.7E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 8.18a. CENTRAL TENDENCY EXPOURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	2.68E-04	mg/m^3	R	4.9E-06	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	9.8E-07
	1,1,2-Trichloroethane	9.30E-02	mg/L	3.04E-04	mg/m^3	R	5.6E-06	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	3.1E-07
	1,1-Dichloroethene	1.10E-02	mg/L	1.40E-04	mg/m^3	R	2.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	1,2-Dichloroethane	1.40E-02	mg/L	5.60E-05	mg/m^3	R	1.0E-06	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	9.3E-08
	1,2-Dichloropropane	2.00E-03	mg/L	8.83E-06	mg/m^3	R	1.6E-07	mg/kg-day	6.79E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	Benzene	3.50E-02	mg/L	2.07E-04	mg/m^3	R	3.8E-06	mg/kg-day	2.70E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-07
	Bromodichloromethane	4.00E-03	mg/L	1.38E-05	mg/m^3	R	2.5E-07	mg/kg-day	6.20E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-08
	Carbon Tetrachloride	6.80E-02	mg/L	7.54E-04	mg/m^3	R	1.4E-05	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	7.3E-07
	Chloroform	7.70E-01	mg/L	4.37E-03	mg/m^3	R	8.0E-05	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	6.5E-06
	cis-1,2-Dichloroethene	2.50E+00	mg/L	1.48E-02	mg/m^3	R	2.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Dichlorodifluoromethane	3.80E-01	mg/L	2.56E-02	mg/m^3	R	4.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Methylene Chloride	1.90E-02	mg/L	1.08E-04	mg/m^3	R	2.0E-06	mg/kg-day	1.65E-03	$(mg/kg\text{-}day)^{-1}$	3.3E-09
	Naphthalene	3.00E-03	mg/L	5.53E-06	mg/m^3	R	1.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Tetrachloroethene	3.30E-01	mg/L	2.38E-03	mg/m^3	R	4.4E-05	mg/kg-day	2.00E-02	$(mg/kg\text{-}day)^{-1}$	8.7E-07
	Toluene	9.80E-02	mg/L	5.39E-04	mg/m^3	R	9.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Total 1,2-Dichloroethene	1.00E+00	mg/L	5.90E-03	mg/m^3	R	1.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	1.90E-04	mg/m^3	R	3.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.30E+02	mg/L	8.47E-01	mg/m^3	R	1.6E-02	mg/kg-day	7.00E-03	$(mg/kg\text{-}day)^{-1}$	1.1E-04
	Vinyl Chloride	2.10E-02	mg/L	3.48E-04	mg/m^3	R	6.4E-06	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-07
											1.2E-04
										Total Risk Across All Exposure Routes/Pathways	**1.2E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 4.19

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO AIR IN A TRENCH
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Air in trench (<15 feet deep)
Receptor Population: Construction/Excavation Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	VDEQ, August 2002	Derived	VDEQ, August 2002	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	2.5	USEPA Region 4, May 2000	1.5	USEPA, August 1997	Cair x IRa x ET x EF x ED
	EF	Exposure Frequency	(days/year)	30	Professional Judgement	30	Professional Judgement	BW x AT
	ED	Exposure Duration	(years)	1	Professional Judgement	1	Professional Judgement	
	ET	Exposure Time	(hr/day)	8	USEPA Region 4, May 2000	8	USEPA Region 4, May 2000	
	BW	Body Weight	(kg)	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	365	USEPA, December 1989	365	USEPA, December 1989	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 3.35E-04
Noncancer Inhalation Intake(RME) = 2.35E-02

Cancer Inhalation Intake(CTE) = 2.01E-04
Noncancer Inhalation Intake(CTE) = 1.41E-02

TABLE 7.19. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO AIR IN A TRENCH
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Air in trench (<15 feet deep)
Receptor Population: Construction/Excavation Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	3.47E-03	mg/m^3	R	8.1E-05	mg/kg-day	8.00E-02	mg/kg-day	2.10E-01	mg/m^3	1.4E-03
	1,12-Trichloroethane	9.30E-02	mg/L	2.82E-03	mg/m^3	R	6.6E-05	mg/kg-day	4.00E-03	mg/kg-day	1.40E-02	mg/m^3	1.7E-02
	1,1-Dichloroethene	1.10E-02	mg/L	4.14E-04	mg/m^3	R	9.7E-06	mg/kg-day	5.71E-02	mg/kg-day	2.00E-01	mg/m^3	1.7E-04
	1,2-Dichloroethane	1.40E-02	mg/L	4.93E-04	mg/m^3	R	1.2E-05	mg/kg-day	7.00E-01	mg/kg-day	2.50E+00	mg/m^3	1.7E-05
	1,2-Dichloropropane	2.00E-03	mg/L	6.64E-05	mg/m^3	R	1.6E-06	mg/kg-day	1.14E-03	mg/kg-day	4.0E-03	mg/m^3	1.4E-03
	Benzene	3.50E-02	mg/L	1.45E-03	mg/m^3	R	3.4E-05	mg/kg-day	8.57E-03	mg/kg-day	3.0E-02	mg/m^3	4.0E-03
	Bromodichloromethane	4.00E-03	mg/L	1.12E-04	mg/m^3	R	2.6E-06	mg/kg-day	2.00E-02	mg/kg-day	7.0E-02	mg/m^3	1.3E-04
	Carbon Tetrachloride	6.80E-02	mg/L	2.03E-03	mg/m^3	R	4.8E-05	mg/kg-day	5.00E-02	mg/kg-day	1.8E-01	mg/m^3	9.5E-04
	Chloroform	7.70E-01	mg/L	2.58E-02	mg/m^3	R	8.0E+04	mg/kg-day	1.40E-02	mg/kg-day	4.9E-02	mg/m^3	4.3E-02
	cis-1,2-Dichloroethene	2.50E+00	mg/L	9.29E-02	mg/m^3	R	2.2E-03	mg/kg-day	1.00E-02	mg/kg-day	3.5E-02	mg/m^3	2.2E-01
	Dichlorodifluoromethane	3.80E-01	mg/L	1.28E-02	mg/m^3	R	3.0E-04	mg/kg-day	5.71E-02	mg/kg-day	2.0E-01	mg/m^3	5.3E-03
	Methylene Chloride	1.90E-02	mg/L	7.45E-04	mg/m^3	R	1.7E-05	mg/kg-day	3.00E-01	mg/kg-day	1.1E+00	mg/m^3	5.8E-05
	Naphthalene	3.00E-03	mg/L	8.80E-05	mg/m^3	R	2.1E-06	mg/kg-day	8.57E-04	mg/kg-day	3.00E-03	mg/m^3	2.4E-03
	Tetrachloroethene	3.30E-01	mg/L	9.48E-03	mg/m^3	R	2.2E-04	mg/kg-day	1.40E-01	mg/kg-day	4.90E-01	mg/m^3	1.6E-03
	Toluene	9.80E-02	mg/L	3.76E-03	mg/m^3	R	8.8E-05	mg/kg-day	1.14E-01	mg/kg-day	4.00E-01	mg/m^3	7.7E-04
	1,2-Dichloroethene,Total	1.00E+00	mg/L	3.72E-02	mg/m^3	R	8.7E-04	mg/kg-day		mg/kg-day		mg/m^3	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	9.37E-04	mg/m^3	R	2.2E-05	mg/kg-day	2.00E-02	mg/kg-day	7.00E-02	mg/m^3	1.1E-03
	Trichloroethene	1.30E+02	mg/L	4.19E+00	mg/m^3	R	9.8E-02	mg/kg-day	1.70E-01	mg/kg-day	6.00E-01	mg/m^3	5.6E-01
	Vinyl Chloride	2.10E-02	mg/L	8.84E-04	mg/m^3	R	2.3E-05	mg/kg-day	2.88E-02	mg/kg-day	1.00E-01	mg/m^3	8.1E-04
	(total)												6.8E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**8.8E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 8.19. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO AIR IN A TRENCH
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Air in trench (<15 feet deep)
Receptor Population: Construction/Excavation Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	3.47E-03	mg/m^3	R	1.2E-06	mg/kg-day	2.00E-01	(mg/kg-day)$^{-1}$	2.3E-07
	1,12-Trichloroethane	9.30E-02	mg/L	2.82E-03	mg/m^3	R	9.4E-07	mg/kg-day	5.60E-02	(mg/kg-day)$^{-1}$	5.3E-08
	1,1-Dichloroethene	1.10E-02	mg/L	4.14E-04	mg/m^3	R	1.4E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	1,2-Dichloroethane	1.40E-02	mg/L	4.93E-04	mg/m^3	R	1.7E-07	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	1.5E-08
	1,2-Dichloropropane	2.00E-03	mg/L	6.84E-05	mg/m^3	R	2.3E-08	mg/kg-day	6.79E-02	(mg/kg-day)$^{-1}$	1.6E-09
	Benzene	3.50E-02	mg/L	1.45E-03	mg/m^3	R	4.9E-07	mg/kg-day	2.70E-02	(mg/kg-day)$^{-1}$	1.3E-08
	Bromodichloromethane	4.00E-03	mg/L	1.12E-04	mg/m^3	R	3.8E-08	mg/kg-day	6.20E-02	(mg/kg-day)$^{-1}$	2.3E-09
	Carbon Tetrachloride	6.80E-02	mg/L	2.03E-03	mg/m^3	R	6.8E-07	mg/kg-day	5.30E-02	(mg/kg-day)$^{-1}$	3.6E-08
	Chloroform	7.70E-01	mg/L	2.58E-02	mg/m^3	R	8.6E-06	mg/kg-day	8.10E-02	(mg/kg-day)$^{-1}$	7.0E-07
	cis-1,2-Dichloroethene	2.50E+00	mg/L	9.29E-02	mg/m^3	R	3.1E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Dichlorodifluoromethane	3.80E-01	mg/L	1.28E-02	mg/m^3	R	4.3E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Methylene Chloride	1.90E-02	mg/L	7.45E-04	mg/m^3	R	2.5E-07	mg/kg-day	1.65E-03	(mg/kg-day)$^{-1}$	4.1E-10
	Naphthalene	3.00E-03	mg/L	8.80E-05	mg/m^3	R	3.0E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	Tetrachloroethene	3.30E-01	mg/L	9.48E-03	mg/m^3	R	3.2E-06	mg/kg-day	2.00E-02	(mg/kg-day)$^{-1}$	6.4E-08
	Toluene	9.80E-02	mg/L	3.78E-03	mg/m^3	R	1.3E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	1,2-Dichloroethene,Total	1.00E+00	mg/L	3.72E-02	mg/m^3	R	1.2E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	9.37E-04	mg/m^3	R	3.1E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethene	1.30E+02	mg/L	4.19E+00	mg/m^3	R	1.4E-03	mg/kg-day	7.00E-03	(mg/kg-day)$^{-1}$	9.8E-06
	Vinyl Chloride	2.10E-02	mg/L	9.84E-04	mg/m^3	R	3.3E-07	mg/kg-day	1.50E-02	(mg/kg-day)$^{-1}$	4.9E-09
	(total)										1.1E-05
										Total Risk Across All Exposure Routes/Pathways	**1.1E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 7.19a. CENTRAL TENDENCY EXPOURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO AIR IN A TRENCH
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Air in trench (<15 feet deep)
Receptor Population: Construction/Excavation Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
inhalation	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	3.47E-03	mg/m³	R	4.9E-05	mg/kg-day	6.00E-02	mg/kg-day	2.10E-01	mg/m³	8.1E-04
	1,12-Trichloroethane	9.30E-02	mg/L	2.82E-03	mg/m³	R	4.0E-05	mg/kg-day	4.00E-03	mg/kg-day	1.40E-02	mg/m³	9.9E-03
	1,1-Dichloroethene	1.10E-02	mg/L	4.14E-04	mg/m³	R	5.8E-06	mg/kg-day	5.71E-02	mg/kg-day	2.00E-01	mg/m³	1.0E-04
	1,2-Dichloroethane	1.40E-02	mg/L	4.93E-04	mg/m³	R	6.9E-06	mg/kg-day	7.00E-01	mg/kg-day	2.50E+00	mg/m³	9.9E-06
	1,2-Dichloropropane	2.00E-03	mg/L	6.84E-05	mg/m³	R	9.6E-07	mg/kg-day	1.14E-03	mg/kg-day	4.0E-03	mg/m³	8.4E-04
	Benzene	3.50E-02	mg/L	1.45E-03	mg/m³	R	2.0E-05	mg/kg-day	8.57E-03	mg/kg-day	3.0E-02	mg/m³	2.4E-03
	Bromodichloromethane	4.00E-03	mg/L	1.12E-04	mg/m³	R	1.6E-06	mg/kg-day	2.00E-02	mg/kg-day	7.0E-02	mg/m³	7.9E-05
	Carbon Tetrachloride	6.80E-02	mg/L	2.03E-03	mg/m³	R	2.9E-05	mg/kg-day	5.00E-02	mg/kg-day	1.8E-01	mg/m³	5.7E-04
	Chloroform	7.70E-01	mg/L	2.58E-02	mg/m³	R	3.6E-04	mg/kg-day	1.40E-02	mg/kg-day	4.9E-02	mg/m³	2.6E-02
	cis-1,2-Dichloroethene	2.50E+00	mg/L	9.29E-02	mg/m³	R	1.3E-03	mg/kg-day	1.00E-02	mg/kg-day	3.5E-02	mg/m³	1.3E-01
	Dichlorodifluoromethane	3.80E-01	mg/L	1.28E-02	mg/m³	R	1.6E-04	mg/kg-day	5.71E-02	mg/kg-day	2.0E-01	mg/m³	3.2E-03
	Methylene Chloride	1.90E-02	mg/L	7.45E-04	mg/m³	R	1.0E-05	mg/kg-day	3.00E-01	mg/kg-day	1.1E+00	mg/m³	3.5E-05
	Naphthalene	3.00E-03	mg/L	8.80E-05	mg/m³	R	1.2E-06	mg/kg-day	8.57E-04	mg/kg-day	3.00E-03	mg/m³	1.4E-03
	Tetrachloroethene	3.30E-01	mg/L	9.48E-03	mg/m³	R	1.3E-04	mg/kg-day	1.40E-01	mg/kg-day	4.90E-01	mg/m³	9.5E-04
	Toluene	9.80E-02	mg/L	3.76E-03	mg/m³	R	5.3E-05	mg/kg-day	1.14E-01	mg/kg-day	4.00E-01	mg/m³	4.6E-04
	1,2-Dichloroethene,Total	1.00E+00	mg/L	3.72E-02	mg/m³	R	5.2E-04	mg/kg-day		mg/kg-day		mg/m³	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	9.37E-04	mg/m³	R	1.3E-05	mg/kg-day	2.00E-02	mg/kg-day	7.00E-02	mg/m³	6.6E-04
	Trichloroethene	1.30E+02	mg/L	4.19E+00	mg/m³	R	5.9E-02	mg/kg-day	1.70E-01	mg/kg-day	6.00E-01	mg/m³	3.5E-01
	Vinyl Chloride	2.10E-02	mg/L	9.84E-04	mg/m³	R	1.4E-05	mg/kg-day	2.86E-02	mg/kg-day	1.00E-01	mg/m³	4.9E-04
	(total)												5.3E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**5.3E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 8.19a. CENTRAL TENDENCY EXPOURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION/EXCAVATION WORKERS TO AIR IN A TRENCH
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Air in trench (<15 feet deep)
Receptor Population: Construction/Excavation Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	1.40E-01	mg/L	3.47E-03	mg/m^3	R	7.0E-07	mg/kg-day	2.00E-01	(mg/kg-day)$^{-1}$	1.4E-07
	1,12-Trichloroethane	9.30E-02	mg/L	2.82E-03	mg/m^3	R	5.7E-07	mg/kg-day	5.60E-02	(mg/kg-day)$^{-1}$	3.2E-08
	1,1-Dichloroethene	1.10E-02	mg/L	4.14E-04	mg/m^3	R	8.3E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	1,2-Dichloroethane	1.40E-02	mg/L	4.93E-04	mg/m^3	R	9.9E-08	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	9.0E-09
	1,2-Dichloropropane	2.00E-03	mg/L	6.84E-05	mg/m^3	R	1.4E-08	mg/kg-day	6.79E-02	(mg/kg-day)$^{-1}$	9.4E-10
	Benzene	3.50E-02	mg/L	1.45E-03	mg/m^3	R	2.9E-07	mg/kg-day	2.70E-02	(mg/kg-day)$^{-1}$	7.9E-09
	Bromodichloromethane	4.00E-03	mg/L	1.12E-04	mg/m^3	R	2.3E-08	mg/kg-day	8.20E-02	(mg/kg-day)$^{-1}$	1.4E-09
	Carbon Tetrachloride	6.80E-02	mg/L	2.03E-03	mg/m^3	R	4.1E-07	mg/kg-day	5.30E-02	(mg/kg-day)$^{-1}$	2.2E-08
	Chloroform	7.70E-01	mg/L	2.58E-02	mg/m^3	R	5.2E-06	mg/kg-day	8.10E-02	(mg/kg-day)$^{-1}$	4.2E-07
	cis-1,2-Dichloroethene	2.50E+00	mg/L	9.29E-02	mg/m^3	R	1.9E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Dichlorodifluoromethane	3.80E-01	mg/L	1.28E-02	mg/m^3	R	2.6E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Methylene Chloride	1.90E-02	mg/L	7.45E-04	mg/m^3	R	1.5E-07	mg/kg-day	1.65E-03	(mg/kg-day)$^{-1}$	2.5E-10
	Naphthalene	3.00E-03	mg/L	8.80E-05	mg/m^3	R	1.8E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	Tetrachloroethene	3.30E-01	mg/L	9.48E-03	mg/m^3	R	1.9E-06	mg/kg-day	2.00E-02	(mg/kg-day)$^{-1}$	3.8E-08
	Toluene	9.80E-02	mg/L	3.76E-03	mg/m^3	R	7.6E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	1,2-Dichloroethene,Total	1.00E+00	mg/L	3.72E-02	mg/m^3	R	7.5E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	2.50E-02	mg/L	9.37E-04	mg/m^3	R	1.9E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethene	1.30E+02	mg/L	4.19E+00	mg/m^3	R	8.4E-04	mg/kg-day	7.00E-03	(mg/kg-day)$^{-1}$	5.9E-06
	Vinyl Chloride	2.10E-02	mg/L	9.84E-04	mg/m^3	R	2.0E-07	mg/kg-day	1.50E-02	(mg/kg-day)$^{-1}$	3.0E-09
	(total)										6.6E-06
										Total Risk Across All Exposure Routes/Pathways	**6.6E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF AIR CONCENTRATIONS IN A TRENCH
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

For Mass-Transfer Coefficients

Kg,H2O	0.833	cm/s
MWH2O	18	
Kg,O2	0.002	cm/s
MWO2	32	
T	77	F
T	298	K
R	8.20E-05	atm-m3/mol-K

For Emission Flux and Concentration in Trench

CF1	1.00E-03	L/cm3
CF2	1.00E+04	cm2/m2
CF3	3600	s/hr
F	1	
ACH	360	hr-1

Trench dimensions

Length	8	ft
	2.44	m
Width	11	ft
	3.35	m
Depth	10	ft
	3.05	m
Width/Depth	1.10	

Table 3.8 Exposure-point concentrations (inhalation) for construction/utility workers in a trench: Groundwater less than 15 feet deep

	CAS No.	Molecular Weight MWi g/mol	Henry's Law Constant Hi atm-m3/mol	Gas-Phase Mass Transfer Coefficient KiG cm/s	Liquid-Phase Mass Transfer Coefficiant KiL cm/s	Overall Mass Transfer Coefficient Ki cm/s	Concentration of Contaminant in Groundwater Cgw ug/L	Volatilization Factor VF L/m3	Concentration of Contaminant in Trench Ctrench ug/m3
Volatile Organic Compounds (VOCs)									
1,1,2,2-Tetrachloroethane	79-34-5	167.85	3.45E-04	3.94E-01	8.73E-04	7.55E-04	1.40E+02	2.48E-02	3.47E+00
1,12-Trichloroethane	79-00-5	133.40	9.13E-04	4.26E-01	9.80E-04	9.23E-04	9.30E+01	3.03E-02	2.82E+00
1,1-Dichloroethene	75-35-4	96.94	2.61E-02	4.74E-01	1.15E-03	1.15E-03	1.10E+01	3.76E-02	4.14E-01
1,2-Dichloroethane	107-06-2	98.96	9.79E-04	4.71E-01	1.14E-03	1.07E-03	1.40E+01	3.52E-02	4.93E-01
1,2-Dichloropropane	78-87-5	112.99	2.80E-03	4.50E-01	1.06E-03	1.04E-03	2.00E+00	3.42E-02	6.84E-02
Benzene	71-43-2	78.11	5.55E-03	5.09E-01	1.28E-03	1.27E-03	3.50E+01	4.15E-02	1.45E+00
Bromodichloromethane	75-27-4	163.83	1.60E-03	3.98E-01	8.84E-04	8.55E-04	4.00E+00	2.80E-02	1.12E-01
Carbon Tetrachloride	56-23-5	153.82	3.04E-02	4.06E-01	9.12E-04	9.11E-04	6.80E+01	2.99E-02	2.03E+00
Chloroform	67-66-3	119.38	3.67E-03	4.42E-01	1.04E-03	1.02E-03	7.70E+02	3.35E-02	2.58E+01
cis-1,2-Dichloroethene	156-59-2	96.94	4.08E-03	4.74E-01	1.15E-03	1.13E-03	2.50E+03	3.72E-02	9.29E+01
Dichlorodifluoromethane	75-25-2	120.92	1.00E-01	4.40E-01	1.03E-03	1.03E-03	3.80E+02	3.37E-02	1.28E+01
Methylene Chloride	75-09-2	84.93	2.19E-03	4.95E-01	1.23E-03	1.19E-03	1.90E+01	3.92E-02	7.45E-01
Naphthalene	91-20-3	128.17	4.83E-04	4.32E-01	9.99E-04	8.95E-04	3.00E+00	2.93E-02	8.80E-02
Tetrachloroethene	127-18-4	165.83	1.84E-02	3.96E-01	8.79E-04	8.76E-04	3.30E+02	2.87E-02	9.48E+00
Toluene	108-88-3	92.14	6.64E-03	4.82E-01	1.18E-03	1.17E-03	9.80E+01	3.83E-02	3.76E+00
1,2-Dichloroethene,Total	540-59-0	96.94	4.08E-03	4.74E-01	1.15E-03	1.13E-03	1.00E+03	3.72E-02	3.72E+01
trans-1,2-Dichloroethene	156-60-5	96.94	9.38E-03	4.74E-01	1.15E-03	1.14E-03	2.50E+01	3.75E-02	9.37E-01
Trichloroethene	79-01-6	131.39	1.03E-02	4.28E-01	9.87E-04	9.82E-04	1.30E+05	3.22E-02	4.19E+03
Vinyl Chloride	75-01-4	62.50	2.70E-02	5.49E-01	1.43E-03	1.43E-03	2.10E+01	4.68E-02	9.84E-01

TABLE 4.20
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire SWMU 17
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	USEPA, December 2002	Maximum	USEPA, December 2002	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	USEPA Region 4, May 2000	0.01	USEPA Region 4, May 2000	Cw x IR x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	30	Professional Judgment	30	Professional Judgment	
	ED	Exposure Duration	(years)	10	USEPA Region 4, May 2000	5	Professional Judgment	
	ET	Exposure Time	(hr/day)	1.5	USEPA, August 1997	1	USEPA, August 1997	
	BW	Body Weight	(kg)	45	USEPA Region 4, May 2000	45	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	(days)	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	3650	USEPA, December 1989	1825	USEPA, December 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	USEPA, December 2002	Maximum	USEPA, December 2002	The equations and parameters for for estimating DAevent and the chemical-specific dermally absorbed dose from water (DAD) are provided in Section 6.2.4.4 of the text.
	A	Skin Surface Area	cm^2	3,280	USEPA, August 1997	3,280	USEPA, August 1997	
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	
	ED	Exposure Duration	years	10	USEPA Region 4, May 2000	5	USEPA, May 1993	
	EF	Exposure Frequency	days/year	30	Professional judgement	30	Professional judgement	
	t_{event}	Duration of Event	hour/event	1.5	USEPA, August 1997	1	USEPA, August 1997	USEPA, July 2004
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	T	Lag Time	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	BW	Body Weight	kg	45	USEPA Region 4, May 2000	45	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3650	USEPA, December 1989	1825	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 3.91E-06
Noncancer Ingestion Intake(RME) = 2.74E-05

Cancer Ingestion Intake(CTE) = 1.30E-06
Noncancer Ingestion Intake(CTE) = 1.83E-05

Cancer Dermal Intake(RME) = 8.56E-01
Noncancer Dermal Intake(RME) = 5.99E+00

Cancer Dermal Intake(CTE) = 4.28E-01
Noncancer Dermal Intake(CTE) = 5.99E+00

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
ADOLESCENT TRESPASSERS - REASONABLE MAXIMUM EXPOSURE (RME)

SITE NAME: SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
LOCATION: NWS CHARLESTON, SOUTH CAROLINA
DATE: 09/22/05

REFERENCES: U.S. EPA, July 2004

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	SW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)			B	FA	DAevent
Antimony	5.50E-03		I			1.50E+00			1.00E-03				1	8.25E-09
Iron	2.74E+00		I			1.50E+00			1.00E-03				1	4.11E-06
Manganese	1.69E-01		I			1.50E+00			1.00E-03				1	2.54E-07

TABLE 7.20 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire SWMU 17
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	1.5E-07	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	3.8E-04
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	7.5E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.5E-04
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	4.6E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.9E-04
	(total)												8.2E-04
Dermal	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	4.9E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	8.2E-04
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	2.5E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.2E-05
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	1.5E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.6E-03
	(total)												2.5E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**3.3E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 8.20 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire SWMU 17
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	2.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	1.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	6.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										0.0E+00
Dermal	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	7.1E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	3.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	2.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										0.0E+00
										Total Risk Across All Exposure Routes/Pathways	**0.0E+00**

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
ADOLESCENT TRESPASSERS - CENTRAL TENDENCY EXPOSURE (CTE)

SITE NAME: SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
LOCATION: NWS CHARLESTON, SOUTH CAROLINA
DATE: 09/22/05

REFERENCES: U.S. EPA, July 2004

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x $(6T \times tevent/3.1416)^{0.5}$

IF tevent > t*, DAevent = FA x Kp x C x CF x $((tevent/(1 + B)) + (2T \times ((1+3B+3B^2)/(1 + B)^2)))$

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	SW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)			B	FA	DAevent
Antimony	5.50E-03		I			1.00E+00			1.00E-03				1	5.50E-09
Iron	2.74E+00		I			1.00E+00			1.00E-03				1	2.74E-06
Manganese	1.69E-01		I			1.00E+00			1.00E-03				1	1.69E-07

TABLE 7.20a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire SWMU 17
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	1.0E-07	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	2.5E-04
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	5.0E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.7E-04
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	3.1E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.3E-04
	(total)												5.5E-04
Dermal	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	3.3E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	5.5E-04
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	1.6E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.5E-05
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	1.0E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.1E-03
	(total)												1.7E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**2.2E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 8.20a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire SWMU 17
Receptor Population: Trespassers
Receptor Age: Adolescent (7 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	7.2E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	3.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	2.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										0.0E+00
Dermal	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	2.4E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	1.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	7.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										0.0E+00
										Total Risk Across All Exposure Routes/Pathways	**0.0E+00**

TABLE 4.21
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	USEPA, December 2002	Maximum	USEPA, December 2002	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	USEPA Region 4, May 2000	0.01	USEPA Region 4, May 2000	Cw x IR x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	100	Professional judgement	100	Professional judgement	
	ED	Exposure Duration	(years)	24	USEPA Region 4, May 2000	7	USEPA, May 1993	
	ET	Exposure Time	(hr/day)	1.5	USEPA, August 1997	1	USEPA, August 1997	
	BW	Body Weight	(kg)	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	(days)	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	8760	USEPA, December 1989	2555	USEPA, December 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	USEPA, December 2002	Maximum	USEPA, December 2002	The equations and parameters for for estimating DAevent and the chemical-specific dermally absorbed dose from water (DAD) are provided in Section 6.2.4.4 of the text.
	A	Skin Surface Area	cm^2	5700	USEPA, July 2004	5700	USEPA, July 2004	
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	
	ED	Exposure Duration	years	24	USEPA Region 4, May 2000	7	USEPA, May 1993	
	EF	Exposure Frequency	days/year	100	Professional judgement	100	Professional judgement	
	t_{event}	Duration of Event	hour/event	1.5	USEPA, August 1997	1	USEPA, August 1997	USEPA, July 2004
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	T	Lag Time	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8760	USEPA, December 1989	2555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 2.01E-05
Noncancer Ingestion Intake(RME) = 5.87E-05

Cancer Ingestion Intake(CTE) = 3.91E-06
Noncancer Ingestion Intake(CTE) = 3.91E-05

Cancer Dermal Intake(RME) = 7.65E+00
Noncancer Dermal Intake(RME) = 2.23E+01

Cancer Dermal Intake(CTE) = 2.23E+00
Noncancer Dermal Intake(CTE) = 2.23E+01

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
FUTURE ADULT RESIDENTS- REASONABLE MAXIMUM EXPOSURE (RME)

SITE NAME: SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
LOCATION: NWS CHARLESTON, SOUTH CAROLINA
DATE: 09/22/05

REFERENCES: U.S. EPA, July 2004

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	SW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)			B	FA	DAevent
Antimony	5.50E-03		I			1.50E+00			1.00E-03				1	8.25E-09
Iron	2.74E+00		I			1.50E+00			1.00E-03				1	4.11E-06
Manganese	1.69E-01		I			1.50E+00			1.00E-03				1	2.54E-07

TABLE 7.21 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	3.2E-07	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	8.1E-04
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	1.6E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.4E-04
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	9.9E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	4.1E-04
	(total)												1.8E-03
Dermal	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	1.8E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.1E-03
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	9.2E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.1E-04
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	5.7E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	5.9E-03
	(total)												9.3E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**1.1E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 8.21 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	1.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	5.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	3.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										0.0E+00
Dermal	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	6.3E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	3.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	1.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										0.0E+00
										Total Risk Across All Exposure Routes/Pathways	**0.0E+00**

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
FUTURE ADULT RESIDENTS- CENTRAL TENDENCY EXPOSURE (CTE)

SITE NAME: SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
LOCATION: NWS CHARLESTON, SOUTH CAROLINA
DATE: 09/22/05

REFERENCES: U.S. EPA, July 2004

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = $2FA \times Kp \times C \times CF \times (6T \times tevent/3.1416)^{0.5}$

IF tevent > t*, DAevent = $FA \times Kp \times C \times CF \times ((tevent/(1 + B)) + (2T \times ((1+3B+3B^2)/(1 + B)^2)))$

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	SW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)			B	FA	DAevent
Antimony	5.50E-03		I			1.00E+00			1.00E-03				1	5.50E-09
Iron	2.74E+00		I			1.00E+00			1.00E-03				1	2.74E-06
Manganese	1.69E-01		I			1.00E+00			1.00E-03				1	1.69E-07

TABLE 7.21a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	2.2E-07	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	5.4E-04
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	1.1E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.6E-04
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	6.6E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	2.8E-04
	(total)												1.2E-03
Dermal	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	1.2E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	2.0E-03
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	6.1E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.0E-04
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	3.8E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	3.9E-03
	(total)												6.2E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**7.3E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 8.21a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	2.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	1.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	6.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										0.0E+00
Dermal	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	1.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	6.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	3.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										0.0E+00
										Total Risk Across All Exposure Routes/Pathways	**0.0E+00**

TABLE 4.22
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	USEPA, December 2002	Maximum	USEPA, December 2002	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	USEPA Region 4, May 2000	0.05	USEPA Region 4, May 2000	Cw x IR x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	100	Professional judgement	100	Professional judgement	
	ED	Exposure Duration	(years)	24	USEPA Region 4, May 2000	7	USEPA, May 1993	
	ET	Exposure Time	(hr/day)	1.5	USEPA, August 1997	1	USEPA, August 1997	
	BW	Body Weight	(kg)	15	USEPA Region 4, May 2000	15	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	(days)	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	8760	USEPA, December 1989	2555	USEPA, December 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	USEPA, December 2002	Maximum	USEPA, December 2002	The equations and parameters for
	A	Skin Surface Area	cm^2	2800	USEPA, July 2004	2800	USEPA, July 2004	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.2.4.4
	ED	Exposure Duration	years	24	USEPA Region 4, May 2000	7	USEPA, May 1993	of the text.
	EF	Exposure Frequency	days/year	100	Professional judgement	100	Professional judgement	
	t_{event}	Duration of Event	hour/event	1.5	USEPA, August 1997	1	USEPA, August 1997	USEPA, July 2004
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	T	Lag Time	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	BW	Body Weight	kg	15	USEPA Region 4, May 2000	15	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8760	USEPA, December 1989	2555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 4.70E-04
Noncancer Ingestion Intake(RME) = 1.37E-03

Cancer Ingestion Intake(CTE) = 9.13E-05
Noncancer Ingestion Intake(CTE) = 9.13E-04

Cancer Dermal Intake(RME) = 1.75E+01
Nonoancer Dermal Intake(RME) = 5.11E+01

Cancer Dermal Intake(CTE) = 5.11E+00
Noncancer Dermal Intake(CTE) = 5.11E+01

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
FUTURE CHILD RESIDENTS- REASONABLE MAXIMUM EXPOSURE (RME)

SITE NAME: SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
LOCATION: NWS CHARLESTON, SOUTH CAROLINA
DATE: 09/22/05

REFERENCES: U.S. EPA, July 2004

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF
FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	SW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)			B	FA	DAevent
Antimony	5.50E-03		i			1.50E+00			1.00E-03				1	8.25E-09
Iron	2.74E+00		i			1.50E+00			1.00E-03				1	4.11E-06
Manganese	1.69E-01		i			1.50E+00			1.00E-03				1	2.54E-07

TABLE 7.22 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	7.5E-06	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	1.9E-02
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	3.8E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.3E-02
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	2.3E-04	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	9.6E-03
	(total)												4.1E-02
Dermal	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	4.2E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	7.0E-03
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	2.1E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.0E-04
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	1.3E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.4E-02
	(total)												2.1E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**6.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 8.22 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	2.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	1.3E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	7.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										0.0E+00
Dermal	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	1.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	7.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	4.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										0.0E+00
										Total Risk Across All Exposure Routes/Pathways	**0.0E+00**

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
FUTURE CHILD RESIDENTS- CENTRAL TENDENCY EXPOSURE (CTE)

SITE NAME: SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
LOCATION: NWS CHARLESTON, SOUTH CAROLINA
DATE: 09/22/05

REFERENCES: U.S. EPA, July 2004

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = $2FA \times Kp \times C \times CF \times (6T \times tevent/3.1416)^{0.5}$

IF tevent > t*, DAevent = $FA \times Kp \times C \times CF \times ((tevent/(1 + B)) + (2T \times ((1+3B+3B^2)/(1 + B)^2)))$

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	SW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)			B	FA	DAevent
Antimony	5.50E-03		I			1.00E+00			1.00E-03				1	5.50E-09
Iron	2.74E+00		I			1.00E+00			1.00E-03				1	2.74E-06
Manganese	1.69E-01		I			1.00E+00			1.00E-03				1	1.69E-07

TABLE 7.22a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	5.0E-06	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	1.3E-02
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	2.5E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.3E-03
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	1.5E-04	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	6.4E-03
	(total)												2.7E-02
Dermal	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	2.8E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	4.7E-03
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	1.4E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.7E-04
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	8.6E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	9.0E-03
	(total)												1.4E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**4.1E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 8.22a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire SWMU 17
Receptor Population: Residents
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	5.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	2.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	1.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										0.0E+00
Dermal	Antimony	5.50E-03	mg/L	5.50E-03	mg/L	M	2.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	2.74E+00	mg/L	2.74E+00	mg/L	M	1.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.69E-01	mg/L	1.69E-01	mg/L	M	8.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										0.0E+00
										Total Risk Across All Exposure Routes/Pathways	**0.0E+00**

TABLE 9.1. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION/EXCAVATION WORKERS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	6.E-13			6.E-13	METHYLENE CHLORIDE	Liver	9.E-08			9.E-08
			TRICHLOROETHENE	2.E-10	2.E-09		2.E-09	TRICHLOROETHENE	CNS	2.E-06	1.E-04		1.E-04
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	1.E-06			1.E-06
			BENZO(A)ANTHRACENE	4.E-09		2.E-09	6.E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	3.E-08		1.E-08	4.E-08	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	4.E-09		2.E-09	6.E-09	BENZO(B)FLUORANTHENE					
			CARBAZOLE	5.E-11		2.E-11	7.E-11	CARBAZOLE					
			CHRYSENE	4.E-11		1.E-11	5.E-11	CHRYSENE					
			DIBENZO(A,H)ANTHRACENE	5.E-09		2.E-09	7.E-09	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1248	6.E-09		3.E-09	9.E-09	AROCLOR-1248					
			AROCLOR-1254	1.E-08		4.E-09	1.E-08	AROCLOR-1254	Immunological	2.E-02		7.E-03	2.E-02
			AROCLOR-1260	4.E-09		2.E-09	6.E-09	AROCLOR-1260					
			ALPHA-BHC	2.E-11		7.E-12	3.E-11	ALPHA-BHC					
			BETA-BHC	9.E-12		3.E-12	1.E-11	BETA-BHC					
			GAMMA-BHC (LINDANE)	6.E-12		8.E-13	7.E-12	GAMMA-BHC (LINDANE)	Kidney, Liver	1.E-06		1.E-07	1.E-06
			ALUMINUM					ALUMINUM	Body Weight	6.E-03			6.E-03
			ANTIMONY					ANTIMONY	Blood	3.E-02			3.E-02
			ARSENIC	4.E-08		4.E-09	5.E-08	ARSENIC	Skin, CVS	7.E-03		6.E-04	7.E-03
			BARIUM					BARIUM	Kidney	1.E-04			1.E-04
			CADMIUM					CADMIUM	Kidney	1.E-02		6.E-04	1.E-02
			CHROMIUM		6.E-07		6.E-07	CHROMIUM	Fetotoxicity/GS/Bone	7.E-03	3.E-02		4.E-02
			COBALT					COBALT	NA	8.E-05			6.E-05
			COPPER					COPPER	Gastrointestinal	5.E-03			5.E-03
			LEAD					LEAD					
			MANGANESE					MANGANESE	CNS	6.E-04			6.E-04
			MERCURY					MERCURY	CNS	6.E-04			6.E-04
			NICKEL					NICKEL	Body Weight	2.E-03			2.E-03
			ZINC					ZINC	Blood	7.E-04			7.E-04
			Total Risk Across Surface Soil				7.E-07		Total Hazard Index Across Surface Soil				1.E-01

Target Organ Analysis-Surface Soil

Total Liver HI =	1.E-06	Total CNS HI =	1.E-03
Total Kidney HI =	1.E-02	Total Blood HI =	3.E-02
Total CVS HI =	7.E-03	Total Body Weight HI =	8.E-03
Total Immune System HI =	2.E-02	Total Hair HI =	2.E-02
Total Skin HI =	7.E-03	Total Bone HI =	4.E-02
Total Gastrointestinal System HI =	4.E-02		
Total Fetotoxicity HI =	4.E-02		

TABLE 9.1. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION/EXCAVATION WORKERS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	1,1,2,2-TETRACHLOROETHANE	2.E-10			2.E-10	1,1,2,2-TETRACHLOROETHAN	Liver	1.E-06			1.E-06
			1,1,2-TRICHLOROETHANE	9.E-11			9.E-11	1,1,2-TRICHLOROETHANE	Liver	3.E-05			3.E-05
			1,2-DICHLOROPROPANE	2.E-12			2.E-12	1,2-DICHLOROPROPANE					
			ACETONE					ACETONE	Kidney	4.E-07			4.E-07
			BENZENE	6.E-13			6.E-13	BENZENE	Blood	2.E-07			2.E-07
			BROMODICHLOROMETHANE					BROMODICHLOROMETHANE					
			CARBON TETRACHLORIDE	4.E-09	4.E-08		5.E-08	CARBON TETRACHLORIDE	Liver	3.E-03	1.E-03		4.E-03
			CHLOROFORM					CHLOROFORM	Liver	4.E-04			4.E-04
			CHLOROMETHANE					CHLOROMETHANE	Neurological				
			METHYLENE CHLORIDE	6.E-13			6.E-13	METHYLENE CHLORIDE	Liver	9.E-08			9.E-08
			TETRACHLOROETHENE	2.E-10			2.E-10	TETRACHLOROETHENE	Liver	2.E-06			2.E-06
			TRICHLOROETHENE	7.E-08	6.E-07		7.E-07	TRICHLOROETHENE	CNS	7.E-04	4.E-02		4.E-02
			VINYL CHLORIDE	2.E-11			2.E-11	VINYL CHLORIDE	Liver	6.E-07			6.E-07
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	5.E-05			5.E-05
			2,4-DINITROTOLUENE					2,4-DINITROTOLUENE	CNS, Liver	1.E-04		3.E-05	1.E-04
			2,4,6-TRINITROTOLUENE	6.E-11		6.E-12		2,4,6-TRINITROTOLUENE	Liver	3.E-04		3.E-05	3.E-04
			PENTACHLOROPHENOL	4.E-10		3.E-10	7.E-10	PENTACHLOROPHENOL	Liver, Kidney	5.E-06		4.E-06	9.E-06
			ALUMINUM					ALUMINUM	Body Weight	9.E-03			9.E-03
			ARSENIC	4.E-08		4.E-09	5.E-08	ARSENIC	Skin, CVS	7.E-03		6.E-04	7.E-03
			BARIUM					BARIUM	Kidney	1.E-04			1.E-04
			CADMIUM					CADMIUM	Kidney	4.E-04		3.E-05	5.E-04
			CHROMIUM					CHROMIUM	Fetotoxicity/GS/Bone	4.E-03			4.E-03
			COBALT					COBALT	NA	6.E-05			6.E-05
			NICKEL					NICKEL	Body Weight	1.E-04			1.E-04
			VANADIUM					VANADIUM	Hair Loss	2.E-02			2.E-02
			ZINC					ZINC	Blood	5.E-05			5.E-05
			CYANIDE					CYANIDE	Weight Loss, Thyroid	1.E-04		3.E-05	1.E-04
			Total Risk Across Subsurface Soil				8.E-07	Total Hazard Index Across Subsurface Soil					8.E-02

Target Organ Analysis - Subsurface Soil

Total Liver HI =	5.E-03	Total CNS HI =	4.E-02
Total Kidney HI =	6.E-04	Total Blood HI =	1.E-04
Total CVS HI =	9.E-03	Total Body Weight HI =	9.E-03
Total Skin HI =	7.E-03	Total Hair HI =	2.E-02
Total Gastrointestinal System HI =	4.E-03	Total Bone HI =	4.E-03
Total Fetotoxicity HI =	4.E-03	Total Thyroid HI =	1.E-04

TABLE 9.1. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION/EXCAVATION WORKERS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	In a Trench	1,1,2,2-Tetrachloroethane		2.E-07	6.E-08	3.E-07	1,1,2,2-Tetrachloroethane	Liver		1.E-03	4.E-04	2.E-03
			1,1,2-Trichloroethane		5.E-08	1.E-08	6.E-08	1,1,2-Trichloroethane	Liver		2.E-02	3.E-03	2.E-02
			1,1-Dichloroethene					1,1-Dichloroethene	Liver		2.E-04	5.E-05	2.E-04
			1,2-Dichloroethane		2.E-08	1.E-09	2.E-08	1,2-Dichloroethane	NA		2.E-05	5.E-05	7.E-05
			1,2-Dichloropropane		2.E-09	3.E-10	2.E-09	1,2-Dichloropropane	Nasal		1.E-03		1.E-03
			Benzene		1.E-08	7.E-09	2.E-08	Benzene	Blood		4.E-03	9.E-04	5.E-03
			Bromodichloromethane		2.E-09	4.E-10	3.E-09	Bromodichloromethane	Kidney		1.E-04	2.E-05	2.E-04
			Carbon Tetrachloride		4.E-08	4.E-08	8.E-08	Carbon Tetrachloride	Liver		1.E-03	3.E-02	3.E-02
			Chloroform		7.E-07			Chloroform	Liver		4.E-02	1.E-02	5.E-02
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood		2.E-01	3.E-02	3.E-01
			Dichlorodifluoromethane					Dichlorodifluoromethane	Liver		5.E-03	3.E-04	6.E-03
			Methylene Chloride		4.E-10	1.E-10	5.E-10	Methylene Chloride	Liver		6.E-05	2.E-05	8.E-05
			Naphthalene					Naphthalene	Nasal		2.E-03	1.E-04	3.E-03
			Tetrachloroethene		6.E-08	2.E-06	2.E-06	Tetrachloroethene	Liver		2.E-03	2.E-02	3.E-02
			Toluene					Toluene	Kidney, Liver, CNS		8.E-04	3.E-04	1.E-03
			Total 1,2-Dichloroethene					Total 1,2-Dichloroethene	Blood, Liver			2.E-02	2.E-02
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver		1.E-03	2.E-04	1.E-03
			Trichloroethene		1.E-05	5.E-06	2.E-05	Trichloroethene	CNS		6.E-01	6.E-02	6.E-01
			Vinyl Chloride		5.E-09	2.E-08	3.E-08	Vinyl Chloride	Liver		8.E-04	7.E-04	1.E-03
			Bis(2-Ethylhexyl)phthalate					Bis(2-Ethylhexyl)phthalate	Liver			5.E-03	5.E-03
			RDX					RDX	Prostate			7.E-06	7.E-06
			Antimony					Antimony	Blood			1.E-03	1.E-03
			Arsenic					Arsenic	Skin, CVS			1.E-03	1.E-03
			Barium					Barium	Kidney			2.E-03	2.E-03
			Beryllium					Beryllium	GS, Respiratory			5.E-02	5.E-02
			Cobalt					Cobalt	NA			8.E-04	8.E-04
			Manganese					Manganese	CNS			8.E-02	8.E-02
			Nickel					Nickel	Body Weight			2.E-03	2.E-03
			Chloride					Chloride					
			Sulfate					Sulfate					
			Total Risk Across Groundwater		1.E-05	7.E-06	2.E-05	Total Hazard Index Across Groundwater			9.E-01	3.E-01	1.E+00

Target Organ Analysis

Total Liver HI =	2.E-01	Total CNS HI =	6.E-01
Total Kidney HI =	3.E-03	Total Blood HI =	3.E-01
Total Nasal HI =	1.E-03	Total Prostate HI =	7.E-06
Total Skin HI =	1.E-03	Total Gastrointestinal HI =	5.E-02
Total CVS HI =	1.E-03	Total Respiratory HI =	5.E-02
Total Body Weight HI =	2.E-03		

TABLE 9.2. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - OCCUPATIONAL WORKERS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	4.E-11			4.E-11	METHYLENE CHLORIDE	Liver	2.E-07			2.E-07
			TRICHLOROETHENE	1.E-08	4.E-07		5.E-07	TRICHLOROETHENE	CNS	6.E-06	1.E-03		1.E-03
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	2.E-06			2.E-06
			BENZO(A)ANTHRACENE	3.E-07		2.E-07	5.E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.E-06		2.E-06	4.E-06	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	3.E-07		2.E-07	5.E-07	BENZO(B)FLUORANTHENE					
			CARBAZOLE	3.E-09		3.E-09	6.E-09	CARBAZOLE					
			CHRYSENE	2.E-09		2.E-09	4.E-09	CHRYSENE					
			DIBENZO(A,H)ANTHRACENE	3.E-07		3.E-07	6.E-07	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1248	4.E-07		4.E-07	8.E-07	AROCLOR-1248					
			AROCLOR-1254	6.E-07		6.E-07	1.E-06	AROCLOR-1254	Immunological	4.E-02		4.E-02	8.E-02
			AROCLOR-1260	2.E-07		2.E-07	5.E-07	AROCLOR-1260					
			ALPHA-BHC	1.E-09		1.E-09	2.E-09	ALPHA-BHC					
			BETA-BHC	6.E-10		4.E-10	9.E-10	BETA-BHC					
			GAMMA-BHC (LINDANE)	4.E-10		1.E-10	5.E-10	GAMMA-BHC (LINDANE)	Kidney, Liver	3.E-06		7.E-07	4.E-06
			ALUMINUM					ALUMINUM	Body Weight	1.E-02			1.E-02
			ANTIMONY					ANTIMONY	Blood	8.E-02			8.E-02
			ARSENIC	3.E-06		5.E-07	3.E-06	ARSENIC	Skin, CVS	2.E-02		3.E-03	2.E-02
			BARIUM					BARIUM	Kidney	3.E-04			3.E-04
			CADMIUM					CADMIUM	Kidney	2.E-02		3.E-03	3.E-02
			CHROMIUM		1.E-07		1.E-07	CHROMIUM	Fetotoxicity/GS/Bone	2.E-02	2.E-04		2.E-02
			COBALT					COBALT	NA	2.E-04			2.E-04
			COPPER					COPPER	Gastrointestinal	1.E-02			1.E-02
			LEAD					LEAD					
			MANGANESE					MANGANESE	CNS	2.E-03			2.E-03
			MERCURY					MERCURY	CNS	2.E-03			2.E-03
			NICKEL					NICKEL	Body Weight	4.E-03			4.E-03
			ZINC					ZINC	Blood	2.E-03			2.E-03
			Total Risk Across Surface Soil				1.E-05	Total Hazard Index Across Surface Soil					3.E-01

Target Organ Analysis-Surface Soil

Total Liver HI =	4.E-06	Total CNS HI =	4.E-03
Total Kidney HI =	3.E-02	Total Blood HI =	8.E-02
Total CVS HI =	2.E-02	Total Body Weight HI =	2.E-02
Total Immune System HI =	8.E-02	Total Bone HI =	2.E-02
Total Skin HI =	2.E-02	Total Fetotoxicity HI =	2.E-02
Total Gastrointestinal System HI =	3.E-02		

TABLE 9.2. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - OCCUPATIONAL WORKERS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Indoor Air	1,1,2,2-Tetrachloroethane		1.E-08		1.E-08	1,1,2,2-Tetrachloroethane	Liver		3.E-06		3.E-06
			1,1,2-Trichloroethane		6.E-09		6.E-09	1,1,2-Trichloroethane	Liver		7.E-05		7.E-05
			1,1-Dichloroethene					1,1-Dichloroethene	Liver		2.E-05		2.E-05
			1,2-Dichloroethane		2.E-09		2.E-09	1,2-Dichloroethane	NA		8.E-08		
			1,2-Dichloropropane		5.E-10		5.E-10	1,2-Dichloropropane	Nasal		2.E-05		2.E-05
			Benzene		7.E-09		7.E-09	Benzene	Blood		9.E-05		9.E-05
			Bromodichloromethane		5.E-10		5.E-10	Bromodichloromethane	Kidney		1.E-06		1.E-06
			Carbon Tetrachloride		1.E-07		1.E-07	Carbon Tetrachloride	Liver		1.E-04		1.E-04
			Chloroform		3.E-07		3.E-07	Chloroform	Liver		8.E-04		8.E-04
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood		4.E-03		4.E-03
			Dichlorodifluoromethane					Dichlorodifluoromethane	Liver		7.E-03		7.E-03
			Methylene Chloride		1.E-10		1.E-10	Methylene Chloride	Liver		6.E-07		6.E-07
			Naphthalene					Naphthalene	Nasal		4.E-06		4.E-06
			Tetrachloroethene		1.E-07		1.E-07	Tetrachloroethene	Liver		1.E-04		1.E-04
			Toluene					Toluene	Kidney, Liver, CNS		2.E-05		2.E-05
			Total 1,2-Dichloroethene					Total 1,2-Dichloroethene	Blood, Liver				
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver		5.E-05		5.E-05
			Trichloroethene		1.E-05		1.E-05	Trichloroethene	CNS		3.E-02		3.E-02
			Vinyl Chloride		1.E-08		1.E-08	Vinyl Chloride	Liver		9.E-05		9.E-05
			Total Risk Across Indoor Air		1.E-05		1.E-05	Total Hazard Index Across Indoor Air			4.E-02		4.E-02

Target Organ Analysis

Total Liver HI =	8.E-03
Total Kidney HI =	2.E-05
Total Nasal HI =	2.E-05
Total CNS HI =	3.E-02
Total Blood HI =	4.E-03

TABLE 9.3. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ASOLESCENT TRESPASSERS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Receptor Population: Trespassers
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	3.E-12			3.E-12	METHYLENE CHLORIDE	Liver	4.E-08			4.E-08
			TRICHLOROETHENE	1.E-09	5.E-09		6.E-09	TRICHLOROETHENE	CNS	1.E-06	3.E-05		3.E-05
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	5.E-07			5.E-07
			BENZO(A)ANTHRACENE	2.E-08		2.E-08	4.E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	1.E-07		1.E-07	3.E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	2.E-08		2.E-08	4.E-08	BENZO(B)FLUORANTHENE					
			CARBAZOLE	2.E-10		2.E-10	4.E-10	CARBAZOLE					
			CHRYSENE	2.E-10		1.E-10	3.E-10	CHRYSENE					
			DIBENZO(A,H)ANTHRACENE	2.E-08		2.E-08	5.E-08	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1248	3.E-08		3.E-08	6.E-08	AROCLOR-1248					
			AROCLOR-1254	5.E-08		4.E-08	9.E-08	AROCLOR-1254	Immunological	8.E-03		7.E-03	2.E-02
			AROCLOR-1260	2.E-08		2.E-08	4.E-08	AROCLOR-1260					
			ALPHA-BHC	1.E-10		7.E-11	2.E-10	ALPHA-BHC					
			BETA-BHC	4.E-11		3.E-11	7.E-11	BETA-BHC					
			GAMMA-BHC (LINDANE)	3.E-11		8.E-12	4.E-11	GAMMA-BHC (LINDANE)	Kidney, Liver	5.E-07		1.E-07	7.E-07
			ALUMINUM					ALUMINUM	Body Weight	3.E-03			3.E-03
			ANTIMONY					ANTIMONY	Blood	1.E-02			1.E-02
			ARSENIC	2.E-07		4.E-08	2.E-07	ARSENIC	Skin, CVS	3.E-03		6.E-04	4.E-03
			BARIUM					BARIUM	Kidney	6.E-05			6.E-05
			CADMIUM					CADMIUM	Kidney	5.E-03		6.E-04	5.E-03
			CHROMIUM		1.E-09		1.E-09	CHROMIUM	Fetotoxicity/GS/Bone	3.E-03	6.E-06		3.E-03
			COBALT					COBALT	NA	4.E-05			4.E-05
			COPPER					COPPER	Gastrointestinal	3.E-03			3.E-03
			LEAD					LEAD					
			MANGANESE					MANGANESE	CNS	3.E-04			3.E-04
			MERCURY					MERCURY	CNS	3.E-04			3.E-04
			NICKEL					NICKEL	Body Weight	8.E-04			8.E-04
			ZINC					ZINC	Weight Loss, Thyroid	3.E-04			3.E-04
			Total Risk Across Surface Soil				8.E-07		Total Hazard Index Across Surface Soil				5.E-02

Target Organ Analysis

Total Liver HI =	7.E-07	Total CNS HI =	6.E-04
Total Kidney HI =	5.E-03	Total Blood HI =	1.E-02
Total CVS HI =	4.E-03	Total Body Weight HI =	4.E-03
Total Immune System HI =	2.E-02	Total Bone HI =	3.E-03
Total Skin HI =	4.E-03	Total Fetotoxicity HI =	3.E-03
Total Gastrointestinal System HI =	6.E-03		

TABLE 9.3. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ASOLESCENT TRESPASSERS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Receptor Population: Trespassers
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Blood	4.E-04		8.E-04	1.E-03
			Iron					Iron	Gastrointestinal	3.E-04		8.E-05	3.E-04
			Manganese					Manganese	CNS	2.E-04		2.E-03	2.E-03
			Total Risk Across Surface Water					Total Hazard Index Across Water					3.E-03
Sediment	Sediment	Sediment	Total Risk Across Sediment					Total Hazard Index Across Sediment					
			Total Risk Across Surface Water and Sediment					Total Hazard Index Across Surface Water and Sediment					3.E-03

Target Organ Analysis	
Total Blood HI =	1.E-03
Total Gastrointestinal HI =	3.E-04
Total CNS HI =	2.E-03

TABLE 9.4. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	5.E-11			5.E-11	METHYLENE CHLORIDE	Liver	3.E-07			3.E-07
			TRICHLOROETHENE	2.E-08	6.E-07		6.E-07	TRICHLOROETHENE	CNS	9.E-06	1.E-03		1.E-03
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	3.E-06			3.E-06
			BENZO(A)ANTHRACENE	3.E-07		2.E-07	5.E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	3.E-06		1.E-06	4.E-06	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	4.E-07		2.E-07	6.E-07	BENZO(B)FLUORANTHENE					
			CARBAZOLE	4.E-09		2.E-09	6.E-09	CARBAZOLE					
			CHRYSENE	3.E-09		2.E-09	5.E-09	CHRYSENE					
			DIBENZO(A,H)ANTHRACENE	4.E-07		2.E-07	7.E-07	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1248	5.E-07		3.E-07	8.E-07	AROCLOR-1248					
			AROCLOR-1254	8.E-07		5.E-07	1.E-06	AROCLOR-1254	Immunological	6.E-02		3.E-02	9.E-02
			AROCLOR-1260	3.E-07		2.E-07	5.E-07	AROCLOR-1260					
			ALPHA-BHC	2.E-09		8.E-10	3.E-09	ALPHA-BHC					
			BETA-BHC	8.E-10		3.E-10	1.E-09	BETA-BHC					
			GAMMA-BHC (LINDANE)	5.E-10		8.E-11	6.E-10	GAMMA-BHC (LINDANE)	Kidney, Liver	4.E-06		6.E-07	5.E-06
			ALUMINUM					ALUMINUM	Body Weight	2.E-02			2.E-02
			ANTIMONY					ANTIMONY	Blood	1.E-01			1.E-01
			ARSENIC	4.E-06		4.E-07	4.E-06	ARSENIC	Skin, CVS	2.E-02		3.E-03	3.E-02
			BARIUM					BARIUM	Kidney	5.E-04			5.E-04
			CADMIUM					CADMIUM	Kidney	3.E-02		3.E-03	4.E-02
			CHROMIUM		1.E-07		1.E-07	CHROMIUM	Fetotoxicity/GS/Bone	2.E-02	3.E-04		2.E-02
			COBALT					COBALT	NA	3.E-04			3.E-04
			COPPER					COPPER	Gastrointestinal	2.E-02			2.E-02
			LEAD					LEAD					
			MANGANESE					MANGANESE	CNS	2.E-03			2.E-03
			MERCURY					MERCURY	CNS	2.E-03			2.E-03
			NICKEL					NICKEL	Body Weight	6.E-03			6.E-03
			ZINC					ZINC	Blood	2.E-03			2.E-03
			Total Risk Across Surface Soil				1.E-05	Total Hazard Index Across Surface Soil					3.E-01

Target Organ Analysis-Surface Soil

Total Liver HI =	5.E-06	Total CNS HI =	6.E-03
Total Kidney HI =	4.E-02	Total Blood HI =	1.E-01
Total CVS HI =	3.E-02	Total Body Weight HI =	3.E-02
Total Immune System HI =	9.E-02	Total Bone HI =	2.E-02
Total Skin HI =	3.E-02	Total Fetotoxicity HI =	2.E-02
Total Gastrointestinal System HI =	4.E-02		

TABLE 9.4. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap	1,1,2,2-Tetrachloroethane	3.E-04	3.E-04	3.E-05	6.E-04	1,1,2,2-Tetrachloroethane	Liver	6.E-02	6.E-02	6.E-03	1.E-01
			1,1,2-Trichloroethane	5.E-05	5.E-05	4.E-06	1.E-04	1,1,2-Trichloroethane	Liver	6.E-01	6.E-01	5.E-02	1.E+00
			1,1-Dichloroethene					1,1-Dichloroethene	Liver	6.E-03	6.E-03	6.E-04	1.E-02
			1,2-Dichloroethane	1.E-05	1.E-05	4.E-07	2.E-05	1,2-Dichloroethane	NA	2.E-02	2.E-02	7.E-04	4.E-02
			1,2-Dichloropropane	1.E-06	1.E-06	1.E-07	3.E-06	1,2-Dichloropropane	Nasal				
			Benzene	2.E-05	2.E-05	2.E-06	4.E-05	Benzene	Blood	2.E-01	2.E-01	1.E-02	5.E-01
			Bromodichloromethane	2.E-06	2.E-06	1.E-07	5.E-06	Bromodichloromethane	Kidney	5.E-03	5.E-03	3.E-04	1.E-02
			Carbon Tetrachloride	8.E-05	8.E-05	2.E-05	2.E-04	Carbon Tetrachloride	Liver	3.E+00	3.E+00	5.E-01	6.E+00
			Chloroform					Chloroform	Liver	2.E+00	2.E+00	1.E-01	4.E+00
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	7.E+00	7.E+00	5.E-01	1.E+01
			Dichlorodifluoromethane					Dichlorodifluoromethane	Liver	5.E-02	5.E-02	5.E-03	1.E-01
			Methylene Chloride	1.E-06	1.E-06	4.E-08	3.E-06	Methylene Chloride	Liver	9.E-03	9.E-03	2.E-04	2.E-02
			Naphthalene					Naphthalene	Nasal	4.E-03	4.E-03	2.E-03	1.E-02
			Tetrachloroethene	2.E-03	2.E-03	8.E-04	4.E-03	Tetrachloroethene	Liver	9.E-01	9.E-01	4.E-01	2.E+00
			Toluene					Toluene	Kidney, Liver, CNS	1.E-02	1.E-02	4.E-03	3.E-02
			Total 1,2-Dichloroethene					Total 1,2-Dichloroethene	Blood, Liver	3.E+00	3.E+00	2.E-01	6.E+00
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver	3.E-02	3.E-02	2.E-03	7.E-02
			Trichloroethene	2.E-02	2.E-02	2.E-03	3.E-02	Trichloroethene	CNS	7.E+00	7.E+00	9.E-01	2.E+01
			Vinyl Chloride	1.E-04	1.E-04	6.E-06	3.E-04	Vinyl Chloride	Liver	2.E-01	2.E-01	7.E-03	4.E-01
			Bis(2-Ethylhexyl)phthalate	7.E-06		8.E-06	2.E-05	Bis(2-Ethylhexyl)phthalate	Liver	7.E-02		9.E-02	2.E-01
			RDX	2.E-06		1.E-08	2.E-06	RDX	Prostate	2.E-02		1.E-04	2.E-02
			Antimony					Antimony	Blood	4.E-01		8.E-03	4.E-01
			Arsenic	3.E-04		9.E-07	3.E-04	Arsenic	Skin, CVS	2.E+00		6.E-03	2.E+00
			Barium					Barium	Kidney	3.E-01		1.E-02	3.E-01
			Beryllium					Beryllium	GS, Respiratory	6.E-01		3.E-01	9.E-01
			Cobalt					Cobalt	NA	1.E+00		4.E-03	1.E+00
			Manganese					Manganese	CNS	6.E+00		4.E-01	6.E+00
			Nickel					Nickel	Body Weight	7.E-01		1.E-02	7.E-01
			Chloride					Chloride					
			Sulfate					Sulfate					

TABLE 9.4. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Indoor Air	1,1,2,2-Tetrachloroethane		5.E-06		5.E-06	1,1,2,2-Tetrachloroethane	Liver		1.E-03		1.E-03
			1,1,2-Trichloroethane		2.E-06		2.E-06	1,1,2-Trichloroethane	Liver		2.E-02		2.E-02
			1,1-Dichloroethene					1,1-Dichloroethene	Liver		7.E-04		7.E-04
			1,2-Dichloroethane		5.E-07		5.E-07	1,2-Dichloroethane	NA		2.E-05		2.E-05
			1,2-Dichloropropane		6.E-08		6.E-08	1,2-Dichloropropane	Nasal		2.E-03		2.E-03
			Benzene		5.E-07		5.E-07	Benzene	Blood		7.E-03		7.E-03
			Bromodichloromethane		8.E-08		8.E-08	Bromodichloromethane	Kidney		2.E-04		2.E-04
			Carbon Tetrachloride		4.E-08		4.E-08	Carbon Tetrachloride	Liver		4.E-03		4.E-03
			Chloroform		3.E-05		3.E-05	Chloroform	Liver		9.E-02		9.E-02
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood		4.E-01		4.E-01
			Dichlorodifluoromethane					Dichlorodifluoromethane	Liver		1.E-01		1.E-01
			Methylene Chloride		2.E-08		2.E-08	Methylene Chloride	Liver		1.E-04		1.E-04
			Naphthalene					Naphthalene	Nasal		2.E-03		2.E-03
			Tetrachloroethene		4.E-06		4.E-06	Tetrachloroethene	Liver		5.E-03		5.E-03
			Toluene					Toluene	Kidney, Liver, CNS		1.E-03		1.E-03
			Total 1,2-Dichloroethene					Total 1,2-Dichloroethene	Blood, Liver				
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver		3.E-03		3.E-03
			Trichloroethene		6.E-04		6.E-04	Trichloroethene	CNS		1.E+00		1.E+00
			Vinyl Chloride		5.E-07		5.E-07	Vinyl Chloride	Liver		3.E-03		3.E-03
			Total Risk Across Groundwater	2.E-02	2.E-02	3.E-03	4.E-02	Total Hazard Index Across Groundwater		3.E+01	2.E+01	4.E+00	6.E+01
			Total Risk Across Indoor Air		6.E-04		6.E-04	Total Hazard Index Across Indoor Air			2.E+00		2.E+00

Target Organ Analysis

Total Liver HI =	2.E+01
Total Kidney HI =	3.E-01
Total Nasal HI =	4.E-03
Total Skin HI =	2.E+00
Total CVS HI =	2.E+00
Total Body Weight HI =	7.E-01

Total CNS HI =	2.E+01
Total Blood HI =	2.E+01
Total Prostate HI =	2.E-02
Total Gastrointestinal HI =	9.E-01
Total Respiratory HI =	9.E-01

TABLE 9.4. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Blood	8.E-04		3.E-03	4.E-03
			Iron					Iron	Gastrointestinal	5.E-04		3.E-04	8.E-04
			Manganese					Manganese	CNS	4.E-04		6.E-03	6.E-03
			Total Risk Across Surface Water					Total Hazard Index Across Water					1.E-02
Sediment	Sediment	Sediment	Total Risk Across Sediment					Total Hazard Index Across Sediment					
			Total Risk Across Surface Water and Sediment					Total Hazard Index Across Surface Water and Sediment					1.E-02

	Target Organ Analysis
Total Blood HI =	4.E-03
Total Gastrointestinal HI =	8.E-04
Total CNS HI =	6.E-03

TABLE 9.5. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	1.E-10			1.E-10	METHYLENE CHLORIDE	Liver	3.E-06			3.E-06
			TRICHLOROETHENE	5.E-08	5.E-07		6.E-07	TRICHLOROETHENE	CNS	6.E-05	5.E-03		5.E-03
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	3.E-05			3.E-05
			BENZO(A)ANTHRACENE	8.E-07		3.E-07	1.E-06	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	6.E-06		2.E-06	8.E-06	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	9.E-07		3.E-07	1.E-06	BENZO(B)FLUORANTHENE					
			CARBAZOLE	1.E-08		4.E-09	1.E-08	CARBAZOLE					
			CHRYSENE	7.E-09		3.E-09	1.E-08	CHRYSENE					
			DIBENZO(A,H)ANTHRACENE	1.E-06		4.E-07	1.E-06	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1248	1.E-06		5.E-07	2.E-06	AROCLOR-1248					
			AROCLOR-1254	2.E-06		7.E-07	3.E-06	AROCLOR-1254	Immunological	6.E-01		2.E-01	8.E-01
			AROCLOR-1260	6.E-07		3.E-07	1.E-06	AROCLOR-1260					
			ALPHA-BHC	5.E-09		1.E-09	6.E-09	ALPHA-BHC					
			BETA-BHC	2.E-09		5.E-10	2.E-09	BETA-BHC					
			GAMMA-BHC (LINDANE)	1.E-09		1.E-10	1.E-09	GAMMA-BHC (LINDANE)	Kidney, Liver	4.E-05		4.E-06	4.E-05
			ALUMINUM					ALUMINUM	Body Weight	2.E-01			2.E-01
			ANTIMONY					ANTIMONY	Blood	1.E+00			1.E+00
			ARSENIC	9.E-06		7.E-07	9.E-06	ARSENIC	Skin, CVS	2.E-01		2.E-02	2.E-01
			BARIUM					BARIUM	Kidney	4.E-03			4.E-03
			CADMIUM					CADMIUM	Kidney	3.E-01		2.E-02	3.E-01
			CHROMIUM		1.E-07		1.E-07	CHROMIUM	Fetotoxicity/GS/Bone	2.E-01	1.E-03		2.E-01
			COBALT					COBALT	NA	3.E-03			3.E-03
			COPPER					COPPER	Gastrointestinal	2.E-01			2.E-01
			LEAD					LEAD					
			MANGANESE					MANGANESE	CNS	2.E-02			2.E-02
			MERCURY					MERCURY	CNS	2.E-02			2.E-02
			NICKEL					NICKEL	Body Weight	6.E-02			5.E-02
			ZINC					ZINC	Blood	2.E-02			2.E-02
			Total Risk Across Surface Soil				3.E-05		Total Hazard Index Across Surface Soil				3.E+00

Target Organ Analysis-Surface Soil

Total Liver HI =	4.E-05	Total CNS HI =	5.E-02
Total Kidney HI =	3.E-01	Total Blood HI =	1.E+00
Total CVS HI =	2.E-01	Total Body Weight HI =	2.E-01
Total Immune System HI =	8.E-01	Total Bone HI =	2.E-01
Total Skin HI =	2.E-01	Total Fetotoxicity HI =	2.E-01
Total Gastrointestinal System HI =	4.E-01		

TABLE 9.5. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap	1,1,2,2-Tetrachloroethane	2.E-04	2.E-04	1.E-05	3.E-04	1,1,2,2-Tetrachloroethane	Liver	1.E-01	1.E-01	1.E-02	3.E-01
			1,1,2-Trichloroethane	3.E-05	3.E-05	2.E-06	6.E-05	1,1,2-Trichloroethane	Liver	1.E+00	1.E+00	8.E-02	3.E+00
			1,1-Dichloroethene					1,1-Dichloroethene	Liver	1.E-02	1.E-02	1.E-03	3.E-02
			1,2-Dichloroethane	7.E-06	7.E-06	2.E-07	1.E-05	1,2-Dichloroethane	NA	4.E-02	4.E-02	1.E-03	9.E-02
			1,2-Dichloropropane	7.E-07	7.E-07	4.E-08	2.E-06	1,2-Dichloropropane	Nasal				
			Benzene	1.E-05	1.E-05	9.E-07	2.E-05	Benzene	Blood	6.E-01	6.E-01	2.E-02	1.E+00
			Bromodichloromethane	1.E-06	1.E-06	6.E-08	3.E-06	Bromodichloromethane	Kidney	1.E-02	1.E-02	6.E-04	3.E-02
			Carbon Tetrachloride	5.E-05	5.E-05	7.E-06	1.E-04	Carbon Tetrachloride	Liver	6.E+00	6.E+00	9.E-01	1.E+01
			Chloroform					Chloroform	Liver	5.E+00	5.E+00	2.E-01	1.E+01
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	2.E+01	2.E+01	8.E-01	3.E+01
			Dichlorodifluoromethane					Dichlorodifluoromethane	Liver	1.E-01	1.E-01	6.E-03	3.E-01
			Methylene Chloride	8.E-07	8.E-07	2.E-08	2.E-06	Methylene Chloride	Liver	2.E-02	2.E-02	4.E-04	4.E-02
			Naphthalene					Naphthalene	Nasal	1.E-02	1.E-02	3.E-03	2.E-02
			Tetrachloroethene	1.E-03	1.E-03	3.E-04	2.E-03	Tetrachloroethene	Liver	2.E+00	2.E+00	7.E-01	5.E+00
			Toluene					Toluene	Kidney, Liver, CNS	3.E-02	3.E-02	6.E-03	7.E-02
			Total 1,2-Dichloroethene					Total 1,2-Dichloroethene	Blood, Liver	7.E+00	7.E+00	4.E-01	1.E+01
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver	8.E-02	8.E-02	4.E-03	2.E-01
			Trichloroethene	9.E-03	9.E-03	9.E-04	2.E-02	Trichloroethene	CNS	2.E+01	2.E+01	2.E+00	3.E+01
			Vinyl Chloride	2.E-04	2.E-04	5.E-06	4.E-04	Vinyl Chloride	Liver	4.E-01	4.E-01	1.E-02	9.E-01
			Bis(2-Ethylhexyl)phthalate	4.E-06		4.E-08	8.E-06	Bis(2-Ethylhexyl)phthalate	Liver	2.E-01		1.E-01	3.E-01
			RDX	1.E-06		6.E-09	1.E-06	RDX	Prostate	4.E-02		2.E-04	4.E-02
			Antimony					Antimony	Blood	9.E-01		1.E-02	9.E-01
			Arsenic	2.E-04		4.E-07	2.E-04	Arsenic	Skin, CVS	5.E+00		1.E-02	5.E+00
			Barium					Barium	Kidney	6.E-01		2.E-02	6.E-01
			Beryllium					Beryllium	GS, Respiratory	1.E+00		4.E-01	2.E+00
			Cobalt					Cobalt	NA	3.E+00		7.E-03	3.E+00
			Manganese					Manganese	CNS	1.E+01		7.E-01	1.E+01
			Nickel					Nickel	Body Weight	2.E+00		2.E-02	2.E+00
			Chloride					Chloride					
			Sulfate					Sulfate					

TABLE 9.5. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Indoor Air	1,1,2,2-Tetrachloroethane		4.E-06		4.E-06	1,1,2,2-Tetrachloroethane	Liver		4.E-03		4.E-03
			1,1,2-Trichloroethane		1.E-06		1.E-06	1,1,2-Trichloroethane	Liver		7.E-02		7.E-02
			1,1-Dichloroethene					1,1-Dichloroethene	Liver		2.E-03		2.E-03
			1,2-Dichloroethane		4.E-07		4.E-07	1,2-Dichloroethane	NA		8.E-05		8.E-05
			1,2-Dichloropropane		5.E-06		5.E-06	1,2-Dichloropropane	Nasal		7.E-03		7.E-03
			Benzene		5.E-07		5.E-07	Benzene	Blood		2.E-02		2.E-02
			Bromodichloromethane		7.E-06		7.E-06	Bromodichloromethane	Kidney		7.E-04		7.E-04
			Carbon Tetrachloride		3.E-06		3.E-06	Carbon Tetrachloride	Liver		1.E-02		1.E-02
			Chloroform		3.E-05		3.E-05	Chloroform	Liver		3.E-01		3.E-01
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood		1.E+00		1.E+00
			Dichlorodifluoromethane					Dichlorodifluoromethane	Liver		4.E-01		4.E-01
			Methylene Chloride		1.E-06		1.E-06	Methylene Chloride	Liver		3.E-04		3.E-04
			Naphthalene					Naphthalene	Nasal		6.E-03		6.E-03
			Tetrachloroethene		4.E-06		4.E-06	Tetrachloroethene	Liver		2.E-02		2.E-02
			Toluene					Toluene	Kidney, Liver, CNS		5.E-03		5.E-03
			Total 1,2-Dichloroethene					Total 1,2-Dichloroethene	Blood, Liver				
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver		9.E-03		9.E-03
			Trichloroethene		5.E-04		5.E-04	Trichloroethene	CNS		5.E+00		5.E+00
			Vinyl Chloride		9.E-07		9.E-07	Vinyl Chloride	Liver		1.E-02		1.E-02
			Total Risk Across Groundwater	1.E-02	1.E-02	1.E-03	2.E-02	Total Hazard Index Across Groundwater		8.E+01	6.E+01	6.E+00	1.E+02
			Total Risk Across Indoor Air		5.E-04		5.E-04	Total Hazard Index Across Indoor Air			7.E+00		7.E+00

Target Organ Analysis

Total Liver HI =	5.E+01	Total CNS HI =	4.E+01
Total Kidney HI =	7.E-01	Total Blood HI =	5.E+01
Total Nasal HI =	1.E-02	Total Prostate HI =	4.E-02
Total Skin HI =	5.E+00	Total Gastrointestinal HI =	2.E+00
Total CVS HI =	5.E+00	Total Respiratory HI =	2.E+00
Total Body Weight HI =	2.E+00		

TABLE 9.5. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Blood	2.E-02		7.E-03	3.E-02
			Iron					Iron	Gastrointestinal	1.E-02		7.E-04	1.E-02
			Manganese					Manganese	CNS	1.E-02		1.E-02	2.E-02
			Total Risk Across Surface Water					Total Hazard Index Across Water					6.E-02
Sediment	Sediment	Sediment	Total Risk Across Sediment					Total Hazard Index Across Sediment					
			Total Risk Across Surface Water and Sediment					Total Hazard Index Across Surface Water and Sediment					6.E-02

	Target Organ Analysis
Total Blood HI =	3.E-02
Total Gastrointestinal HI =	1.E-02
Total CNS HI =	2.E-02

TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - TOTAL RESIDENTIAL ILCRS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child + Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	2.E-10			2.E-10	METHYLENE CHLORIDE	Liver				
			TRICHLOROETHENE	7.E-06	1.E-06		1.E-06	TRICHLOROETHENE	CNS				
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood				
			BENZO(A)ANTHRACENE	1.E-06		5.E-07	2.E-06	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	8.E-06		3.E-06	1.E-05	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	1.E-06		5.E-07	2.E-06	BENZO(B)FLUORANTHENE					
			CARBAZOLE	1.E-08		6.E-09	2.E-08	CARBAZOLE					
			CHRYSENE	1.E-08		4.E-09	1.E-08	CHRYSENE					
			DIBENZO(A,H)ANTHRACENE	1.E-06		6.E-07	2.E-06	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1248	2.E-06		8.E-07	3.E-06	AROCLOR-1248					
			AROCLOR-1254	3.E-06		1.E-06	4.E-06	AROCLOR-1254	Immunological				
			AROCLOR-1260	1.E-06		5.E-07	2.E-06	AROCLOR-1260					
			ALPHA-BHC	7.E-09		2.E-09	9.E-09	ALPHA-BHC					
			BETA-BHC	3.E-09		8.E-10	3.E-09	BETA-BHC					
			GAMMA-BHC (LINDANE)	2.E-09		2.E-10	2.E-09	GAMMA-BHC (LINDANE)	Kidney, Liver				
			ALUMINUM					ALUMINUM	Body Weight				
			ANTIMONY					ANTIMONY	Blood				
			ARSENIC	1.E-05		1.E-06	1.E-05	ARSENIC	Skin, CVS				
			BARIUM					BARIUM	Kidney				
			CADMIUM					CADMIUM	Kidney				
			CHROMIUM		3.E-07		3.E-07	CHROMIUM	Fetotoxicity/GS/Bone				
			COBALT					COBALT	NA				
			COPPER					COPPER	Gastrointestinal				
			LEAD					LEAD					
			MANGANESE					MANGANESE	CNS				
			MERCURY					MERCURY	CNS				
			NICKEL					NICKEL	Body Weight				
			ZINC					ZINC	Blood				
			Total Risk Across Surface Soil				4.E-05						

TABLE 9.8. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - TOTAL RESIDENTIAL ILCRS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child + Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap	1,1,2,2-Tetrachloroethane	4.E-04	4.E-04	4.E-05	9.E-04	1,1,2,2-Tetrachloroethane	Liver				
			1,1,2-Trichloroethane	8.E-05	8.E-05	5.E-06	2.E-04	1,1,2-Trichloroethane	Liver				
			1,1-Dichloroethene					1,1-Dichloroethene	Liver				
			1,2-Dichloroethane	2.E-05	2.E-05	6.E-07	4.E-05	1,2-Dichloroethane	NA				
			1,2-Dichloropropane	2.E-06	2.E-06	1.E-07	4.E-06	1,2-Dichloropropane	Nasal				
			Benzene	3.E-05	3.E-05	3.E-06	6.E-05	Benzene	Blood				
			Bromodichloromethane	4.E-06	4.E-06	2.E-07	8.E-06	Bromodichloromethane	Kidney				
			Carbon Tetrachloride	1.E-04	1.E-04	2.E-05	3.E-04	Carbon Tetrachloride	Liver				
			Chloroform					Chloroform	Liver				
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood				
			Dichlorodifluoromethane					Dichlorodifluoromethane	Liver				
			Methylene Chloride	2.E-06	2.E-06	5.E-08	4.E-06	Methylene Chloride	Liver				
			Naphthalene					Naphthalene	Nasal				
			Tetrachloroethene	3.E-03	3.E-03	1.E-03	6.E-03	Tetrachloroethene	Liver				
			Toluene					Toluene	Kidney, Liver, CNS				
			Total 1,2-Dichloroethene					Total 1,2-Dichloroethene	Blood, Liver				
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver				
			Trichloroethene	3.E-02	3.E-02	3.E-03	5.E-02	Trichloroethene	CNS				
			Vinyl Chloride	3.E-04	3.E-04	1.E-05	6.E-04	Vinyl Chloride	Liver				
			Bis(2-Ethylhexyl)phthalate	1.E-05		1.E-05	2.E-05	Bis(2-Ethylhexyl)phthalate	Liver				
			RDX	3.E-06		2.E-08	3.E-06	RDX	Prostate				
			Antimony					Antimony	Blood				
			Arsenic	5.E-04		1.E-06	5.E-04	Arsenic	Skin, CVS				
			Barium					Barium	Kidney				
			Beryllium					Beryllium	GS, Respiratory				
			Cobalt					Cobalt	NA				
			Manganese					Manganese	CNS				
			Nickel					Nickel	Body Weight				
			Chloride					Chloride					
			Sulfate					Sulfate					

TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - TOTAL RESIDENTIAL ILCRS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child + Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Indoor Air	1,1,2,2-Tetrachloroethane		9.E-06		9.E-06	1,1,2,2-Tetrachloroethane	Liver				
			1,1,2-Trichloroethane		3.E-06		3.E-06	1,1,2-Trichloroethane	Liver				
			1,1-Dichloroethene					1,1-Dichloroethene	Liver				
			1,2-Dichloroethane		9.E-07		9.E-07	1,2-Dichloroethane	NA				
			1,2-Dichloropropane		1.E-07		1.E-07	1,2-Dichloropropane	Nasal				
			Benzene		1.E-06		1.E-06	Benzene	Blood				
			Bromodichloromethane		2.E-07		2.E-07	Bromodichloromethane	Kidney				
			Carbon Tetrachloride		7.E-06		7.E-06	Carbon Tetrachloride	Liver				
			Chloroform		6.E-05		6.E-05	Chloroform	Liver				
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood				
			Dichlorodifluoromethane					Dichlorodifluoromethane	Liver				
			Methylene Chloride		3.E-08		3.E-08	Methylene Chloride	Liver				
			Naphthalene					Naphthalene	Nasal				
			Tetrachloroethene		8.E-06		8.E-06	Tetrachloroethene	Liver				
			Toluene					Toluene	Kidney, Liver, CNS				
			Total 1,2-Dichloroethene					Total 1,2-Dichloroethene	Blood, Liver				
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver				
			Trichloroethene		1.E-03		1.E-03	Trichloroethene	CNS				
			Vinyl Chloride		1.E-06		1.E-06	Vinyl Chloride	Liver				
Total Risk Across Groundwater				3.E-02	3.E-02	4.E-03	6.E-02	Total Hazard Index Across Groundwater					
Total Risk Across Indoor Air					1.E-03		1.E-03	Total Hazard Index Across Indoor Air					

TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - TOTAL RESIDENTIAL ILCRS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child + Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Blood				
			Iron					Iron	Gastrointestinal				
			Manganese					Manganese	CNS				
				Total Risk Across Surface Water									
Sediment	Sediment	Sediment		Total Risk Across Sediment									
			Total Risk Across Surface Water and Sediment										

TABLE 9.1a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION/EXCAVATION WORKERS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	6.E-13			6.E-13	METHYLENE CHLORIDE	Liver	9.E-08			9.E-08
			TRICHLOROETHENE	2.E-10	1.E-09		2.E-09	TRICHLOROETHENE	CNS	2.E-06	6.E-05		8.E-05
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	1.E-06			1.E-06
			BENZO(A)ANTHRACENE	4.E-09		5.E-10	5.E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	3.E-08		4.E-09	3.E-08	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	4.E-09		6.E-10	5.E-09	BENZO(B)FLUORANTHENE					
			CARBAZOLE	5.E-11		6.E-12	6.E-11	CARBAZOLE					
			CHRYSENE	4.E-11		5.E-12	4.E-11	CHRYSENE					
			DIBENZO(A,H)ANTHRACENE	5.E-09		7.E-10	6.E-09	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1248	6.E-09		9.E-10	7.E-09	AROCLOR-1248					
			AROCLOR-1254	1.E-08		1.E-09	1.E-08	AROCLOR-1254	Immunological	2.E-02		2.E-03	2.E-02
			AROCLOR-1260	4.E-09		5.E-10	4.E-09	AROCLOR-1260					
			ALPHA-BHC	2.E-11		2.E-12	3.E-11	ALPHA-BHC					
			BETA-BHC	9.E-12		9.E-13	1.E-11	BETA-BHC					
			GAMMA-BHC (LINDANE)	6.E-12		3.E-13	7.E-12	GAMMA-BHC (LINDANE)	Kidney, Liver	1.E-06		4.E-08	1.E-06
			ALUMINUM					ALUMINUM	Body Weight	6.E-03			6.E-03
			ANTIMONY					ANTIMONY	Blood	3.E-02			3.E-02
			ARSENIC	4.E-08		1.E-09	4.E-08	ARSENIC	Skin, CVS	7.E-03		2.E-04	7.E-03
			BARIUM					BARIUM	Kidney	1.E-04			1.E-04
			CADMIUM					CADMIUM	Kidney	1.E-02		2.E-04	1.E-02
			CHROMIUM		3.E-07		3.E-07	CHROMIUM	Fetotoxicity/GS/Bone	7.E-03	2.E-02		3.E-02
			COBALT					COBALT	NA	8.E-05			8.E-05
			COPPER					COPPER	Gastrointestinal	5.E-03			5.E-03
			LEAD					LEAD					
			MANGANESE					MANGANESE	CNS	6.E-04			6.E-04
			MERCURY					MERCURY	CNS	6.E-04			6.E-04
			NICKEL					NICKEL	Body Weight	2.E-03			2.E-03
			ZINC					ZINC	Blood	7.E-04			7.E-04
			Total Risk Across Surface Soil				5.E-07		Total Hazard Index Across Surface Soil				1.E-01

Target Organ Analysis-Surface Soil

Total Liver HI =	1.E-06	Total CNS HI =	1.E-03
Total Kidney HI =	1.E-02	Total Blood HI =	3.E-02
Total CVS HI =	7.E-03	Total Body Weight HI =	8.E-03
Total Immune System HI =	2.E-02	Total Hair HI =	2.E-02
Total Skin HI =	7.E-03	Total Bone HI =	3.E-02
Total Gastrointestinal System HI =	3.E-02		
Total Fetotoxicity HI =	3.E-02		

TABLE 9.1a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION/EXCAVATION WORKERS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	1,1,2,2-TETRACHLOROETHANE	2.E-10			2.E-10	1,1,2,2-TETRACHLOROETHAN	Liver	1.E-06			1.E-06
			1,1,2-TRICHLOROETHANE	9.E-11			9.E-11	1,1,2-TRICHLOROETHANE	Liver	3.E-05			3.E-05
			1,2-DICHLOROPROPANE	2.E-12			2.E-12	1,2-DICHLOROPROPANE					
			ACETONE					ACETONE	Kidney	4.E-07			4.E-07
			BENZENE	6.E-13			6.E-13	BENZENE	Blood	2.E-07			2.E-07
			BROMODICHLOROMETHANE					BROMODICHLOROMETHANE					
			CARBON TETRACHLORIDE	4.E-09	3.E-08		3.E-08	CARBON TETRACHLORIDE	Liver	3.E-03	7.E-04		3.E-03
			CHLOROFORM					CHLOROFORM	Liver	4.E-04			4.E-04
			CHLOROMETHANE					CHLOROMETHANE	Neurological				
			METHYLENE CHLORIDE	6.E-13			6.E-13	METHYLENE CHLORIDE	Liver	9.E-08			9.E-08
			TETRACHLOROETHENE	2.E-10			2.E-10	TETRACHLOROETHENE	Liver	2.E-06			2.E-06
			TRICHLOROETHENE	7.E-08	4.E-07		4.E-07	TRICHLOROETHENE	CNS	7.E-04	2.E-02		2.E-02
			VINYL CHLORIDE	2.E-11			2.E-11	VINYL CHLORIDE	Liver	6.E-07			6.E-07
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	5.E-05			5.E-05
			2,4-DINITROTOLUENE					2,4-DINITROTOLUENE	CNS, Liver	1.E-04		1.E-05	1.E-04
			2,4,6-TRINITROTOLUENE	6.E-11		2.E-12		2,4,6-TRINITROTOLUENE	Liver	3.E-04		9.E-06	3.E-04
			PENTACHLOROPHENOL	4.E-10		1.E-10	5.E-10	PENTACHLOROPHENOL	Liver, Kidney	5.E-06		1.E-06	6.E-06
			ALUMINUM					ALUMINUM	Body Weight	9.E-03			9.E-03
			ARSENIC	4.E-08		1.E-09	4.E-08	ARSENIC	Skin, CVS	7.E-03		2.E-04	7.E-03
			BARIUM					BARIUM	Kidney	1.E-04			1.E-04
			CADMIUM					CADMIUM	Kidney	4.E-04		9.E-06	4.E-04
			CHROMIUM					CHROMIUM	Fetotoxicity/GS/Bone	4.E-03			4.E-03
			COBALT					COBALT	NA	6.E-05			6.E-05
			NICKEL					NICKEL	Body Weight	1.E-04			1.E-04
			VANADIUM					VANADIUM	Hair Loss	2.E-02			2.E-02
			ZINC					ZINC	Blood	5.E-05			5.E-05
			CYANIDE					CYANIDE	Weight Loss, Thyroid	1.E-04		1.E-05	1.E-04
			Total Risk Across Subsurface Soil				5.E-07	*Total Hazard Index Across Subsurface Soil*					8.E-02

Target Organ Analysis - Subsurface Soil

Total Liver HI =	4.E-03	Total CNS HI =	2.E-02
Total Kidney HI =	5.E-04	Total Blood HI =	1.E-04
Total CVS HI =	9.E-03	Total Body Weight HI =	9.E-03
Total Skin HI =	7.E-03	Total Hair HI =	2.E-02
Total Gastrointestinal System HI =	4.E-03	Total Bone HI =	4.E-03
Total Fetotoxicity HI =	4.E-03	Total Thyroid HI =	1.E-04

TABLE 9.1a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION/EXCAVATION WORKERS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	In a Trench	1,1,2,2-Tetrachloroethane		1.E-07	4.E-08	2.E-07	1,1,2,2-Tetrachloroethane	Liver		8.E-04	2.E-04	1.E-03
			1,1,2-Trichloroethane		3.E-08	6.E-09	4.E-08	1,1,2-Trichloroethane	Liver		1.E-02	2.E-03	1.E-02
			1,1-Dichloroethene					1,1-Dichloroethene	Liver		1.E-04	3.E-05	1.E-04
			1,2-Dichloroethane		9.E-09	8.E-10	1.E-08	1,2-Dichloroethane	NA		1.E-05	3.E-05	4.E-05
			1,2-Dichloropropane		9.E-10	2.E-10	1.E-09	1,2-Dichloropropane	Nasal		8.E-04		8.E-04
			Benzene		8.E-09	4.E-09	1.E-08	Benzene	Blood		2.E-03	5.E-04	3.E-03
			Bromodichloromethane		1.E-09	2.E-10	2.E-09	Bromodichloromethane	Kidney		8.E-05	1.E-05	9.E-05
			Carbon Tetrachloride		2.E-08	3.E-08	5.E-08	Carbon Tetrachloride	Liver		6.E-04	2.E-02	2.E-02
			Chloroform		4.E-07			Chloroform	Liver		3.E-02	6.E-03	3.E-02
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood		1.E-01	2.E-02	2.E-01
			Dichlorodifluoromethane					Dichlorodifluoromethane	Liver		3.E-03	2.E-04	3.E-03
			Methylene Chloride		2.E-10	7.E-11	3.E-10	Methylene Chloride	Liver		3.E-05	1.E-05	5.E-05
			Naphthalene					Naphthalene	Nasal		1.E-03	8.E-05	2.E-03
			Tetrachloroethene		4.E-08	1.E-08	1.E-06	Tetrachloroethene	Liver		1.E-03	2.E-02	2.E-02
			Toluene					Toluene	Kidney, Liver, CNS		5.E-04	2.E-04	6.E-04
			Total 1,2-Dichloroethene					Total 1,2-Dichloroethene	Blood, Liver			9.E-03	9.E-03
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver		7.E-04	1.E-04	8.E-04
			Trichloroethene		6.E-06	3.E-06	9.E-06	Trichloroethene	CNS		3.E-01	4.E-02	4.E-01
			Vinyl Chloride		3.E-09	1.E-08	1.E-08	Vinyl Chloride	Liver		5.E-04	4.E-04	9.E-04
			Bis(2-Ethylhexyl)phthalate					Bis(2-Ethylhexyl)phthalate	Liver			3.E-03	3.E-03
			RDX					RDX	Prostate			5.E-06	5.E-06
			Antimony					Antimony	Blood			7.E-04	7.E-04
			Arsenic					Arsenic	Skin, CVS			6.E-04	6.E-04
			Barium					Barium	Kidney			1.E-03	1.E-03
			Beryllium					Beryllium	GS, Respiratory			2.E-02	2.E-02
			Cobalt					Cobalt	NA			4.E-04	4.E-04
			Manganese					Manganese	CNS			4.E-02	4.E-02
			Nickel					Nickel	Body Weight			1.E-03	1.E-03
			Chloride					Chloride					
			Sulfate					Sulfate					
			Total Risk Across Groundwater		7.E-06	5.E-06	1.E-05	Total Hazard Index Across Groundwater			5.E-01	2.E-01	7.E-01

Target Organ Analysis

Total Liver HI =	1.E-01
Total Kidney HI =	2.E-03
Total Nasal HI =	8.E-04
Total Skin HI =	6.E-04
Total CVS HI =	6.E-04
Total Body Weight HI =	1.E-03

Total CNS HI =	4.E-01
Total Blood HI =	2.E-01
Total Prostate HI =	5.E-06
Total Gastrointestinal HI =	2.E-02
Total Respiratory HI =	2.E-02

TABLE 9.2a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - OCCUPATIONAL WORKERS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	6.E-12			6.E-12	METHYLENE CHLORIDE	Liver	1.E-07			1.E-07
			TRICHLOROETHENE	2.E-09	1.E-07		1.E-07	TRICHLOROETHENE	CNS	3.E-06	9.E-04		9.E-04
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	1.E-06			1.E-06
			BENZO(A)ANTHRACENE	4.E-08		7.E-09	5.E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	3.E-07		5.E-08	3.E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	4.E-08		8.E-09	5.E-08	BENZO(B)FLUORANTHENE					
			CARBAZOLE	5.E-10		9.E-11	6.E-10	CARBAZOLE					
			CHRYSENE	4.E-10		6.E-11	4.E-10	CHRYSENE					
			DIBENZO(A,H)ANTHRACENE	5.E-08		9.E-09	6.E-08	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1248	6.E-08		1.E-08	7.E-08	AROCLOR-1248					
			AROCLOR-1254	1.E-07		2.E-08	1.E-07	AROCLOR-1254	Immunological	2.E-02		3.E-03	2.E-02
			AROCLOR-1260	4.E-08		7.E-09	5.E-08	AROCLOR-1260					
			ALPHA-BHC	2.E-10		3.E-11	3.E-10	ALPHA-BHC					
			BETA-BHC	9.E-11		1.E-11	1.E-10	BETA-BHC					
			GAMMA-BHC (LINDANE)	6.E-11		3.E-12	7.E-11	GAMMA-BHC (LINDANE)	Kidney, Liver	1.E-06		7.E-08	1.E-05
			ALUMINUM					ALUMINUM	Body Weight	7.E-03			7.E-03
			ANTIMONY					ANTIMONY	Blood	3.E-02			3.E-02
			ARSENIC	4.E-07		2.E-08	4.E-07	ARSENIC	Skin, CVS	7.E-03		3.E-04	8.E-03
			BARIUM					BARIUM	Kidney	1.E-04			1.E-04
			CADMIUM					CADMIUM	Kidney	1.E-02		3.E-04	1.E-02
			CHROMIUM		3.E-08		3.E-08	CHROMIUM	Fetotoxicity/GS/Bone	7.E-03	2.E-04		7.E-03
			COBALT					COBALT	NA	9.E-05			9.E-05
			COPPER					COPPER	Gastrointestinal	6.E-03			6.E-03
			LEAD					LEAD					
			MANGANESE					MANGANESE	CNS	7.E-04			7.E-04
			MERCURY					MERCURY	CNS	7.E-04			7.E-04
			NICKEL					NICKEL	Body Weight	2.E-03			2.E-03
			ZINC					ZINC	Blood	8.E-04			8.E-04
			Total Risk Across Surface Soil				1.E-06	Total Hazard Index Across Surface Soil					1.E-01

Target Organ Analysis-Surface Soil

Total Liver HI =	1.E-06	Total CNS HI =	2.E-03
Total Kidney HI =	1.E-02	Total Blood HI =	3.E-02
Total CVS HI =	8.E-03	Total Body Weight HI =	8.E-03
Total Immune System HI =	2.E-02	Total Hair HI =	2.E-02
Total Skin HI =	8.E-03	Total Bone HI =	7.E-03
Total Gastrointestinal System HI =	1.E-02		
Total Fetotoxicity HI =	7.E-03		

TABLE 9.2a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - OCCUPATIONAL WORKERS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Indoor Air	1,1,2,2-Tetrachloroethane		3.E-09		3.E-09	1,1,2,2-Tetrachloroethane	Liver		2.E-06		2.E-06
			1,1,2-Trichloroethane		1.E-09		1.E-09	1,1,2-Trichloroethane	Liver		5.E-05		5.E-05
			1,1-Dichloroethene					1,1-Dichloroethene	Liver		1.E-05		1.E-05
			1,2-Dichloroethane		4.E-10		4.E-10	1,2-Dichloroethane	NA		5.E-08		
			1,2-Dichloropropane		1.E-10		1.E-10	1,2-Dichloropropane	Nasal		1.E-05		1.E-05
			Benzene		2.E-09		2.E-09	Benzene	Blood		5.E-05		5.E-05
			Bromodichloromethane		1.E-10		1.E-10	Bromodichloromethane	Kidney		7.E-07		7.E-07
			Carbon Tetrachloride		3.E-08		3.E-08	Carbon Tetrachloride	Liver		9.E-05		9.E-05
			Chloroform		7.E-08		7.E-08	Chloroform	Liver		5.E-04		5.E-04
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood		3.E-03		3.E-03
			Dichlorodifluoromethane					Dichlorodifluoromethane	Liver		4.E-03		4.E-03
			Methylene Chloride		2.E-11		2.E-11	Methylene Chloride	Liver		4.E-07		4.E-07
			Naphthalene					Naphthalene	Nasal		3.E-06		3.E-06
			Tetrachloroethene		3.E-08		3.E-08	Tetrachloroethene	Liver		8.E-05		8.E-05
			Toluene					Toluene	Kidney, Liver, CNS		1.E-05		1.E-05
			Total 1,2-Dichloroethene					Total 1,2-Dichloroethene	Blood, Liver				
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver		3.E-05		3.E-05
			Trichloroethene		3.E-06		3.E-06	Trichloroethene	CNS		2.E-02		2.E-02
			Vinyl Chloride		3.E-09		3.E-09	Vinyl Chloride	Liver		6.E-05		6.E-05
			Total Risk Across Indoor Air		3.E-06		3.E-06	Total Hazard Index Across Indoor Air			2.E-02		2.E-02

Target Organ Analysis

Total Liver HI =	5.E-03
Total Kidney HI =	1.E-05
Total Nasal HI =	1.E-05
Total CNS HI =	2.E-02
Total Blood HI =	3.E-03

TABLE 9.3a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ASOLESCENT TRESPASSERS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Receptor Population: Trespassers
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	7.E-13			7.E-13	METHYLENE CHLORIDE	Liver	2.E-08			2.E-08
			TRICHLOROETHENE	3.E-10	2.E-09		2.E-09	TRICHLOROETHENE	CNS	6.E-07	1.E-05		1.E-05
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	2.E-07			2.E-07
			BENZO(A)ANTHRACENE	5.E-09		2.E-09	6.E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	4.E-08		1.E-08	5.E-08	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	5.E-09		2.E-09	7.E-09	BENZO(B)FLUORANTHENE					
			CARBAZOLE	6.E-11		2.E-11	8.E-11	CARBAZOLE					
			CHRYSENE	4.E-11		1.E-11	6.E-11	CHRYSENE					
			DIBENZO(A,H)ANTHRACENE	6.E-09		2.E-09	8.E-09	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1248	7.E-09		3.E-09	1.E-08	AROCLOR-1248					
			AROCLOR-1254	1.E-08		4.E-09	2.E-08	AROCLOR-1254	Immunological	4.E-03		1.E-03	5.E-03
			AROCLOR-1260	5.E-09		2.E-09	6.E-09	AROCLOR-1260					
			ALPHA-BHC	3.E-11		7.E-12	3.E-11	ALPHA-BHC					
			BETA-BHC	1.E-11		3.E-12	1.E-11	BETA-BHC					
			GAMMA-BHC (LINDANE)	7.E-12		8.E-13	8.E-12	GAMMA-BHC (LINDANE)	Kidney, Liver	3.E-07		3.E-08	3.E-07
			ALUMINUM					ALUMINUM	Body Weight	1.E-03			1.E-03
			ANTIMONY					ANTIMONY	Blood	7.E-03			7.E-03
			ARSENIC	5.E-08		4.E-09	5.E-08	ARSENIC	Skin, CVS	2.E-03		1.E-04	2.E-03
			BARIUM					BARIUM	Kidney	3.E-05			3.E-05
			CADMIUM					CADMIUM	Kidney	2.E-03		1.E-04	2.E-03
			CHROMIUM		5.E-10		5.E-10	CHROMIUM	Fetotoxicity/GS/Bone	2.E-03	3.E-06		2.E-03
			COBALT					COBALT	NA	2.E-05			2.E-05
			COPPER					COPPER	Gastrointestinal	1.E-03			1.E-03
			LEAD					LEAD					
			MANGANESE					MANGANESE	CNS	1.E-04			1.E-04
			MERCURY					MERCURY	CNS	1.E-04			1.E-04
			NICKEL					NICKEL	Body Weight	4.E-04			4.E-04
			ZINC					ZINC	Blood	2.E-04			2.E-04
			Total Risk Across Surface Soil				2.E-07		Total Hazard Index Across Surface Soil				2.E-02

Target Organ Analysis

Total Liver HI =	3.E-07
Total Kidney HI =	2.E-03
Total CVS HI =	2.E-03
Total Immune System HI =	5.E-03
Total Skin HI =	2.E-03
Total Gastrointestinal System HI =	3.E-03
Total Fetotoxicity HI =	2.E-03

Total CNS HI =	3.E-04
Total Blood HI =	7.E-03
Total Body Weight HI =	2.E-03
Total Bone HI =	2.E-03

TABLE 9.3a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ASOLESCENT TRESPASSERS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Receptor Population: Trespassers
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Blood	3.E-04		5.E-04	8.E-04
			Iron					Iron	Gastrointestinal	2.E-04		5.E-05	2.E-04
			Manganese					Manganese	CNS	1.E-04		1.E-03	1.E-03
			Total Risk Across Surface Water					Total Hazard Index Across Water					2.E-03
Sediment	Sediment	Sediment	Total Risk Across Sediment					Total Hazard Index Across Sediment					
			Total Risk Across Surface Water and Sediment					Total Hazard Index Across Surface Water and Sediment					2.E-03

Target Organ Analysis	
Total Blood HI =	8.E-04
Total Gastrointestinal HI =	2.E-04
Total CNS HI =	1.E-03

TABLE 9.4a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	5.E-12			5.E-12	METHYLENE CHLORIDE	Liver	1.E-07			1.E-07
			TRICHLOROETHENE	2.E-09	1.E-07		1.E-07	TRICHLOROETHENE	CNS	3.E-06	1.E-03		1.E-03
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	1.E-06			1.E-06
			BENZO(A)ANTHRACENE	3.E-08		5.E-09	4.E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.E-07		4.E-08	3.E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	4.E-06		5.E-09	4.E-08	BENZO(B)FLUORANTHENE					
			CARBAZOLE	4.E-10		6.E-11	5.E-10	CARBAZOLE					
			CHRYSENE	3.E-10		5.E-11	3.E-10	CHRYSENE					
			DIBENZO(A,H)ANTHRACENE	4.E-08		6.E-09	5.E-08	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1248	5.E-08		8.E-09	6.E-08	AROCLOR-1248					
			AROCLOR-1254	8.E-08		1.E-08	9.E-08	AROCLOR-1254	Immunological	2.E-02		3.E-03	2.E-02
			AROCLOR-1260	3.E-08		5.E-09	4.E-08	AROCLOR-1260					
			ALPHA-BHC	2.E-10		2.E-11	2.E-10	ALPHA-BHC					
			BETA-BHC	7.E-11		8.E-12	8.E-11	BETA-BHC					
			GAMMA-BHC (LINDANE)	5.E-11		2.E-12	5.E-11	GAMMA-BHC (LINDANE)	Kidney, Liver	1.E-06		6.E-08	1.E-06
			ALUMINUM					ALUMINUM	Body Weight	7.E-03			7.E-03
			ANTIMONY					ANTIMONY	Blood	4.E-02			4.E-02
			ARSENIC	4.E-07		1.E-08	4.E-07	ARSENIC	Skin, CVS	8.E-03		3.E-04	8.E-03
			BARIUM					BARIUM	Kidney	2.E-04			2.E-04
			CADMIUM					CADMIUM	Kidney	1.E-02		3.E-04	1.E-02
			CHROMIUM		3.E-08		3.E-08	CHROMIUM	Fetotoxicity/GS/Bone	8.E-03	2.E-04		8.E-03
			COBALT					COBALT	NA	1.E-04			1.E-04
			COPPER					COPPER	Gastrointestinal	6.E-03			6.E-03
			LEAD					LEAD					
			MANGANESE					MANGANESE	CNS	7.E-04			7.E-04
			MERCURY					MERCURY	CNS	7.E-04			7.E-04
			NICKEL					NICKEL	Body Weight	2.E-03			2.E-03
			ZINC					ZINC	Blood	8.E-04			8.E-04
			Total Risk Across Surface Soil				1.E-06	Total Hazard Index Across Surface Soil					1.E-01

Target Organ Analysis-Surface Soil

Total Liver HI =	1.E-06	Total CNS HI =	2.E-03
Total Kidney HI =	1.E-02	Total Blood HI =	4.E-02
Total CVS HI =	8.E-03	Total Body Weight HI =	9.E-03
Total Immune System HI =	2.E-02	Total Hair HI =	2.E-02
Total Skin HI =	8.E-03	Total Bone HI =	8.E-03
Total Gastrointestinal System HI =	1.E-02		
Total Fetotoxicity HI =	8.E-03		

TABLE 9.4a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap	1,1,2,2-Tetrachloroethane	4.E-05	4.E-05	4.E-06	8.E-05	1,1,2,2-Tetrachloroethane	Liver	3.E-02	3.E-02	4.E-03	6.E-02
			1,1,2-Trichloroethane	7.E-06	7.E-06	6.E-07	1.E-05	1,1,2-Trichloroethane	Liver	3.E-01	3.E-01	3.E-02	6.E-01
			1,1-Dichloroethene					1,1-Dichloroethene	Liver	3.E-03	3.E-03	4.E-04	6.E-03
			1,2-Dichloroethane	2.E-06	2.E-06	8.E-08	3.E-06	1,2-Dichloroethane	NA	9.E-03	9.E-03	4.E-04	2.E-02
			1,2-Dichloropropane	2.E-07	2.E-07	2.E-08	4.E-07	1,2-Dichloropropane	Nasal				
			Benzene	2.E-06	2.E-06	4.E-07	5.E-06	Benzene	Blood	1.E-01	1.E-01	6.E-03	2.E-01
			Bromodichloromethane	3.E-07	3.E-07	2.E-08	7.E-07	Bromodichloromethane	Kidney	3.E-03	3.E-03	2.E-04	5.E-03
			Carbon Tetrachloride	1.E-05	1.E-05	3.E-06	3.E-05	Carbon Tetrachloride	Liver	1.E+00	1.E+00	3.E-01	3.E+00
			Chloroform					Chloroform	Liver	1.E+00	1.E+00	8.E-02	2.E+00
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	3.E+00	3.E+00	3.E-01	7.E+00
			Dichlorodifluoromethane					Dichlorodifluoromethane	Liver	2.E-02	2.E-02	3.E-03	5.E-02
			Methylene Chloride	2.E-07	2.E-07	6.E-09	4.E-07	Methylene Chloride	Liver	4.E-03	4.E-03	1.E-04	8.E-03
			Naphthalene					Naphthalene	Nasal	2.E-03	2.E-03	1.E-03	5.E-03
			Tetrachloroethene	2.E-04	2.E-04	1.E-04	6.E-04	Tetrachloroethene	Liver	4.E-01	4.E-01	2.E-01	1.E+00
			Toluene					Toluene	Kidney, Liver, CNS	6.E-03	6.E-03	2.E-03	1.E-02
			Total 1,2-Dichloroethene					Total 1,2-Dichloroethene	Blood, Liver	1.E+00	1.E+00	1.E-01	3.E+00
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver	2.E-02	2.E-02	1.E-03	3.E-02
			Trichloroethene	2.E-03	2.E-03	3.E-04	5.E-03	Trichloroethene	CNS	3.E+00	3.E+00	5.E-01	7.E+00
			Vinyl Chloride	2.E-05	2.E-05	9.E-07	4.E-05	Vinyl Chloride	Liver	9.E-02	9.E-02	4.E-03	2.E-01
			Bis(2-Ethylhexyl)phthalate	1.E-06		1.E-06	2.E-06	Bis(2-Ethylhexyl)phthalate	Liver	3.E-02		5.E-02	6.E-02
			RDX	3.E-07		2.E-09	3.E-07	RDX	Prostate	9.E-03		7.E-05	9.E-03
			Antimony					Antimony	Blood	2.E-01		4.E-03	2.E-01
			Arsenic	4.E-05		1.E-07	4.E-05	Arsenic	Skin, CVS	1.E+00		3.E-03	1.E+00
			Barium					Barium	Kidney	1.E-01		6.E-03	1.E-01
			Beryllium					Beryllium	GS, Respiratory	3.E-01		1.E-01	4.E-01
			Cobalt					Cobalt	NA	6.E-01		2.E-03	6.E-01
			Manganese					Manganese	CNS	3.E+00		2.E-01	3.E+00
			Nickel					Nickel	Body Weight	3.E-01		5.E-03	3.E-01
			Chloride					Chloride					
			Sulfate					Sulfate					

TABLE 9.4a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Indoor Air	1,1,2,2-Tetrachloroethane		1.E-06		1.E-06	1,1,2,2-Tetrachloroethane	Liver		8.E-04		8.E-04
			1,1,2-Trichloroethane		3.E-07		3.E-07	1,1,2-Trichloroethane	Liver		1.E-02		1.E-02
			1,1-Dichloroethene					1,1-Dichloroethene	Liver		4.E-04		4.E-04
			1,2-Dichloroethane		9.E-08		9.E-08	1,2-Dichloroethane	NA		1.E-05		1.E-05
			1,2-Dichloropropane		1.E-08		1.E-08	1,2-Dichloropropane	Nasal		1.E-03		1.E-03
			Benzene		1.E-07		1.E-07	Benzene	Blood		4.E-03		4.E-03
			Bromodichloromethane		2.E-08		2.E-08	Bromodichloromethane	Kidney		1.E-04		1.E-04
			Carbon Tetrachloride		7.E-07		7.E-07	Carbon Tetrachloride	Liver		3.E-03		3.E-03
			Chloroform		6.E-06		6.E-06	Chloroform	Liver		6.E-02		6.E-02
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood		3.E-01		3.E-01
			Dichlorodifluoromethane					Dichlorodifluoromethane	Liver		8.E-02		8.E-02
			Methylene Chloride		3.E-09		3.E-09	Methylene Chloride	Liver		7.E-05		7.E-05
			Naphthalene					Naphthalene	Nasal		1.E-03		1.E-03
			Tetrachloroethene		9.E-07		9.E-07	Tetrachloroethene	Liver		3.E-03		3.E-03
			Toluene					Toluene	Kidney, Liver, CNS		9.E-04		9.E-04
			Total 1,2-Dichloroethene					Total 1,2-Dichloroethene	Blood, Liver				
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver		2.E-03		2.E-03
			Trichloroethene		1.E-04		1.E-04	Trichloroethene	CNS		9.E-01		9.E-01
			Vinyl Chloride		1.E-07		1.E-07	Vinyl Chloride	Liver		2.E-03		2.E-03
			Total Risk Across Groundwater	3.E-03	2.E-03	5.E-04	5.E-03	Total Hazard Index Across Groundwater		2.E+01	1.E+01	2.E+00	3.E+01
			Total Risk Across Indoor Air		1.E-04		1.E-04	Total Hazard Index Across Indoor Air			1.E+00		1.E+00

Target Organ Analysis

Total Liver HI =	1.E+01	Total CNS HI =	6.E+00
Total Kidney HI =	1.E-01	Total Blood HI =	1.E+01
Total Nasal HI =	3.E-03	Total Prostate HI =	9.E-03
Total Skin HI =	1.E+00	Total Gastrointestinal HI =	4.E-01
Total CVS HI =	1.E+00	Total Respiratory HI =	4.E-01
Total Body Weight HI =	3.E-01		

TABLE 9.4a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Blood	5.E-04		2.E-03	3.E-03
			Iron					Iron	Gastrointestinal	4.E-04		2.E-04	6.E-04
			Manganese					Manganese	CNS	3.E-04		4.E-03	4.E-03
			Total Risk Across Surface Water					Total Hazard Index Across Water					7.E-03
Sediment	Sediment	Sediment	Total Risk Across Sediment					Total Hazard Index Across Sediment					
			Total Risk Across Surface Water and Sediment					Total Hazard Index Across Surface Water and Sediment					7.E-03

	Target Organ Analysis
Total Blood HI =	3.E-03
Total Gastrointestinal HI =	6.E-04
Total CNS HI =	4.E-03

TABLE 9.5a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	1.E-11			1.E-11	METHYLENE CHLORIDE	Liver	1.E-06			1.E-06
			TRICHLOROETHENE	5.E-09	1.E-07		1.E-07	TRICHLOROETHENE	CNS	3.E-05	3.E-03		3.E-03
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	1.E-05			1.E-05
			BENZO(A)ANTHRACENE	9.E-08		1.E-08	1.E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	7.E-07		1.E-07	8.E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	1.E-07		1.E-08	1.E-07	BENZO(B)FLUORANTHENE					
			CARBAZOLE	1.E-09		2.E-10	1.E-09	CARBAZOLE					
			CHRYSENE	8.E-10		1.E-10	9.E-10	CHRYSENE					
			DIBENZO(A,H)ANTHRACENE	1.E-07		2.E-08	1.E-07	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1248	1.E-07		2.E-08	2.E-07	AROCLOR-1248					
			AROCLOR-1254	2.E-07		3.E-08	2.E-07	AROCLOR-1254	Immunological	2.E-01		3.E-02	2.E-01
			AROCLOR-1260	9.E-08		1.E-08	1.E-07	AROCLOR-1260					
			ALPHA-BHC	5.E-10		6.E-11	6.E-10	ALPHA-BHC					
			BETA-BHC	2.E-10		2.E-11	2.E-10	BETA-BHC					
			GAMMA-BHC (LINDANE)	1.E-10		6.E-12	1.E-10	GAMMA-BHC (LINDANE)	Kidney, Liver	1.E-05		6.E-07	1.E-05
			ALUMINUM					ALUMINUM	Body Weight	7.E-02			7.E-02
			ANTIMONY					ANTIMONY	Blood	3.E-01			3.E-01
			ARSENIC	1.E-06		3.E-08	1.E-06	ARSENIC	Skin, CVS	7.E-02		2.E-03	8.E-02
			BARIUM					BARIUM	Kidney	1.E-03			1.E-03
			CADMIUM					CADMIUM	Kidney	1.E-01		2.E-03	1.E-01
			CHROMIUM		3.E-06		3.E-08	CHROMIUM	Feotoxicity/GS/Bone	7.E-02	8.E-04		7.E-02
			COBALT					COBALT	NA	9.E-04			9.E-04
			COPPER					COPPER	Gastrointestinal	6.E-02			6.E-02
			LEAD					LEAD					
			MANGANESE					MANGANESE	CNS	7.E-03			7.E-03
			MERCURY					MERCURY	CNS	7.E-03			7.E-03
			NICKEL					NICKEL	Body Weight	2.E-02			2.E-02
			ZINC					ZINC	Blood	8.E-03			8.E-03
				Total Risk Across Surface Soil			3.E-06			Total Hazard Index Across Surface Soil			1.E+00

Target Organ Analysis-Surface Soil

Total Liver HI =	1.E-05	Total CNS HI =	2.E-02
Total Kidney HI =	1.E-01	Total Blood HI =	3.E-01
Total CVS HI =	8.E-02	Total Body Weight HI =	8.E-02
Total Immune System HI =	2.E-01	Total Hair HI =	2.E-01
Total Skin HI =	8.E-02	Total Bone HI =	7.E-02
Total Gastrointestinal System HI =	1.E-01		
Total Feotoxicity HI =	7.E-02		

TABLE 9.5a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap	1,1,2,2-Tetrachloroethane	2.E-05	2.E-05	2.E-06	5.E-05	1,1,2,2-Tetrachloroethane	Liver	7.E-02	7.E-02	6.E-03	1.E-01
			1,1,2-Trichloroethane	4.E-06	4.E-06	3.E-07	9.E-06	1,1,2-Trichloroethane	Liver	7.E-01	7.E-01	5.E-02	1.E+00
			1,1-Dichloroethene					1,1-Dichloroethene	Liver	6.E-03	6.E-03	6.E-04	1.E-02
			1,2-Dichloroethane	1.E-06	1.E-06	4.E-06	2.E-06	1,2-Dichloroethane	NA	2.E-02	2.E-02	7.E-04	4.E-02
			1,2-Dichloropropane	1.E-07	1.E-07	8.E-09	2.E-07	1,2-Dichloropropane	Nasal				
			Benzene	2.E-06	2.E-06	2.E-07	3.E-06	Benzene	Blood	2.E-01	2.E-01	1.E-02	5.E-01
			Bromodichloromethane	2.E-07	2.E-07	1.E-06	4.E-07	Bromodichloromethane	Kidney	6.E-03	6.E-03	3.E-04	1.E-02
			Carbon Tetrachloride	7.E-06	7.E-06	1.E-06	2.E-05	Carbon Tetrachloride	Liver	3.E+00	3.E+00	5.E-01	6.E+00
			Chloroform					Chloroform	Liver	2.E+00	2.E+00	1.E-01	4.E+00
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	7.E+00	7.E+00	5.E-01	1.E+01
			Dichlorodifluoromethane					Dichlorodifluoromethane	Liver	5.E-02	5.E-02	5.E-03	1.E-01
			Methylene Chloride	1.E-07	1.E-07	3.E-09	2.E-07	Methylene Chloride	Liver	9.E-03	9.E-03	2.E-04	2.E-02
			Naphthalene					Naphthalene	Nasal	4.E-03	4.E-03	2.E-03	1.E-02
			Tetrachloroethene	1.E-04	1.E-04	6.E-05	4.E-04	Tetrachloroethene	Liver	9.E-01	9.E-01	4.E-01	2.E+00
			Toluene					Toluene	Kidney, Liver, CNS	1.E-02	1.E-02	4.E-03	3.E-02
			Total 1,2-Dichloroethene					Total 1,2-Dichloroethene	Blood, Liver	3.E+00	3.E+00	2.E-01	6.E+00
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver	4.E-02	4.E-02	2.E-03	7.E-02
			Trichloroethene	1.E-03	1.E-03	2.E-04	3.E-03	Trichloroethene	CNS	7.E+00	7.E+00	9.E-01	2.E+01
			Vinyl Chloride	3.E-05	3.E-05	1.E-06	5.E-05	Vinyl Chloride	Liver	2.E-01	2.E-01	7.E-03	4.E-01
			Bis(2-Ethylhexyl)phthalate	6.E-07		7.E-07	1.E-06	Bis(2-Ethylhexyl)phthalate	Liver	8.E-02		9.E-02	2.E-01
			RDX	2.E-07		1.E-09	2.E-07	RDX	Prostate	2.E-02		1.E-04	2.E-02
			Antimony					Antimony	Blood	4.E-01		7.E-03	4.E-01
			Arsenic	3.E-05		7.E-06	3.E-05	Arsenic	Skin, CVS	2.E+00		5.E-03	2.E+00
			Barium					Barium	Kidney	3.E-01		1.E-02	3.E-01
			Beryllium					Beryllium	GS, Respiratory	6.E-01		2.E-01	8.E-01
			Cobalt					Cobalt	NA	1.E+00		3.E-03	1.E+00
			Manganese					Manganese	CNS	6.E+00		4.E-01	6.E+00
			Nickel					Nickel	Body Weight	7.E-01		9.E-03	7.E-01
			Chloride					Chloride					
			Sulfate					Sulfate					

TABLE 9.5a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Indoor Air	1,1,2,2-Tetrachloroethane		1.E-06		1.E-06	1,1,2,2-Tetrachloroethane	Liver		3.E-03		3.E-03
			1,1,2-Trichloroethane		3.E-07		3.E-07	1,1,2-Trichloroethane	Liver		5.E-02		5.E-02
			1,1-Dichloroethene					1,1-Dichloroethene	Liver		2.E-03		2.E-03
			1,2-Dichloroethane		9.E-06		9.E-06	1,2-Dichloroethane	NA		5.E-05		5.E-05
			1,2-Dichloropropane		1.E-08		1.E-08	1,2-Dichloropropane	Nasal		5.E-03		5.E-03
			Benzene		1.E-07		1.E-07	Benzene	Blood		2.E-02		2.E-02
			Bromodichloromethane		2.E-08		2.E-08	Bromodichloromethane	Kidney		4.E-04		4.E-04
			Carbon Tetrachloride		7.E-07		7.E-07	Carbon Tetrachloride	Liver		1.E-02		1.E-02
			Chloroform		6.E-06		6.E-06	Chloroform	Liver		2.E-01		2.E-01
			cis-1,2-Dichloroethene					*cis-1,2-Dichloroethene*	Blood		9.E-01		9.E-01
			Dichlorodifluoromethane					Dichlorodifluoromethane	Liver		3.E-01		3.E-01
			Methylene Chloride		3.E-09		3.E-09	Methylene Chloride	Liver		2.E-04		2.E-04
			Naphthalene					Naphthalene	Nasal		4.E-03		4.E-03
			Tetrachloroethene		9.E-07		9.E-07	Tetrachloroethene	Liver		1.E-02		1.E-02
			Toluene					Toluene	Kidney, Liver, CNS		3.E-03		3.E-03
			Total 1,2-Dichloroethene					Total 1,2-Dichloroethene	Blood, Liver				
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver		6.E-03		6.E-03
			Trichloroethene		1.E-04		1.E-04	Trichloroethene	CNS		3.E+00		3.E+00
			Vinyl Chloride		2.E-07		2.E-07	Vinyl Chloride	Liver		8.E-03		8.E-03
			Total Risk Across Groundwater	2.E-03	2.E-03	2.E-04	3.E-03	Total Hazard Index Across Groundwater		4.E+01	2.E+01	3.E+00	6.E+01
			Total Risk Across Indoor Air		1.E-04		1.E-04	Total Hazard Index Across Indoor Air			5.E+00		5.E+00

Target Organ Analysis

Total Liver HI =	2.E+01
Total Kidney HI =	3.E-01
Total Nasal HI =	9.E-03
Total Skin HI =	2.E+00
Total CVS HI =	2.E+00
Total Body Weight HI =	7.E-01

Total CNS HI =	2.E+01
Total Blood HI =	2.E+01
Total Prostate HI =	2.E-02
Total Gastrointestinal HI =	8.E-01
Total Respiratory HI =	8.E-01

TABLE 9.5a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Blood	1.E-02		5.E-03	2.E-02
			Iron					Iron	Gastrointestinal	8.E-03		5.E-04	9.E-03
			Manganese					Manganese	CNS	6.E-03		9.E-03	2.E-02
			Total Risk Across Surface Water					Total Hazard Index Across Water					4.E-02
Sediment	Sediment	Sediment	Total Risk Across Sediment					Total Hazard Index Across Sediment					
			Total Risk Across Surface Water and Sediment					Total Hazard Index Across Surface Water and Sediment					4.E-02

Target Organ Analysis	
Total Blood HI =	2.E-02
Total Gastrointestinal HI =	9.E-03
Total CNS HI =	2.E-02

TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - TOTAL RESIDENTIAL ILCRS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child + Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	2.E-11			2.E-11	METHYLENE CHLORIDE	Liver				
			TRICHLOROETHENE	7.E-09	2.E-07		2.E-07	TRICHLOROETHENE	CNS				
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood				
			BENZO(A)ANTHRACENE	1.E-07		2.E-08	1.E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	9.E-07		1.E-07	1.E-06	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	1.E-07		2.E-08	2.E-07	BENZO(B)FLUORANTHENE					
			CARBAZOLE	2.E-09		2.E-10	2.E-09	CARBAZOLE					
			CHRYSENE	1.E-09		2.E-10	1.E-09	CHRYSENE					
			DIBENZO(A,H)ANTHRACENE	2.E-07		2.E-08	2.E-07	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1248	2.E-07		3.E-08	2.E-07	AROCLOR-1248					
			AROCLOR-1254	3.E-07		5.E-08	3.E-07	AROCLOR-1254	Immunological				
			AROCLOR-1260	1.E-07		2.E-08	1.E-07	AROCLOR-1260					
			ALPHA-BHC	7.E-10		8.E-11	8.E-10	ALPHA-BHC					
			BETA-BHC	3.E-10		3.E-11	3.E-10	BETA-BHC					
			GAMMA-BHC (LINDANE)	2.E-10		9.E-12	2.E-10	GAMMA-BHC (LINDANE)	Kidney, Liver				
			ALUMINUM					ALUMINUM	Body Weight				
			ANTIMONY					ANTIMONY	Blood				
			ARSENIC	1.E-06		4.E-08	1.E-06	ARSENIC	Skin, CVS				
			BARIUM					BARIUM	Kidney				
			CADMIUM					CADMIUM	Kidney				
			CHROMIUM		6.E-08		6.E-08	CHROMIUM	Fetotoxicity/GS/Bone				
			COBALT					COBALT	NA				
			COPPER					COPPER	Gastrointestinal				
			LEAD					LEAD					
			MANGANESE					MANGANESE	CNS				
			MERCURY					MERCURY	CNS				
			NICKEL					NICKEL	Body Weight				
			ZINC					ZINC	Blood				
			Total Risk Across Surface Soil				4.E-06						

TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - TOTAL RESIDENTIAL ILCRS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child + Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap	1,1,2,2-Tetrachloroethane	6.E-05	6.E-05	6.E-06	1.E-04	1,1,2,2-Tetrachloroethane	Liver				
			1,1,2-Trichloroethane	1.E-05	1.E-05	9.E-07	2.E-05	1,1,2-Trichloroethane	Liver				
			1,1-Dichloroethene					1,1-Dichloroethene	Liver				
			1,2-Dichloroethane	3.E-06	3.E-06	1.E-07	5.E-06	1,2-Dichloroethane	NA				
			1,2-Dichloropropane	3.E-07	3.E-07	2.E-08	6.E-07	1,2-Dichloropropane	Nasal				
			Benzene	4.E-06	4.E-06	5.E-07	9.E-06	Benzene	Blood				
			Bromodichloromethane	5.E-07	5.E-07	4.E-08	1.E-06	Bromodichloromethane	Kidney				
			Carbon Tetrachloride	2.E-05	2.E-05	4.E-06	4.E-05	Carbon Tetrachloride	Liver				
			Chloroform					Chloroform	Liver				
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood				
			Dichlorodifluoromethane					Dichlorodifluoromethane	Liver				
			Methylene Chloride	3.E-07	3.E-07	1.E-06	6.E-07	Methylene Chloride	Liver				
			Naphthalene					Naphthalene	Nasal				
			Tetrachloroethene	4.E-04	4.E-04	2.E-04	9.E-04	Tetrachloroethene	Liver				
			Toluene					Toluene	Kidney, Liver, CNS				
			Total 1,2-Dichloroethene					Total 1,2-Dichloroethene	Blood, Liver				
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver				
			Trichloroethene	4.E-03	4.E-03	5.E-04	8.E-03	Trichloroethene	CNS				
			Vinyl Chloride	4.E-05	4.E-05	2.E-06	9.E-05	Vinyl Chloride	Liver				
			Bis(2-Ethylhexyl)phthalate	2.E-06		2.E-06	4.E-06	Bis(2-Ethylhexyl)phthalate	Liver				
			RDX	5.E-07		4.E-09	5.E-07	RDX	Prostate				
			Antimony					Antimony	Blood				
			Arsenic	7.E-05		2.E-07	7.E-05	Arsenic	Skin, CVS				
			Barium					Barium	Kidney				
			Beryllium					Beryllium	GS, Respiratory				
			Cobalt					Cobalt	NA				
			Manganese					Manganese	CNS				
			Nickel					Nickel	Body Weight				
			Chloride					Chloride					
			Sulfate					Sulfate					

TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - TOTAL RESIDENTIAL ILCRS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child + Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Indoor Air	1,1,2,2-Tetrachloroethane		2.E-06		2.E-06	1,1,2,2-Tetrachloroethane	Liver				
			1,1,2-Trichloroethane		6.E-07		6.E-07	1,1,2-Trichloroethane	Liver				
			1,1-Dichloroethene					1,1-Dichloroethene	Liver				
			1,2-Dichloroethane		2.E-07		2.E-07	1,2-Dichloroethane	NA				
			1,2-Dichloropropane		2.E-08		2.E-08	1,2-Dichloropropane	Nasal				
			Benzene		2.E-07		2.E-07	Benzene	Blood				
			Bromodichloromethane		3.E-09		3.E-09	Bromodichloromethane	Kidney				
			Carbon Tetrachloride		1.E-06		1.E-06	Carbon Tetrachloride	Liver				
			Chloroform		1.E-05		1.E-05	Chloroform	Liver				
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood				
			Dichlorodifluoromethane					Dichlorodifluoromethane	Liver				
			Methylene Chloride		7.E-09		7.E-09	Methylene Chloride	Liver				
			Naphthalene					Naphthalene	Nasal				
			Tetrachloroethene		2.E-06		2.E-06	Tetrachloroethene	Liver				
			Toluene					Toluene	Kidney, Liver, CNS				
			Total 1,2-Dichloroethene					Total 1,2-Dichloroethene	Blood, Liver				
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver				
			Trichloroethene		2.E-04		2.E-04	Trichloroethene	CNS				
			Vinyl Chloride		3.E-07		3.E-07	Vinyl Chloride	Liver				
Total Risk Across Groundwater				4.E-03	4.E-03	7.E-04	9.E-03	Total Hazard Index Across Groundwater					
Total Risk Across Indoor Air					2.E-04		2.E-04	Total Hazard Index Across Indoor Air					

TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - TOTAL RESIDENTIAL ILCRS
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA
NWS CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child + Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Blood				
			Iron					Iron	Gastrointestinal				
			Manganese					Manganese	CNS				
				Total Risk Across Surface Water									
Sediment	Sediment	Sediment		Total Risk Across Sediment									
			Total Risk Across Surface Water and Sediment										

SWMU 17

INDOOR AIR MODELING

DATA EN[illegible] SHEET

GW-SCREEN
Version 3.0; 04/03

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
71432	3.50E+01	Benzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET - BENZENE - RESIDENTIAL

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	8,122	2.68E-03	1.15E-01	1.75E-04	2.28E-03	2.33E-05	1.47E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	4.03E+03	0.10	8.33E+01	2.28E-03	4.00E+02	#NUM!	5.12E-05	2.07E-01	7.8E-06	3.0E-02

DATA E[illegible] SHEET

GW-SCREEN
Version 3.0; 04/03

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75274	4.00E+00	Bromodichloromethane

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET - BROMODICHLOROMETHANE- RESIDNETIAL

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	8,665	7.35E-04	3.17E-02	1.75E-04	7.80E-04	7.35E-05	3.19E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	1.27E+02	0.10	8.33E+01	7.80E-04	4.00E+02	#NUM!	1.09E-04	1.38E-02	1.8E-05	7.0E-02

DATA ENTRY SHEET

GW-SCREEN
Version 3.0; 04/03

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
56235	6.80E+01	Carbon tetrachloride

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET -CARBON TETRACHLORIDE - RESIDENTIAL

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	7,859	1.50E-02	6.46E-01	1.75E-04	2.01E-03	7.46E-06	4.87E-05

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	4.40E+04	0.10	8.33E+01	2.01E-03	4.00E+02	#NUM!	1.72E-05	7.54E-01	1.5E-05	1.8E-01

DATA ENTRY SHEET

GW-SCREEN
Version 3.0; 04/03

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75718	3.80E+02	Dichlorodifluoromethane

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET - DICHLORODIFLUOROMETNANE- RESIDENTIAL

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	8,386	1.62E-01	6.96E+00	1.75E-04	1.72E-03	4.18E-06	2.75E-05

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	2.64E+06	0.10	8.33E+01	1.72E-03	4.00E+02	#NUM!	9.70E-06	2.56E+01	NA	2.0E-01

DATA ENTRY SHEET

GW-SCREEN
Version 3.0; 04/03

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
67663	7.70E+02	Chloroform

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET - CHLOROFORM - RESIDENTIAL

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	7,554	1.86E-03	8.02E-02	1.75E-04	2.69E-03	3.28E-05	2.04E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	6.17E+04	0.10	8.33E+01	2.69E-03	4.00E+02	#NUM!	7.08E-05	4.37E+00	2.3E-05	4.9E-02

DATA ENTRY SHEET

GW-SCREEN
Version 3.0; 04/03

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156592	2.50E+03	cis-1,2-Dichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET - CIS-1,2-DCE

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	7,734	2.04E-03	8.77E-02	1.75E-04	1.90E-03	3.19E-05	1.94E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	2.19E+05	0.10	8.33E+01	1.90E-03	4.00E+02	#NUM!	6.73E-05	1.48E+01	NA	3.5E-02

DATA ENTRY SHEET

GW-SCREEN
Version 3.0; 04/03

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75092	1.90E+01	Methylene chloride

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET - METHYLENE CHLORIDE - RESIDENTIAL

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^v (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_v (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	7,034	1.16E-03	5.01E-02	1.75E-04	2.62E-03	5.59E-05	3.32E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	9.52E+02	0.10	8.33E+01	2.62E-03	4.00E+02	#NUM!	1.14E-04	1.08E-01	4.7E-07	3.0E+00

DATA ENTRY SHEET

GW-SCREEN
Version 3.0; 04/03

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
91203	3.00E+00	Naphthalene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET - NAPHTHALENE - RESIDENTIAL

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	12,913	1.52E-04	6.54E-03	1.75E-04	1.56E-03	2.49E-04	8.71E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	1.96E+01	0.10	8.33E+01	1.56E-03	4.00E+02	#NUM!	2.82E-04	5.53E-03	NA	3.0E-03

DATA ENTRY SHEET

GW-SCREEN
Version 3.0; 04/03

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184	3.30E+02	Tetrachloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET - TETRACHLOROETHENE - RESIDENTIAL

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	9,553	7.81E-03	3.36E-01	1.75E-04	1.86E-03	9.42E-06	6.10E-05

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	1.11E+05	0.10	8.33E+01	1.86E-03	4.00E+02	#NUM!	2.15E-05	2.38E+00	5.7E-06	4.9E-01

DATA ENTRY SHEET

GW-SCREEN
Version 3.0; 04/03

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79016	1.30E+05	Trichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET - TRICHLOROETHENE - RESIDENTIAL

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	8,557	4.78E-03	2.06E-01	1.75E-04	2.04E-03	1.41E-05	9.03E-05

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	2.67E+07	0.10	8.33E+01	2.04E-03	4.00E+02	#NUM!	3.17E-05	8.47E+02	2.0E-06	6.0E-01

DATA ENTRY SHEET

GW-SCREEN
Version 3.0; 04/03

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
108883	9.80E+01	Toluene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET - TOLUENE - RESIDENTIAL

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	9,154	2.92E-03	1.26E-01	1.75E-04	2.25E-03	1.97E-05	1.25E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	1.23E+04	0.10	8.33E+01	2.25E-03	4.00E+02	#NUM!	4.37E-05	5.39E-01	NA	4.0E-01

DATA ENTRY SHEET

GW-SCREEN
Version 3.0; 04/03

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156605	2.50E+01	trans-1,2-Dichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET - TRANS-1,2-DCE - RESIDENTIAL

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	7,136	4.94E-03	2.13E-01	1.75E-04	1.83E-03	1.61E-05	1.02E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	5.32E+03	0.10	8.33E+01	1.83E-03	4.00E+02	#NUM!	3.58E-05	1.90E-01	NA	7.0E-02

DATA ENTRY SHEET

GW-SCREEN
Version 3.0; 04/03

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75014	2.10E+01	Vinyl chloride (chloroethene)

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET - VINYL CHLORIDE - RESIDENTIAL

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	5,000	1.72E-02	7.41E-01	1.75E-04	2.74E-03	9.73E-06	6.36E-05

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	1.56E+04	0.10	8.33E+01	2.74E-03	4.00E+02	#NUM!	2.24E-05	3.48E-01	8.8E-06	1.0E-01

DATA ENTRY SHEET

GW-SCREEN
Version 3.0; 04/03

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75354	1.10E+01	1,1-Dichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET - 1,1-DCE - RESIDENTIAL

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^v (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_v (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	6,392	1.47E-02	6.33E-01	1.75E-04	2.32E-03	8.76E-06	5.72E-05

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	6.96E+03	0.10	8.33E+01	2.32E-03	4.00E+02	#NUM!	2.01E-05	1.40E-01	NA	2.0E-01

DATA ENTRY SHEET

GW-SCREEN
Version 3.0; 04/03

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
107062	1.40E+01	1,2-Dichloroethane

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET - 1,2-DCA - RESIDENTIAL

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	8,522	4.56E-04	1.96E-02	1.75E-04	2.70E-03	1.14E-04	6.14E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	2.75E+02	0.10	8.33E+01	2.70E-03	4.00E+02	#NUM!	2.04E-04	5.60E-02	2.6E-05	4.9E-03

DATA ENTRY SHEET

GW-SCREEN
Version 3.0; 04/03

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
78875	2.00E+00	*1,2-Dichloropropane*

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC		1.00E-08	SC	1.63	0.385	0.197

Enter either a vadose zone SCS soil type OR a user-defined permeability.

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET - 1,2 -DICHLOROPROPANE - RESIDENTIAL

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.48E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	8,632	1.29E-03	5.56E-02	1.75E-04	2.02E-03	3.82E-05	2.30E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	1.11E+02	0.10	8.33E+01	2.02E-03	4.00E+02	#NUM!	7.95E-05	8.83E-03	1.9E-05	4.0E-03

DATA ENTRY SHEET

GW-SCREEN
Version 3.0; 04/03

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79005	9.30E+01	1,1,2-Trichloroethane

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET - 112-TCA - RESIDENTIAL

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	9,572	3.87E-04	1.67E-02	1.75E-04	2.03E-03	1.18E-04	5.91E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	1.55E+03	0.10	8.33E+01	2.03E-03	4.00E+02	#NUM!	1.97E-04	3.04E-01	1.6E-05	1.4E-02

DATA ENTRY SHEET

GW-SCREEN
Version 3.0; 04/03

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79345	1.40E+02	1,1,2,2-Tetrachloroethane

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET - 1122-TCA - RESIDENTIAL

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	10,540	1.34E-04	5.77E-03	1.75E-04	1.87E-03	2.97E-04	1.04E-03

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	8.08E+02	0.10	8.33E+01	1.87E-03	4.00E+02	#NUM!	3.32E-04	2.68E-01	5.8E-05	2.1E-01

DATA E[illegible]SHEET

GW-SCREEN
Version 3.0; 04/03

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

TOTAL

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156592	1.00E+03	1,2-Dichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET - TOTAL 1,2-DCE - RESIDENTIAL

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	7,734	2.04E-03	8.77E-02	1.75E-04	1.90E-03	3.19E-05	1.94E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	8.77E+04	0.10	8.33E+01	1.90E-03	4.00E+02	#NUM!	6.73E-05	5.90E+00	NA	3.5E-02

DATA E[illegible]HEET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79345	1.40E+02	1,1,2,2-Tetrachloroethane

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	400	400	0	0	A	SC	SC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SC	1.63	0.385	0.197								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	18600	18600	380	0.1	0.72	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

INTERMEDIATE CALCULATIONS SHEET - 1,1,2,2-TCA - INDUSTRIAL

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	200	0.188	ERROR	ERROR	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	74,400

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.63E+07	3.61E+08	2.06E-05	200	10,540	1.34E-04	5.77E-03	1.75E-04	1.87E-03	0.00E+00	0.00E+00	2.97E-04	1.04E-03	200

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	8.08E+02	0.10	1.87E+01	1.87E-03	7.44E+03	6.85E+05	7.06E-07	5.70E-04	5.8E-05	2.1E-01

END

DATA EN[illegible]EET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79005	9.30E+01	1,1,2-Trichloroethane

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	400	400	0	0	A	SC	SC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SC	1.63	0.385	0.197								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	18600	18600	380	0.1	0.72	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

INTERMEDIATE CALCULATIONS SHEET - 1,1,2-TCA - INDUSTRIAL

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	200	0.188	ERROR	ERROR	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	74,400

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.63E+07	3.61E+08	2.06E-05	200	9,572	3.87E-04	1.67E-02	1.75E-04	2.03E-03	0.00E+00	0.00E+00	1.18E-04	5.91E-04	200

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	1.55E+03	0.10	1.87E+01	2.03E-03	7.44E+03	2.45E+05	7.01E-07	1.09E-03	1.6E-05	1.4E-02

END

DATA EN[illegible]HEET

GW-[illegible]
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
107062	1.40E+01	1,2-Dichloroethane

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	400	400	0	0	A	SC	SC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SC	1.63	0.385	0.197								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	18600	18600	380	0.1	0.72	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

INTERMEDIATE CALCULATIONS SHEET - 1,2-DCA - INDUSTRIAL

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	200	0.188	ERROR	ERROR	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	74,400

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.63E+07	3.61E+08	2.06E-05	200	8,522	4.56E-04	1.96E-02	1.75E-04	2.70E-03	0.00E+00	0.00E+00	1.14E-04	6.14E-04	200

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	2.75E+02	0.10	1.87E+01	2.70E-03	7.44E+03	1.12E+04	7.01E-07	1.93E-04	2.6E-05	4.9E-03

END

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75354	1.10E+01	1,1-Dichloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	400	400	0	0	A	SC	SC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SC	1.63	0.385	0.197								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	18600	18600	380	0.1	0.72	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

INTERMEDIATE CALCULATIONS SHEET - 1,1-DCE - INDUSTRIAL

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	200	0.188	ERROR	ERROR	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	74,400

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.63E+07	3.61E+08	2.06E-05	200	6,392	1.47E-02	6.33E-01	1.75E-04	2.32E-03	0.00E+00	0.00E+00	8.76E-06	5.72E-05	200

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	6.96E+03	0.10	1.87E+01	2.32E-03	7.44E+03	5.09E+04	6.03E-07	4.20E-03	NA	2.0E-01

END

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
78875	2.00E+00	1,2-Dichloropropane

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	400	400	0	0	A	SC	SC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SC	1.63	0.385	0.197								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	18600	18600	380	0.1	0.72	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

INTERMEDIATE CALCULATIONS SHEET - 1,2-DICHLOROPROPANE - INDUSTRIAL

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	200	0.188	ERROR	ERROR	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	74,400

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.63E+07	3.61E+08	2.06E-05	200	8,632	1.29E-03	5.56E-02	1.75E-04	2.02E-03	0.00E+00	0.00E+00	3.82E-05	2.30E-04	200

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	1.11E+02	0.10	1.87E+01	2.02E-03	7.44E+03	2.54E+05	6.82E-07	7.58E-05	1.9E-05	4.0E-03

END

DATA EN[illegible]HEET

GW-ABV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
71432	3.50E+01	Benzene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm²)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	400	400	0	0	A	SC	SC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm³)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm³/cm³)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm³)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm³/cm³)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm³)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm³/cm³)
SC	1.63	0.385	0.197								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s²)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	18600	18600	380	0.1	0.72	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

INTERMEDIATE CALCULATIONS SHEET - BENZENE - INDUSTRIAL

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	200	0.188	ERROR	ERROR	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	74.400

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.63E+07	3.61E+08	2.06E-05	200	8,122	2.68E-03	1.15E-01	1.75E-04	2.28E-03	0.00E+00	0.00E+00	2.33E-05	1.47E-04	200

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	4.03E+03	0.10	1.87E+01	2.28E-03	7.44E+03	6.44E+04	6.66E-07	2.69E-03	7.8E-06	3.0E-02

END

GW-ABV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75274	4.00E+00	Bromodichloromethane

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	400	400	0	0	A	SC	SC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SC	1.63	0.385	0.197								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	18600	18600	380	0.1	0.72	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

INTERMEDIATE CALCULATIONS SHEET - BROMODICHLOROMETHANE - INDUSTRIAL

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	200	0.188	ERROR	ERROR	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	74,400

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.63E+07	3.61E+08	2.06E-05	200	8,665	7.35E-04	3.17E-02	1.75E-04	7.80E-04	0.00E+00	0.00E+00	7.35E-05	3.19E-04	200

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	1.27E+02	0.10	1.87E+01	7.80E-04	7.44E+03	1.08E+14	6.90E-07	8.74E-05	1.8E-05	7.0E-02

END

DATA EN[illegible]HEET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
56235	6.80E+01	Carbon tetrachloride

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	400	400	0	0	A	SC	SC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SC	1.63	0.385	0.197								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	18600	18600	380	0.1	0.72	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

INTERMEDIATE CALCULATIONS SHEET - CARBON TETRACHLORIDE - INDUSTRIAL

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	200	0.188	ERROR	ERROR	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	74,400

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.63E+07	3.61E+08	2.06E-05	200	7,859	1.50E-02	6.46E-01	1.75E-04	2.01E-03	0.00E+00	0.00E+00	7.46E-06	4.87E-05	200

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	4.40E+04	0.10	1.87E+01	2.01E-03	7.44E+03	2.70E+05	5.88E-07	2.58E-02	1.5E-05	1.8E-01

END

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
67663	7.70E+02	Chloroform

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	400	400	0	0	A	SC	SC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SC	1.63	0.385	0.197								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	18600	18600	380	0.1	0.72	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

INTERMEDIATE CALCULATIONS SHEET - CHLOROFORM - INDUSTRIAL

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	200	0.188	ERROR	ERROR	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	74,400

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.63E+07	3.61E+08	2.06E-05	200	7,554	1.86E-03	8.02E-02	1.75E-04	2.69E-03	0.00E+00	0.00E+00	3.28E-05	2.04E-04	200

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	6.17E+04	0.10	1.87E+01	2.69E-03	7.44E+03	1.17E+04	6.78E-07	4.19E-02	2.3E-05	4.9E-02

END

DATA EN[illegible]EET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156592	2.50E+03	cis-1,2-Dichloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	400	400	0	0	A	SC	SC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SC	1.63	0.385	0.197								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	18600	18600	380	0.1	0.72	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

INTERMEDIATE CALCULATIONS SHEET - CIS-1,2-DCE - INDUSTRIAL

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	200	0.188	ERROR	ERROR	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	74,400

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.63E+07	3.61E+08	2.06E-05	200	7,734	2.04E-03	8.77E-02	1.75E-04	1.90E-03	0.00E+00	0.00E+00	3.19E-05	1.94E-04	200

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	2.19E+05	0.10	1.87E+01	1.90E-03	7.44E+03	5.56E+05	6.77E-07	1.48E-01	NA	3.5E-02

END

DATA EN[illegible]EET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75718	3.80E+02	Dichlorodifluoromethane

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	400	400	0	0	A	SC	SC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SC	1.63	0.385	0.197								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	18600	18600	380	0.1	0.72	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

INTERMEDIATE CALCULATIONS SHEET - DICHLORODIFLUOROMETHANE - INDUSTRIAL

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	200	0.188	ERROR	ERROR	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	74,400

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.63E+07	3.61E+08	2.06E-05	200	8,386	1.62E-01	6.96E+00	1.75E-04	1.72E-03	0.00E+00	0.00E+00	4.18E-06	2.75E-05	200

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	2.64E+06	0.10	1.87E+01	1.72E-03	7.44E+03	2.35E+06	5.17E-07	1.37E+00	NA	2.0E-01

END

DATA EN[illegible]HEET

GW-[illegible]
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75092	1.90E+01	Methylene chloride

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm²)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	400	400	0	0	A	SC	SC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm³)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm³/cm³)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm³)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm³/cm³)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm³)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm³/cm³)
SC	1.63	0.385	0.197								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s²)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	18600	18600	380	0.1	0.72	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

INTERMEDIATE CALCULATIONS SHEET - METHYLENE CHLORIDE - INDUSTRIAL

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	200	0.188	ERROR	ERROR	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	74,400

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.63E+07	3.61E+08	2.06E-05	200	7,034	1.16E-03	5.01E-02	1.75E-04	2.62E-03	0.00E+00	0.00E+00	5.59E-05	3.32E-04	200

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	9.52E+02	0.10	1.87E+01	2.62E-03	7.44E+03	1.53E+04	6.91E-07	6.58E-04	4.7E-07	3.0E+00

END

DATA ENTRY SHEET

GW-1
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
91203	3.00E+00	Naphthalene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	400	400	0	0	A	SC	SC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SC	1.63	0.385	0.197								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	18600	18600	380	0.1	0.72	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

INTERMEDIATE CALCULATIONS SHEET - NAPHTHALENE - INDUSTRIAL

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	200	0.188	ERROR	ERROR	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	74,400

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.63E+07	3.61E+08	2.06E-05	200	12,913	1.52E-04	6.54E-03	1.75E-04	1.56E-03	0.00E+00	0.00E+00	2.49E-04	8.71E-04	200

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	1.96E+01	0.10	1.87E+01	1.56E-03	7.44E+03	1.05E+07	7.04E-07	1.38E-05	NA	3.0E-03

END

DATA EN[illegible]EET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
108883	9.80E+01	Toluene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	400	400	0	0	A	SC	SC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SC	1.63	0.385	0.197								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s²)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	18600	18600	380	0.1	0.72	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

INTERMEDIATE CALCULATIONS SHEET - TOLUENE - INDUSTRIAL

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	200	0.188	ERROR	ERROR	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	74,400

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.63E+07	3.61E+08	2.06E-05	200	9,154	2.92E-03	1.26E-01	1.75E-04	2.25E-03	0.00E+00	0.00E+00	1.97E-05	1.25E-04	200

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	1.23E+04	0.10	1.87E+01	2.25E-03	7.44E+03	7.33E+04	6.58E-07	8.11E-03	NA	4.0E-01

END

DATA EN[illegible]HEET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156592	1.00E+03	cis-1,2-Dichloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	400	400	0	0	A	SC	SC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SC	1.63	0.385	0.197								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	18600	18600	380	0.1	0.72	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

DATA ENTRY SHEET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184	3.30E+02	Tetrachloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	400	400	0	0	A	SC	SC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SC	1.83	0.365	0.197								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	18600	18600	380	0.1	0.72	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	200	0.188	ERROR	ERROR	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	74,400

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.63E+07	3.61E+08	2.06E-05	200	9,553	7.81E-03	3.36E-01	1.75E-04	1.86E-03	0.00E+00	0.00E+00	9.42E-06	6.10E-05	200

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	1.11E+05	0.10	1.87E+01	1.86E-03	7.44E+03	7.62E+05	6.09E-07	6.76E-02	5.7E-06	4.9E-01

END

INTERMEDIATE CALCULATIONS SHEET - TOTAL 1,2-DCE - INDUSTRIAL

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	200	0.188	ERROR	ERROR	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	74,400

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.63E+07	3.61E+08	2.06E-05	200	7,734	2.04E-03	8.77E-02	1.75E-04	1.90E-03	0.00E+00	0.00E+00	3.19E-05	1.94E-04	200

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	8.77E+04	0.10	1.87E+01	1.90E-03	7.44E+03	5.56E+05	6.77E-07	5.94E-02	NA	3.5E-02

END

DATA EN[illegible]HEET

GW-[illegible]
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156605	2.50E+01	trans-1,2-Dichloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	400	400	0	0	A	SC	SC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SC	1.63	0.385	0.197								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	18600	18600	380	0.1	0.72	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

INTERMEDIATE CALCULATIONS SHEET - TRANS-1,2-DCE - INDUSTRIAL

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	200	0.188	ERROR	ERROR	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	74,400

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.63E+07	3.61E+08	2.06E-05	200	7,136	4.94E-03	2.13E-01	1.75E-04	1.83E-03	0.00E+00	0.00E+00	1.61E-05	1.02E-04	200

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	5.32E+03	0.10	1.87E+01	1.83E-03	7.44E+03	9.71E+05	6.47E-07	3.44E-03	NA	7.0E-02

END

DATA E[illegible]HEET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79016	1.30E+05	Trichloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	400	400	0	0	A	SC	SC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SC	1.63	0.385	0.197								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	18600	18600	380	0.1	0.72	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

INTERMEDIATE CALCULATIONS SHEET - TRICHLOROETHENE - INDUSTRIAL

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{ts} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	200	0.188	ERROR	ERROR	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	74,400

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.63E+07	3.61E+08	2.06E-05	200	8,557	4.78E-03	2.06E-01	1.75E-04	2.04E-03	0.00E+00	0.00E+00	1.41E-05	9.03E-05	200

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	2.67E+07	0.10	1.87E+01	2.04E-03	7.44E+03	2.29E+05	6.39E-07	1.71E+01	2.0E-06	6.0E-01

END

DATA E[illegible]HEET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75014	2.10E+01	Vinyl chloride (chloroethene)

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	400	400	0	0	A	SC	SC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SC	1.63	0.385	0.197								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	18600	18600	380	0.1	0.72	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

INTERMEDIATE CALCULATIONS SHEET - VINYL CHLORIDE - INDUSTRIAL

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	200	0.188	ERROR	ERROR	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	74,400

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.63E+07	3.61E+08	2.06E-05	200	5,000	1.72E-02	7.41E-01	1.75E-04	2.74E-03	0.00E+00	0.00E+00	9.73E-06	6.36E-05	200

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC $(mg/m^3)^{-1}$
200	1.56E+04	0.10	1.87E+01	2.74E-03	7.44E+03	9.91E+03	6.13E-07	9.54E-03	8.8E-06	1.0E-01

END

SWMU 17

IEUBK CHILD LEAD MODEL
AND
TRW ADULT LEAD MODEL RESULTS

Calculations of Blood Lead Concentrations (PbBs) - NWS Charleston- SWMU 17, Surface Soil - Construction Worker

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 05/19/03

Exposure Variable	PbB Equation 1*	PbB Equation 2**	Description of Exposure Variable	Units	Values for Non-Residential Exposure Scenario: Using Equation 1 GSDi = Hom	Using Equation 1 GSDi = Het	Using Equation 2 GSDi = Hom	Using Equation 2 GSDi = Het
PbS	X	X	Soil lead concentration	ug/g or ppm	94	94	94	94
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--	0.9	0.9	0.9	0.9
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4	0.4	0.4
GSD_i	X	X	Geometric standard deviation PbB	--	2.1	2.3	2.1	2.3
PbB_0	X	X	Baseline PbB	ug/dL	1.5	1.7	1.5	1.7
IR_S	X		Soil ingestion rate (including soil-derived indoor dust)	g/day	0.100	0.100	--	--
IR_{S+D}		X	Total ingestion rate of outdoor soil and indoor dust	g/day	--	--	0.100	0.100
W_S		X	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--	--	1.0	1.0
K_{SD}		X	Mass fraction of soil in dust	--	--	--	0.7	0.7
$AF_{S,D}$	X	X	Absorption fraction (same for soil and dust)	--	0.12	0.12	0.12	0.12
$EF_{S,D}$	X	X	Exposure frequency (same for soil and dust)	days/yr	30	30	30	30
$AT_{S,D}$	X	X	Averaging time (same for soil and dust)	days/yr	90	90	90	90
PbB_{adult}			**PbB of adult worker, geometric mean**	**ug/dL**	**1.7**	**1.9**	**1.7**	**1.9**
$PbB_{fetal,0.95}$			**95th percentile PbB among fetuses of adult workers**	**ug/dL**	**5.0**	**6.6**	**5.0**	**6.6**
PbB_t			**Target PbB level of concern (e.g., 10 ug/dL)**	**ug/dL**	**10.0**	**10.0**	**10.0**	**10.0**
$P(PbB_{fetal} > PbB_t)$			**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**0.5%**	**1.6%**	**0.5%**	**1.6%**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S,D}) + PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

****Equation 2, alternate approach based on Eq. 1, 2, and A-19 in USEPA (1996).**

PbB_{adult} =	$PbS*BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])/365+PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Blood Lead Concentrations (PbBs) - NWS Charleston- SWMU 17, Surface Soil - Occupational Worker

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 05/19/03

Exposure Variable	PbB Equation 1*	PbB Equation 2**	Description of Exposure Variable	Units	Values for Non-Residential Exposure Scenario: Using Equation 1*		Using Equation 2	
					GSDi = Hom	GSDi = Het	GSDi = Hom	GSDi = Het
PbS	X	X	Soil lead concentration	ug/g or ppm	94	94	94	94
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--	0.9	0.9	0.9	0.9
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4	0.4	0.4
GSD_i	X	X	Geometric standard deviation PbB	--	2.1	2.3	2.1	2.3
PbB_0	X	X	Baseline PbB	ug/dL	1.5	1.7	1.5	1.7
IR_S	X		Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050	--	--
IR_{S+D}		X	Total ingestion rate of outdoor soil and indoor dust	g/day	--	--	0.050	0.050
W_S		X	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--	--	1.0	1.0
K_{SD}		X	Mass fraction of soil in dust	--	--	--	0.7	0.7
$AF_{S,D}$	X	X	Absorption fraction (same for soil and dust)	--	0.12	0.12	0.12	0.12
$EF_{S,D}$	X	X	Exposure frequency (same for soil and dust)	days/yr	250	250	250	250
$AT_{S,D}$	X	X	Averaging time (same for soil and dust)	days/yr	365	365	365	365
PbB_{adult}	**PbB of adult worker, geometric mean**			**ug/dL**	**1.7**	**1.9**	**1.7**	**1.9**
$PbB_{fetal,0.95}$	**95th percentile PbB among fetuses of adult workers**			**ug/dL**	**5.0**	**6.6**	**5.0**	**6.6**
PbB_t	**Target PbB level of concern (e.g., 10 ug/dL)**			**ug/dL**	**10.0**	**10.0**	**10.0**	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**			**%**	**0.5%**	**1.6%**	**0.5%**	**1.6%**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S,D}) + PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

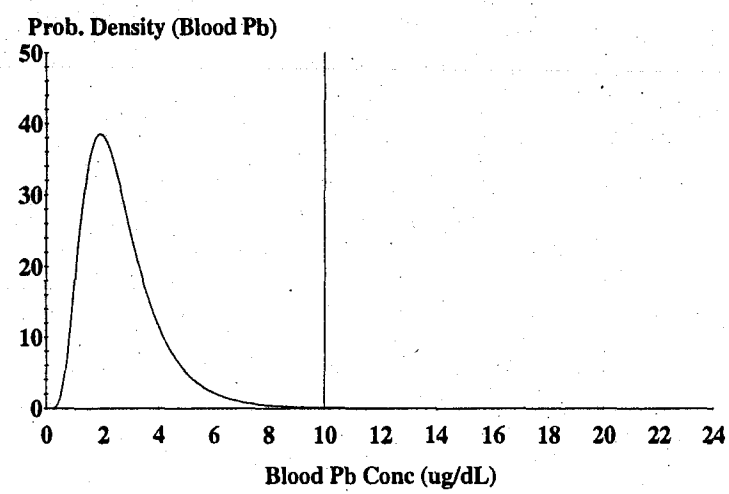
****Equation 2, alternate approach based on Eq. 1, 2, and A-19 in USEPA (1996).**

PbB_{adult} =	$PbS*BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])/365+PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

SWMU 17 -SS-

AVG = 54 mg/kg



Cutoff = 10.000 ug/dl
Geo Mean = 2.455
GSD = 1.600
% Above = 0.140
% Below = 99.860

Age Range = 0 to 84 months
Time Step = Every 4 Hours
Run Mode = Research

SWMUs 16 and 17

EXAMPLE RISK ASSESSMENT CALCULATIONS

CLIENT: NWS, CHARLESTON, SOUTH CAROLINA		JOB NUMBER: 5028
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SOIL/SEDIMENT FUTURE ADULT RESIDENT		
BASED ON: USEPA, DECEMBER 1989		
BY: T. JACKMAN	CHECKED BY:	DATE: 09/23/05

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from incidental ingestion of surface soil by the future child resident for the Reasonable Maximum Exposure (RME).

EQUATION:

$$IEX = \frac{Cs \times IR \times EF \times ED \times FI \times CF}{BW \times AT}$$

Where:

IEX	=	estimated exposure intake (mg/kg/day)
Cs	=	exposure point concentration in soil/sediment (mg/kg)
IR	=	incidental soil ingestion rate (mg/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
FI	=	fraction ingested from contaminated source (unitless)
CF	=	conversion factor (1.0E-6 kg/mg)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFo	=	oral carcinogenic slope factor ($(mg/kg/day)^{-1}$)
RfDo	=	oral noncarcinogenic reference dose (mg/kg/day)

RISKS:

ICLR (Carcinogens) = Intake (mg/kg/day) x CSFo $(mg/kg/day)^{-1}$
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDo (mg/kg/day)

ASSUMPTIONS:

Cs	=	0.87	mg/kg	Aroclor-1254 (surface soil at SWMU 17)
IR	=	100	mg/day	
EF	=	350	days/year	
ED	=	24	years	
FI	=	1		
CF	=	1.0E-06	kg/mg	
BW	=	70	kg	
ATc	=	25550	days	
ATnc	=	8760	days	
CSFo	=	2	$(mg/kg/day)^{-1}$	
RfDo	=	2.00E-05	(mg/kg/day)	

CLIENT: NWS, CHARLESTON, SOUTH CAROLINA		JOB NUMBER: 5028
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SOIL/SEDIMENT FUTURE ADULT RESIDENT		
BASED ON: USEPA, DECEMBER 1989		
BY: T. JACKMAN	CHECKED BY:	DATE: 09/23/05

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{0.87 \text{ mg/kg} \times 100 \text{ mg/day} \times 350 \text{ days/year} \times 24 \text{ years} \times 0.000001 \text{ kg/mg}}{70 \text{ kg} \times 25550 \text{ days}}$$

IEXc = 4.09E-07 mg/kg/day

ICLR = 4.09E-07 mg/kg/day x 2 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ICLR = 8.2E-07

EXAMPLE CARCINOGENIC CALCULATION

$$IEXnc = \frac{0.87 \text{ mg/kg} \times 100 \text{ mg/day} \times 350 \text{ days/year} \times 24 \text{ years} \times 0.000001 \text{ kg/mg}}{70 \text{ kg} \times 8760 \text{ days}}$$

IEXnc = 1.19E-06 mg/kg/day

HQ = 1.19E-06 mg/kg/day / 0.00002 (mg/kg/day) = Hazard Quotient

HQ = 0.06

CLIENT: NWS, CHARLESTON, SOUTH CAROLINA		JOB NUMBER: 5028
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH SOIL/SEDIMENT FUTURE ADULT RESIDENT		
BASED ON: U.S. EPA, DECEMBER 1989 AND JULY 2004		
BY: T. JACKMAN	CHECKED BY:	DATE: 09/23/05

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from dermal contact with surface/subsurface soil by the future child resident for the Reasonable Maximum Exposure (RME).

EQUATION:

$$DEX = \frac{Cs \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

Where:

DEX	=	estimated exposure intake (mg/kg/day)
Cs	=	exposure point concentration in soil/sediment (mg/kg)
CF	=	conversion factor (1.0E-6 kg/mg)
SA	=	skin surface available for contact (cm^2/day)
ABS	=	absorption factor (unitless)
AF	=	adherence factor (mg/cm^2)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFd	=	dermal carcinogenic slope factor ((mg/kg/day)$^{-1}$)
RfDd	=	dermal noncarcinogenic reference dose (mg/kg/day)

RISKS:

ICLR (Carcinogens) = Intake (mg/kg/day) x CSFd (mg/kg/day)$^{-1}$
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDd (mg/kg/day)

ASSUMPTIONS:

Cs	=	0.87	mg/kg	Aroclor-1254 (surface soil at SWMU 17)
CF	=	1.0E-06	kg/mg	
SA	=	5,700	cm^2/day	
AF	=	0.07	mg/cm^2	
ABS	=	0.14		
EF	=	350	days/year	
ED	=	24	years	
BW	=	70	kg	
ATc	=	25550	days	
ATnc	=	8760	days	
CSFd	=	2	(mg/kg/day)$^{-1}$	
RfDd	=	2.00E-05	(mg/kg/day)	

CLIENT: NWS, CHARLESTON, SOUTH CAROLINA		JOB NUMBER: 5028
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH SOIL/SEDIMENT FUTURE ADULT RESIDENT		
BASED ON: U.S. EPA, DECEMBER 1989 AND JULY 2004		
BY: T. JACKMAN	CHECKED BY:	DATE: 09/23/05

EXAMPLE CARCINOGENIC CALCULATION

$$DEXc = \frac{0.87\ mg/kg \times 0.000001\ kg/mg \times 5700cm2/day \times 0.07mg/cm2 \times 0.14 \times 350\ days/year \times 24\ years}{70\ kg \times 25550\ days}$$

DEXc = 2.28E-07 mg/kg/day

ICLR = 2.28E-07 mg/kg/day x 2 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ICLR = 4.6E-07

EXAMPLE NONCARCINOGENIC CALCULATION

$$DEXnc = \frac{0.87\ mg/kg \times 0.000001\ kg/mg \times 5700cm2/day \times 0.07mg/cm2 \times 0.14 \times 350\ days/year \times 24\ years}{70\ kg \times 8760\ days}$$

DEXnc = 6.66E-07 mg/kg/day

HQ = 6.66E-07 mg/kg/day / 0.00002 (mg/kg/day) = Hazard Quotient

HQ = 0.03

CLIENT:		JOB NUMBER:
NWS, CHARLESTON, SOUTH CAROLINA		5028
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF FUGATIVE DUST EMISSIONS AND VOLATILES BY EXCAVATION/CONSTRUCTION WORKERS		
BASED ON: USEPA, DEC. 1989		
BY: T. JACKMAN	CHECKED BY:	DATE: 09/23/05

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from inhalation of fugitive dust and volatiles by an excavation/construction worker

EQUATION:

$$IEX = \frac{Ca \times IR \times ET \times EF \times ED}{BW \times AT}$$

Where:

IEX	=	estimated exposure intake (mg/kg-day)
Ca	=	exposure point concentration in air (mg/m3)
IR	=	inhlation rate (m3/hr)
ET	=	exposure time (hrs/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFi	=	inhalation carcinogenic slope factor (kg-day/mg)
RfDi	=	inhalation noncarcinogenic reference dose (mg/kg-day)

RISKS:

ICLR (Carcinogens) = Intake (mg/kg/day) x CSFi (kg-day/mg)
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDi (mg/kg-day)

ASSUMPTIONS:

Ca	=	9.18E-04	mg/m3	Trichlorothene (surface soil - SWMU 17)
IR	=	2.5	m3/hr	
ET	=	8	hr/day	
EF	=	30	days/year	
ED	=	1	year	
BW	=	70	kg	
ATc	=	25550	days	
ATnc	=	365	days	
CSFi	=	7.00E-03	(kg-day/mg)	
RfDi	=	1.70E-01	mg/kg-day	

CLIENT: NWS, CHARLESTON, SOUTH CAROLINA		JOB NUMBER: 5028
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF FUGATIVE DUST EMISSIONS AND VOLATILES BY EXCAVATION/CONSTRUCTION WORKERS		
BASED ON: USEPA, DEC. 1989		
BY: T. JACKMAN	CHECKED BY:	DATE: 09/23/05

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{9.2E\text{-}04\ mg/m3 \times 2.5\ m3/hr \times 8\ hr/day \times 30\ days/year \times 1\ year}{70\ kg \times 25550\ days}$$

IEXc = 3.08E-07 mg/kg-day

ICLR = 3.08E-07 mg/kg-day x 0.007 (kg-day/mg) = Incremental Lifetime Cancer Risk

ICLR = 2.2E-09

EXAMPLE NONCARCINOGENIC CALCULATION

$$IEXnc = \frac{9.2E\text{-}04\ mg/m3 \times 2.5\ m3/hr \times 8\ hr/day \times 30\ days/year \times 1\ year}{70\ kg \times 365\ days}$$

IEXnc = 2.16E-05 mg/kg-day

HQ = 2.16E-05 mg/kg-day / 1.7E-01 mg/kg-day

HQ = **1.3E-04**

CLIENT: NWS, CHARLESTON, SOUTH CAROLINA		JOB NUMBER: 5028
SUBJECT: ESTIMATION OF AMBIENT AIR CONCENTRATIONS RESULTING FROM FUGITIVE DUST EMISSIONS AND VOLATILIZATION FROM SOIL FOR EXCAVATION/CONSTRUCTION WORKERS		
BASED ON: U.S. EPA 1996		
BY: T.JACKMAN	CHECKED BY:	DATE: 09/23/05

PURPOSE: To calculate ambient air concentrations resulting from fugitive dust and volatilization from surface soil.

RELEVANT EQUATIONS:

Cair = Cs x (1/PEF + 1/VF)

Where:

Cair = Chemical concentration in air (mg/m^3)
Cs = Chemical concentration in soil (mg/kg)
PEF = Particulate emission factor (m^3/kg)
VF = Volatilization factor (m^3/kg) - Calculated on USEPA Soil Screening Guidance Website

ASSUMPTIONS:

Cs = 3.2 mg/kg Chemical: Trichloroethene
PEF = 1.27E+06 m3/kg
VF = 3500 m3/kg

Csat = (1.10E+03 mg/L)/(1.5 g/cm3) x [(0.996 cm3/g) x (1.5 g/cm3) + (0.15 + 4.22E-01 x 0.284)]

Csat = 1.29E+03 mg/kg

Csat is greater than Cs, therfore use Cs in calculation of air concentration.

Cair = 3.2 mg/kg x [(1/1.27E+06 m3/kg) + (1/ m3/kg)]

Cair = 9.18E-04 mg/m^3

CLIENT: NWS, CHARLESTON, SOUTH CAROLINA		JOB NUMBER: 5028
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER FUTURE ADULT RESIDENT		
BASED ON: USEPA, DECEMBER 1989		
BY: T. JACKMAN	CHECKED BY:	DATE: 09/23/05

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from ingestion of groundwater by the future adult resident (RME).

EQUATION:

$$IEX = \frac{Cgw \times CF \times IRgw \times EF \times ED}{BW \times AT}$$

Where:

IEX	=	estimated exposure intake (mg/kg/day)
Cgw	=	exposure point concentration in groundwater (µg/L)
CF	=	conversion factor (1.0E-3 mg/µg)
IRgw	=	ingestion rate (L/hour)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFo	=	oral carcinogenic slope factor ((mg/kg/day)$^{-1}$)
RfDo	=	oral noncarcinogenic reference dose (mg/kg/day)

RISKS:

ICLR (Carcinogens) = Intake (mg/kg/day) x CSFo (mg/kg/day)$^{-1}$
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDo (mg/kg/day)

ASSUMPTIONS:

Cgw	=	1.40E+02	µg/L	1,1,2,2-Tetrachloroethane (SWMU 17)
IRgw	=	2	L/day	
CF	=	1.0E-03	mg/µg	
EF	=	350	days/year	
ED	=	24	years	
BW	=	70	kg	
ATc	=	25,550	days	
ATnc	=	8,760	days	
CSFo	=	2.00E-01	(mg/kg/day)$^{-1}$	
RfDo	=	6.00E-02	(mg/kg/day)	

CLIENT: NWS, CHARLESTON, SOUTH CAROLINA		JOB NUMBER: 5028
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER FUTURE ADULT RESIDENT		
BASED ON: USEPA, DECEMBER 1989		
BY: T. JACKMAN	CHECKED BY:	DATE: 09/23/05

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{140\ mg/L \times 0.001\ mg/mg \times 2\ L/day \times 350\ days/year \times 24\ years}{70\ kg \times 25550\ days}$$

IEXc = 1.32E-03 mg/kg/day

ICLR = 1.32E-03 mg/kg/day x 0.2 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ICLR = 2.6E-04

EXAMPLE NONCARCINOGENIC CALCULATION

$$IEXnc = \frac{140\ mg/L \times 0.001\ mg/mg \times 2\ L/day \times 350\ days/year \times 24\ years}{70\ kg \times 8760\ days}$$

IEXnc = 3.84E-03 mg/kg/day

HQ = 3.84E-03 mg/kg/day / 0.06 (mg/kg/day) = Hazard Quotient

HQ = 6.4E-02

CLIENT: NWS, CHARLESTON, SOUTH CAROLINA		JOB NUMBER: 5028
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER OR SURFACE WATER - FUTURE ADULT RESIDENT		
BASED ON: U.S. EPA, DECEMBER 1989 AND JULY 2004		
BY: T.JACKMAN	CHECKED BY:	DATE: 09/23/05

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from dermal contact with groundwater by the future adult resident.

EQUATION:

$$DAD = \frac{DAevent \times EV \times ED \times EF \times A}{BW \times AT}$$

Where:

DAD	=	dermally absorbed dose (mg/kg/day)
DAevent	=	absorbed does per event (mg/cm^2/event)
EV	=	event frequency (events/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
A	=	skin surface available for contact (cm^2)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFd	=	dermal carcinogenic slope factor ((mg/kg/day)$^{-1}$)
RfDd	=	dermal noncarcinogenic reference dose (mg/kg/day)

RISKS:

ICLR (Carcinogens) = DAD (mg/kg/day) x CSFd (mg/kg/day)$^{-1}$
HQ (Noncarcinogens) = DAD (mg/kg/day) / RFDd (mg/kg/day)

EQUATIONS for DAevent:

For Inorganics:

$$DA_{event} = (K_p)(C_{gw})(t_{event})$$

For Organics:

$$If\ t_{event} < t^*, then\ :\ DA_{event} = FA(2\ K_p)(C_{gw})(CF)\left(\sqrt{\frac{6\ \tau\ t_{event}}{\pi}}\right)$$

$$If\ t_{event} > t^*, then\ :\ DA_{event} = FA(K_p)(C_{gw})(CF)\left(\frac{t_{event}}{1+B} + 2\tau\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right)$$

CLIENT: NWS, CHARLESTON, SOUTH CAROLINA		JOB NUMBER: 5028
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER OR SURFACE WATER - FUTURE ADULT RESIDENT		
BASED ON: U.S. EPA, DECEMBER 1989 AND JULY 2004		
BY: T.JACKMAN	CHECKED BY:	DATE: 09/23/05

Where:

FA	=	fraction absorbed (dimensionless)
Kp	=	permeability coefficient from water (cm/hr)
Cgw	=	concentration of chemical in groundwater (mg/L)
tevent	=	duration of event (hr/event)
CF	=	conversion factor (0.001 L/cm^3)
t*	=	time it takes to reach steady-state (hr/event)
τ	=	lag time (hr/event)
B	=	Bunge Model Constant (dimensionless)

EXAMPLE CALCULATION OF DAevent

ASSUMPTIONS:

Cgw	=	1.40E-01	mg/L	1,1,2,2-Tetrachloroethane (SWMU 17 groundwater)
Kp	=	6.94E-03	cm/hr	
tevent	=	0.33	hr/event	
CF	=	0.001	L/cm^3	
t*	=	2.24E+00	hr/event	
τ	=	9.31E-01	hr/event	
B	=	3.46E-02		
FA	=	1		

tevent < t*, therefore,

$$DAevent = 1 \times (2 \times 0.00694\ cm/hr)\ (0.14\ mg/L)\ (0.001\ L/cm3) \times \sqrt{\frac{6 \times 0.931\ hr/event \times 0.33\ hr/event}{\pi}}$$

DAevent = 1.49E-06 mg/cm^2-event

RISK CALCULATIONS

ASSUMPTIONS:

A	=	18,000	cm^2/day
EV	=	1	event/day
ED	=	24	years
EF	=	350	days/year
BW	=	70	kg
ATc	=	25550	days
ATnc	=	8760	days

CSFd = 2.00E-01 $(mg/kg/day)^{-1}$
RfDd = 6.00E-02 (mg/kg/day)

CALCULATION WORKSHEET

CLIENT: NWS, CHARLESTON, SOUTH CAROLINA		**JOB NUMBER:** 5028
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER OR SURFACE WATER - FUTURE ADULT RESIDENT		
BASED ON: U.S. EPA, DECEMBER 1989 AND JULY 2004		
BY: T.JACKMAN	**CHECKED BY:**	**DATE:** 09/23/05

EXAMPLE CARCINOGENIC CALCULATION

$$DADc = \frac{1.49E\text{-}06 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 24 \text{ years} \times 350 \text{ days/year} \times 18000 \text{ cm2/day}}{70 \text{ kg} \times 25550 \text{ days}}$$

DADc = 1.3E-04 mg/kg/day

DADc = 1.26E-04 mg/kg/day x 0.2 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ICLR = 2.5E-05

EXAMPLE NONCARCINOGENIC CALCULATION

$$DADnc = \frac{1.49E\text{-}06 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 24 \text{ years} \times 350 \text{ days/year} \times 18000 \text{ cm2/day}}{70 \text{ kg} \times 8760 \text{ days}}$$

DADnc = 3.7E-04 mg/kg/day

HQ = 3.67E-04 mg/kg/day / 0.06 (mg/kg/day) = Hazard Quotient

HQ = 6.1E-03

CLIENT: NWS, CHARLESTON, SOUTH CAROLINA		JOB NUMBER: 5028
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VAPORS FROM GROUNDWATER VIA VAPOR INTRUSION BY FUTURE ADULT RESIDENTS		
BASED ON: USEPA, DEC. 1989		
BY: T. JACKMAN	CHECKED BY:	DATE: 9/23/2005

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from inhalation of volatiles in indoor air by future adult residents

EQUATION:

$$IEX = \frac{Ca \times IR \times ET \times EF \times ED}{BW \times AT}$$

Where:

IEX	=	estimated exposure intake (mg/kg-day)
Ca	=	exposure point concentration in air (mg/m^3) calculated by Johnson and Ettinger Model
IR	=	inhlation rate (m^3/hr)
ET	=	exposure time (hrs/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFi	=	inhalation carcinogenic slope factor (kg-day/mg)
RfDi	=	inhalation noncarcinogenic reference dose (mg/kg-day)

RISKS:

ICLR (Carcinogens) = Intake (mg/kg/day) x CSFi (kg-day/mg)
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDi (mg/kg-day)

ASSUMPTIONS:

Ca	=	8.5E-01	mg/m^3	TCE (SWMU 17)
IR	=	0.833	m^3/hr	
ET	=	24	hr/day	
EF	=	350	days/year	
ED	=	24	years	
BW	=	70	kg	
ATc	=	25550	days	
ATnc	=	8760	days	
CSFi	=	0.007	(kg-day/mg)	
RfDi	=	0.17	mg/kg-day	

CLIENT: NWS, CHARLESTON, SOUTH CAROLINA		JOB NUMBER: 5028
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VAPORS FROM GROUNDWATER VIA VAPOR INTRUSION BY FUTURE ADULT RESIDENTS		
BASED ON: USEPA, DEC. 1989		
BY: T. JACKMAN	CHECKED BY:	DATE: 9/23/2005

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{8.5E\text{-}01\ mg/m3 \times 0.833\ m3/hr \times 24\ hr/day \times 350\ days/year \times 24\ years}{70\ kg \times 25550\ days}$$

IEXc = 7.95E-02 mg/kg-day

ICLR = 7.95E-02 mg/kg-day x 0.007 (kg-day/mg) = Incremental Lifetime Cancer Risk

ICLR = 5.6E-04

EXAMPLE NONCARCINOGENIC CALCULATION

$$IEXnc = \frac{8.5E\text{-}01\ mg/m3 \times 0.833\ m3/hr \times 24\ hr/day \times 350\ days/year \times 24\ years}{70\ kg \times 8760\ days}$$

IEXnc = 2.32E-01 mg/kg-day

HQ = 2.32E-01 mg/kg-day / 1.7E-01 mg/kg-day

HQ = 1.4E+00

CLIENT: NWS, CHARLESTON, SOUTH CAROLINA		JOB NUMBER: 5028
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SURFACE WATER ADOLESCENT TRESPASSER		
BASED ON: USEPA, DEC. 1989		
BY: T. JACKMAN	CHECKED BY:	DATE: 09/23/05

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from incidental ingestion of surface water by an adolescent trespasser.

EQUATION:

$$IEX = \frac{Csw \times CF \times CRsw \times ET \times EF \times ED}{BW \times AT}$$

Where:

IEX	=	estimated exposure intake (mg/kg/day)
Csw	=	exposure point concentration in surface water (ug/L)
CF	=	conversion factor (1.0E-6 kg/mg)
CRsw	=	contact rate (L/hour)
ET	=	exposure time (hours/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFo	=	oral carcinogenic slope factor ($(mg/kg/day)^{-1}$)
RfDo	=	oral noncarcinogenic reference dose (mg/kg/day)

RISKS:

ICLR (Carcinogens) = Intake (mg/kg/day) x CSFo $(mg/kg/day)^{-1}$
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDo (mg/kg/day)

ASSUMPTIONS:

Csw	=	0.7	ug/L	Tetrachloroethene (SWMU 16)
CRsw	=	0.01	L/day	
CF	=	1.0E-03	mg/ug	
ET	=	1.5	hours	
EF	=	30	days/year	
ED	=	10	years	
BW	=	45	kg	
ATc	=	25,550	days	
ATnc	=	3,650	days	
CSFo	=	0.54	$(mg/kg/day)^{-1}$	
RfDo	=	0.01	(mg/kg/day)	

CLIENT: NWS, CHARLESTON, SOUTH CAROLINA		JOB NUMBER: 5028
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SURFACE WATER ADOLESCENT TRESPASSER		
BASED ON: USEPA, DEC. 1989		
BY: T. JACKMAN	CHECKED BY:	DATE: 09/23/05

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{0.7\ ug/L \times 0.001\ mg/ug \times 0.01\ L/day \times 1.5\ hours \times 30\ days/year \times 10\ years}{45\ kg \times 25550\ days}$$

IEXc = 2.74E-09 mg/kg/day

ICLR = 2.74E-09 mg/kg/day x 0.54 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ICLR = 1.5E-09

EXAMPLE CARCINOGENIC CALCULATION

$$IEXnc = \frac{0.7\ ug/L \times 0.001\ mg/ug \times 0.01\ L/day \times 1.5\ hours \times 30\ days/year \times 10\ years}{45\ kg \times 3650\ days}$$

IEXnc = 1.92E-08 mg/kg/day

HQ = 1.92E-08 mg/kg/day / 0.01 (mg/kg/day) = Hazard Quotient

HQ = 1.9E-06

EXAMPLE CALCULATION - VAPOR CONCENTRATION OF TCE IN A TRENCH
CONSTRUCTION WORKER SCENARIO
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA

Ctrench = CGW x VF

Where:

Ctrench = concentration of contaminant in the trench $\mu g/m^3$
CGW = concentration of contaminant in groundwater µg/L
VF = volatilization factor L/m^3

1. Calculate kiG (gas-phase mass transfer coefficient of component i)

$kiG = (MWH2O/MWi)^{0.335} \times (T/298)^{1.005} \times kG, H2O$

Where:

kiG = gas-phase mass transfer coefficient of component i cm/s
MW_{H2O} = molecular weight of water = 18 g/mol
MW_{PCE} = molecular weight of PCE = **131.39** g/mol
kG,H_2O = gas-phase mass transfer coefficient of water vapor at 25°C cm/s = 0.833 cm/s
T = average system absolute temperature = **298**
The value of kG, H_2O is 0.833 cm/s (Superfund Exposure Assessment Manual, USEPA, April 1988)

$kiG = (18/165.83)^{0.335} \times (298/298)^{1.005} \times 0.833$ cm/s = 4.28E-01 cm/s

2. Calculate kiL (liquid-phase mass transfer coefficient of component i)

$kiL = (MWO_2/MWi)^{0.5} \times (T/298) \times kL, O_2$

Where:
kiL = liquid-phase mass transfer coefficient of component i cm/s
MW_{O2} = molecular weight of O_2 = 32 g/mol
MW_{PCE} = molecular weight of PCE = **131.39** g/mol
T = average system absolute temperature = **298**
kL, O_2 = liquid-phase mass transfer coefficient of oxygen at 25°C cm/s = 0.002 cm/s

$kiL = (32/165.83)^{0.5} \times (298/298) \times 0.002$ cm/s = 9.87E-04 cm/s

EXAMPLE CALCULATION - VAPOR CONCENTRATION OF TCE IN A TRENCH
CONSTRUCTION WORKER SCENARIO
SWMU 17 - OLD SOUTHSIDE MISSILE AND WASTE OIL DISPOSAL AREA

3. Calculate Ki (overall mass transfer coefficient of contaminant)

Ki = 1 / {(1/kiL) + [(RT) / (Hi x kiG)]}

Where:

kiL = liquid-phase mass transfer coefficient of i cm/s =	**9.87E-04**
R = ideal gas constant atm-m^3/mole-°K =	8.20E-05
T = average system absolute temperature =	**298**
Hi = Henry's Law constant of PCE (atm-m^3/mol) =	**1.03E-02**
KiG = gas-phase mass transfer coefficient of i cm/s	**4.28E-01**

Ki = 1 / {(1/8.79E-4) + [(298 x 8.2E-5) / (1.84E-2 x 0.396]} = 9.82E-04 cm/s

4. Calculation of VF (Volatilization Factor)

VF = (Ki x A x F x 10^{-3} x 10^4 x 3,600) / (ACH x V)

Where:

VF = volatilization factor (L/m^3)		
Ki = overall mass transfer coefficient of contaminant =		**9.82E-04** cm/s
A = area of the trench =		**8.18** m^2
F = fraction of floor through which contaminant can enter (unitless) =		**1**
ACH = air changes per hour =		**360** h^{-1}
V = volume of trench =		**24.92** m^3
10^{-3} = conversion factor L/cm^3	0.001	
10^4 = conversion factor cm^2/m^2	10000	
3,600 = conversion factor seconds/hr	3600	

VF = (9.82E-4 x 8.18 x 1 x 10^{-3} x 10^4 x 3,600) / (360 x 24.92) = 3.22E-02 L/m^3

5. Calculation of C_{trench} (concentration of contaminant in the trench)

C_{trench} = C_{GW} x VF

Where:

C_{trench} = concentration of contaminant in the trench (µg/m^3)	
C_{GW} = concentration of TCE in groundwater =	**130,000** µg/L
VF = volatilization factor =	**3.22E-02** L/m^3

C_{trench} = 130,000 ug/L x 3.22E-02 L/m^3 = 4.19E+03 µg/m^3

APPENDIX G
ECOLOGICAL RISK ASSESSMENT SUPPORT

APPENDIX G.1
PHYSICAL AND CHEMICAL CHARACTERISTICS OF ECOLOGICAL COPC CLASSES

APPENDIX G.1

This appendix presents a discussion of the different chemical classes that were detected at SWMUs 16 and 17, including toxicity information, potential food chain and trophic transfer, and bioaccumulation potential. Table E.1-1 presents the bioaccumulation factors (BAFs) that were used in the surrogate species' food-chain models for the individual constituents that were detected at SWMUs 16 and 17. The sources for most of the BAFs are presented in Section 7.5.2 of the SERA, while the text below discusses some additional sources of the BAFs, where necessary. Note that dry weight BAFs were used for this SERA.

Volatile Organic Compounds

VOCs are usually very mobile in the environment because they are poorly adsorbed to soil and sediment particles. Also, because they are very volatile, they typically are only detected in surface water, surface soil, and sediment at low concentrations.

Most VOCs have very little potential to bioaccumulate in ecological receptors; therefore, biomagnification through the food chain does not appear to be significant. VOCs are not expected to biomagnify in plants and are typically only toxic to ecological receptors at relatively high concentrations.

Semivolatile Organic Compounds

The most common semivolatile organic compounds that are found at naval facilities include polynuclear aromatic hydocarbons (PAHs) and phthalates. PAHs are a diverse group of compounds consisting of two or more substituted and unsubstituted polynuclear aromatic rings formed by the incomplete combustion of carbonaceous materials. PAHs are ubiquitous in the modern environment and are common constituents of coal tar, soot, vehicle exhaust, cigarette smoke, certain petroleum products, road tar, mineral oils, creosote, and many cooked foods. PAHs also are released to the environment through natural sources such as volcanoes and forest fires.

PAHs are transferred from surface water by volatilization and sorption to settling particles. The compounds are transformed in surface water by photo-oxidation, chemical oxidation, and microbial metabolism (ATSDR, 1989a). In soil and sediments, microbial metabolism is the major process for degradation of PAHs (ATSDR, 1989a). Although PAHs accumulate in terrestrial and aquatic plants, many organisms are able to metabolize and eliminate these compounds. Vertebrates can readily metabolize PAHs, but lower forms (insects and worms) cannot

metabolize PAHs as quickly. However, food chain uptake does not appear to be a major exposure source to PAHs for aquatic animals (ATSDR, 1989a).

PAHs vary substantially in their toxicity to aquatic organisms. In general, toxicity increases as molecular weight increases, with the exception of some high molecular weight PAHs that have low acute toxicity. Most species of aquatic organisms rapidly accumulate PAHs that occur at low concentrations in the ambient medium. However, uptake of PAHs is highly species-specific, it is higher in algae, mollusks, and other species that are incapable of metabolizing PAHs (Eisler, 1987). The ability of fish to metabolize PAHs may explain why benzo(a)pyrene is frequently not detected or is found at only very low levels in fish from environments heavily contaminated with PAHs (ATSDR, 1989a).

Few generalizations can be made about the ecotoxicity of PAHs because of the extreme variability in toxicity and physiochemical properties of PAHs. Adverse impacts to plants from PAHs, however, are rare (Eisler, 2000). In most animal species, PAHs are metabolized by a mixed-function oxidase enzyme system into intermediates that may be toxic, mutagenic, or carcinogenic to the host. Some invertebrate species cannot efficiently metabolize PAHs (Eisler, 2000), and PAHs can be chronically toxic to invertebrates, but overall, very little is known about the toxicological mechanisms of PAHs in invertebrates (Erstfield and Snow-Ashbrook, 1999). PAHs can bind to cellular macromolecules and thereby disrupt their function in higher level organisms such as mammals and birds. Biological macromolecules include polymers of carbohydrates (e.g., starch), amino acids (proteins), and nucleotides (e.g., DNA). The cellular functions of these polymers include structure, energy storage, energy transfer, material transport, and the storage and transmittal of genetic information. PAHs show little tendency to biomagnify in the food web (Eisler, 2000). USEPA Region IV considers the potential toxicity of PAHs via the terrestrial food web to be generally negligible unless PAHs are present at extremely high concentrations (i.e., percent levels: 10,000 mg/kg) in soil. Microbial metabolism is the major process for degradation of PAHs in soil (ATSDR, 1997).

Phthalates are semivolatile organic compounds that are used in production of plastics (ATSDR, 1993). Most phthalates are expected to sorb to soil or sediment particles after their release because of their high Log K_{OC} values (Howard, 1989). Some phthalates may bioconcentrate in aquatic organisms [Spectrum Laboratories, 1999; Howard, 1989; ATSDR, 1989a]. In general, phthalates have a low acute toxicity to animals (Amdur et al., 1991). Chronic oral exposures, however, have been shown to result in liver toxicity in mammals. Ingested phthalates metabolize to monoesters in the gut and are subsequently absorbed. Following absorption, phthalates distribute primarily to the liver and kidneys and may, in some species, concentrate in the testes

(Rhodes et al., 1986). Liver carcinogenesis has been observed (ATSDR, 1997). Many receptors are able to metabolize and excrete phthalate esters, so their ability to bioaccumulate varies among species. Detailed ecotoxicity data for birds, plants, and invertebrates plants could not be located.

Explosives

Some of the more common explosives include nitroaromatic compounds such as 2,4,6-trinitrotoluene, hexahydro-1,3,5-trinitro-1,3,5-triazine, octahydro-1,3,5,7-tetranitro-1,3,5-tetrazocine, N-methyl-N,2,4,6-tetranitroaniline, and associated by-products and degradation products that may have been released to the environment during manufacturing and load, assembly, and pack processes at military facilities (Talmage et al., 1999). These explosives are moderately to highly toxic to freshwater organisms, with chronic screening values less than 1 mg/L, although some of the screening values are low because of the conservative methods used to develop them based on an absence of data (Talmage et al., 1999). Available data indicate that none of the compounds are expected to bioconcentrate (Talmage et al., 1999). Most of the explosives do not appear to be highly toxic to mammals. Terrestrial reference values (TRVs) are greater than 1 mg/kg-day.

Explosives have little to moderate potential to adsorb to soil and sediment (Talmage et al., 1999). Therefore, explosives will have moderate to high mobility in soils and sediment, and most of the explosives will be found in the water column (Talmage et al., 1999).

Pesticides

Pesticides are used to control pestiferous invertebrates and, therefore, they are toxic to many soil and aquatic invertebrates. In addition, many pesticides are toxic to ecological receptors at higher trophic levels such as mammals and birds. For example, DDT compounds have been linked to eggshell thinning and subsequent decreased survival of several birds of prey (such as eagles and falcons). Other pesticides such as chlordanes, dieldrin, aldrin, endrin, and heptachlor are also very toxic to mammals and birds (Newell et al., 1987).

Organochlorine insecticides such as DDT, chlordane, aldrin, dieldrin, heptachlor, endosulfan, and endrin and their associated breakdown products generally degrade very slowly and tend to be soluble in lipids. These result in bioaccumulation and possible increases in concentrations through food webs (Newman, 1998). Pesticides have high Log K_{OC} values so they are expected to sorb strongly to soil and sediment particles when released to the environment. Consequently,

these compounds may migrate from their site of application when the soil is eroded, although they will not have a tendency to leach to groundwater.

DDT, DDE, and DDD are highly lipid soluble, which combined with an extremely long half-life, results in bioaccumulation (ATSDR, 1989b). When present in ambient water, DDT and its metabolites are concentrated in freshwater and marine plankton, insects, mollusks, and other invertebrates and fish (ATSDR, 1989b). A progressive accumulation of residues may result in high levels of residues in organisms at the top of the food chain (ATSDR, 1989b). Moderate to significant bioconcentration in aquatic species has been reported for dieldrin, with bioconcentration factors (BCFs) ranging from 100 to 10,000 (Howard, 1991). Heptachlor also has been reported to bioconcentrate in aquatic species, with bioconcentration factors in fish up to about 20,000 (Howard, 1991).

Soil to earthworm BAFs for pesticides were calculated from field studies summarized in various studies. BAFs were calculated by dividing the worm concentration by the soil concentration (if the BAFs were not calculated within the study). The BAFs were either presented on a wet weight or dry weight basis. Wet weight BAFs were derived by multiplying the dry weight BAF by 0.16, which is the percent solids of soil invertebrates (Sample et. al., 1997), while dry weight BAFs were derived by dividing the wet weight BAF by 0.16. An average BAF was calculated for each pesticide when data from more than one study were available. The average BAFs were used for both the conservative and average food chain models.

PCBs

The term polychlorinated biphenyls (PCBs) commonly refers to a variety of mixtures of individual biphenyl isomers, each consisting of two joined benzene rings and up to 10 chlorine atoms. Mixtures of these isomers are known by their commercial designation of Aroclor. This trade name is followed by a four-digit number; the first two numbers indicate the type of isomer mixture and the last two numbers indicate the approximate weight percent of chlorine in the mixture (USEPA, 1985).

PCBs released into water adsorb to sediments and other organic matter. Typically, PCB concentrations are greater in the sediment and suspended material than in the water column. Substantial quantities of PCBs in aquatic sediments can act as an environmental reservoir from which PCBs may be released slowly over a long period of time (ATSDR, 1989c). For PCBs that exist in the dissolved state in water, volatilization becomes the primary fate process (USEPA, 1985).

Degradation of PCBs in the environment is dependent upon the degree of chlorination. Generally, the more chlorinated the PCB molecule, the more persistent it will be in the environment. Factors that determine biodegradability include the amount of chlorination, concentration, type of microbial population, available nutrients, and the temperature (ATSDR, 1989c).

Because PCBs are highly lipophilic, they can bioaccumulate in the lipid portions of animals. Bioconcentration factors in the thousands have been reported for various aquatic species (Eisler, 1986a). PCBs can also accumulate in upper trophic level animals such as piscivorous birds and mammals that feed on contaminated prey items (Eisler, 1986a).

Adverse effects of PCBs on terrestrial wildlife include increased mortality, reproductive effects, and behavioral effects (USEPA, 1985). As a group, birds are more resistant to acutely toxic effects of PCBs than mammals (Eisler, 1986a). Among sensitive avian species, PCBs disrupt the normal pattern of growth, reproduction, metabolism, and behavior (Eisler, 1986a). Of the mammals, the mink is the most sensitive wildlife species tested for which data are available (Eisler, 1986a). Impacts to mink include anorexia, weight loss, lethargy, reproductive effects, and death (Eisler, 1986a).

Metals

Many metals occur naturally at various concentrations in the surface water and sediment primarily to chemical weathering of rocks and fallout from volcanoes. Most metals are toxic to aquatic (i.e., fish, benthic invertebrates) and terrestrial (i.e., plants, soil invertebrates, vertebrates) ecological receptors above certain concentrations, with some metals being more toxic at lower concentrations than others. Also, different chemical forms of the metals may be more toxic than others. For example, hexavalent chromium is typically more toxic than trivalent chromium, and methylmercury is more toxic than inorganic mercury. In addition, the toxicity of several metals (cadmium, chromium, copper, lead, nickel, silver, and zinc) to aquatic receptors in freshwater systems decreases with increasing water hardness.

For several metals, the Eco SSL Guidance referenced a document prepared by Sample et al., (1998), which presented soil to biota BAFs. These BAFs were used to predict the tissue concentrations in the small mammals from the chemical concentrations in the soil. The 90th percentile BAF from Sample et al., (1998) was used for the conservative food chain model and the median BAF was used for the average food chain model.

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TABLE G.1-1

DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, FISH, AND SEDIMENT INVERTEBRATES
NWS CHARLESTON
CHARLESTON, SOUTH CAROLINA

Chemicals	Plant BAFs		Earthworm BAFs		Fish BSAFs		Sediment Invertebrate BSAFs	
	Conservative	Average	Conservative	Average	Conservative	Average	Conservative	Average
Pesticides/ PCBs								
4,4'-DDD	1.60E-02	1.60E-02	1.30E+01	1.30E+01	2.80E-01	2.80E-01	1.00E+00	1.00E+00
4,4'-DDE	1.90E-02	1.90E-02	1.30E+01	1.30E+01	7.70E+00	7.70E+00	1.00E+00	1.00E+00
4,4'-DDT	7.80E-03	7.80E-03	1.30E+01	1.30E+01	1.67E+00	1.67E+00	1.00E+00	1.00E+00
Aldrin	6.90E-01	6.90E-01	3.30E+00	3.30E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Alpha-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00	4.77E+00	4.77E+00	1.00E+00	1.00E+00
Aroclor-1242	1.60E-01	1.60E-01	1.59E+01	6.67E+00	1.85E+00	1.85E+00	6.41E+01	3.62E+01
Aroclor-1248	1.60E-02	1.60E-02	1.59E+01	6.67E+00	1.85E+00	1.85E+00	6.41E+01	3.62E+01
Aroclor-1254	1.30E-02	1.30E-02	1.59E+01	6.67E+00	1.85E+00	1.85E+00	6.41E+01	3.62E+01
Aroclor-1260	2.90E-03	2.90E-03	1.59E+01	6.67E+00	1.85E+00	1.85E+00	6.41E+01	3.62E+01
Gamma-Chlordane	2.50E-02	2.50E-02	5.00E+00	5.00E+00	2.22E+00	2.22E+00	1.00E+00	1.00E+00
Heptachlor	1.20E-01	1.20E-01	1.00E+01	1.00E+01	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Endrin Aldehyde	8.20E-02	8.20E-02	3.60E+00	3.60E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Endrin Ketone	8.20E-02	8.20E-02	3.60E+00	3.60E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
alpha-BHC	2.10E-01	2.10E-01	5.00E+00	5.00E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
delta-BHC	9.00E-01	9.00E-01	5.00E+00	5.00E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
gamma-BHC (Lindane)	2.70E-01	2.70E-01	5.00E+00	5.00E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Inorganics								
Arsenic	1.10E+00	3.75E-02	5.23E-01	2.24E-01	1.00E+00	1.00E+00	6.90E-01	1.43E-01
Cadmium	3.25E+00	5.86E-01	4.07E+01	7.71E+00	1.00E+00	1.00E+00	7.99E+00	6.00E-01
Chromium	8.39E-02	4.10E-02	3.16E+00	3.06E-01	1.00E+00	1.00E+00	4.68E-01	1.00E-01
Copper	6.25E-01	1.24E-01	1.53E+00	5.15E-01	1.00E+00	1.00E+00	5.25E+00	1.56E+00
Lead	4.68E-01	3.89E-02	1.52E+00	2.66E-01	1.00E+00	1.00E+00	6.07E-01	7.10E-02
Mercury	5.00E+00	6.52E-01	2.06E+01	1.69E+00	1.00E+00	1.00E+00	2.87E+00	1.14E+00
Nickel	1.41E+00	1.80E-02	4.73E+00	1.06E+00	1.00E+00	1.00E+00	2.32E+00	4.86E-01
Selenium	3.01E+00	6.72E-01	1.34E+00	9.85E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Zinc	1.82E+00	3.66E-01	1.29E+01	3.20E+00	1.00E+00	1.00E+00	7.53E+00	1.94E+00

Acronyms:
BAF - Bioaccumulation Factor
BSAF - Biota Sediment Accumulation Factor

-The sources of the BAFs are presented in Section 7.4.2 of the SERA.

APPENDIX G.2
SURROGATE TERRESTRIAL RECEPTOR PROFILES

The following sections present the receptor profiles for the short-tailed shrew, American woodcock, raccoon, cotton mouse, marsh wren, and mourning dove. The majority of the exposure parameters for the profiles was obtained from the Wildlife Exposure Factors Handbook (USEPA, 1993), however, data from the USEPA Ecological Soil Screening Guidance (USEPA, 2005) was also used. The data for the incidental soil ingestion rates were obtained from the USEPA (1993) or the USEPA Ecological Soil Screening Guidance (USEPA, 2005), as indicated below.

The food ingestion rates are listed in g/g (of body weight)-day on a wet weight basis but were converted to dry weight for the SERA. The home ranges are presented in hectares in USEPA (1993) but were converted to acres by multiplying the number of hectares by 2.471. The estimated percent of soil (or sediment) in the diets are listed in dry weight. Although water ingestion rates are listed in USEPA (1993), they were not used in the surrogate receptor foodchain models because surface water at SWMUs 16 and 17 is saltwater and does not represent an adequate drinking water source.

Short-Tailed Shrew (*Blarina brevicauda*)

Shrews inhabit a wide variety of habitats and are common in areas with abundant vegetative cover. They need cool, moist habitats because of their high metabolic and water-loss rates. The short-tailed shrew is primarily carnivorous, eating insects such as earthworms, slugs, and snails.

The adult body weight for the short-tailed shrew in various habitats ranged from 0.015 to 0.01921 kg with an average of 0.0169 kg. The listed food ingestion rates for shrews are between 0.43 and 0.96 g/g-day (wet-weight). The food ingestion rates in kg/day were calculated by multiplying the maximum ingestion rate by the conservative body weight (conservative scenario) and the average ingestion rate by the average body weight (average exposure scenario). The food ingestion rates were then multiplied by 0.16, which is the percent solids of worms (USEPA, 2005) to convert the ingestion rate from a wet-weight value to a dry-weight value. The incidental soil ingestion rate was calculated by multiplying the ingestion rate by the percentage of soil that is incidentally ingested (assumed 3% for conservative food chain model and 0.9% for the average food chain model) from USEPA (2005). 3% is the 90th percentile value and 0.9% is the 50th percentile value from USEPA (2005).

The home range for the shrew (0. 9699 acres) was calculated using data from a tamarack bog in Manitoba (USEPA, 1993).

American Woodcock (*Scolopax minor*)

Woodcocks inhabit both woodlands and abandoned fields, particularly those with moderately to poorly drained loamy soils, which tend to support abundant earthworm populations. They feed primarily on invertebrates found in moist upland soils by probing the soil with their long prehensile-tipped bill. Earthworms are their

preferred diet, but seeds and other plant matter may also be consumed.

The adult body weight for the woodcock ranges from 0.166 to 0.213 kg with an average of 0.190 kg. The listed food ingestion rates for the woodcock are between 0.73 and 1.0 g/g-day (wet-weight). The food ingestion rates in kg/day were calculated multiplying the maximum ingestion rate by the conservative body weight (conservative scenario) and the average ingestion rate by the average body weight (average exposure scenario). The food ingestion rates were then multiplied by 0.16, which is the percent solids of worms (USEPA, 2005) to convert the ingestion rate from a wet-weight value to a dry-weight value. The incidental soil ingestion rate was calculated by multiplying the ingestion rate by the percentage of soil that is incidentally ingested (assumed 16.4% for conservative food chain model and 6.4% for the average food chain model) from USEPA (2005). 16.4% is the 90th percentile value and 6.4% is the 50th percentile value from USEPA (2005).

The range of home range sizes for the woodcock is 3.1 hectares to 73.6 hectares (7.66 to 182 acres) with an average home range of 25 hectares (62 acres).

Raccoon (*Procyon lotor*)

Raccoons are found near virtually every aquatic habitat, particularly in hardwood swamps, mangroves, floodplain forests, and freshwater and saltwater marshes. They are also common in suburban residential areas. They use surface waters for both drinking and foraging. Raccoons are opportunistic feeders that consume a wide variety of terrestrial and aquatic plants and animals, particularly insects, frogs, crayfish, eggs; fleshy fruits, nuts, acorns, and grains.

The adult body weights listed in USEPA (1993) range from 3.67 to 7.6 kg, with an average of 5.6 kg. The final conservative (0.05 kg/day) and average (0.07 kg/day) food ingestion rates were calculated using the following equation from USEPA (1993):

$$FI = (0.0687)\ (BW^{0.822})*0.25$$

Where: FI = Food ingestion rate (kg/day)

BW = Body weight in kg (conservative body weight was in calculating the conservative food ingestion rate and the average body weight was used in calculating the average food ingestion rate)

To convert the food ingestion rate into a dry weight value, the equation above was multiplied by 0.25, which is the mean percent solids content of bony fish (Sample et al., 1997).

The incidental soil ingestion rate was calculated by multiplying the ingestion rate by the percentage of soil that is incidentally ingestion (0.094), as presented in USEPA (1993).

Home range sizes for the raccoon listed in USEPA (1993) range from 39 hectares to 2,560 hectares (96 acres to 6,300 acres) for an average home range of 630 hectares (1,556 acres).

Cotton Mouse (Peromyscus gossypinus)

Cotton mice are typical woodland dwellers but prefer low moist areas, high grasslands, areas adjacent to aquatic environments, and woodlands bordering open fields. Cotton mice are common in the southeast and feed on grasses, sedges, seeds, fruits, grains, bark, and animal matter. Breeding occurs throughout the year but may decrease during the summer months. The cotton mouse was named as such because the mice will use cotton for nest construction, when available. The cotton mouse is most confused with the white-footed mouse (*Peromyscus leucopus*) for which appearance is similar; however, the cotton mouse is slightly larger overall.

Data for the cotton mouse were not available; therefore, exposure factors for the deer mouse (USEPA, 1993) were used instead. The adult body weight for the deer mouse ranges from 0.0148 to 0.0315 kg with an average of 0.021 kg. The listed food ingestion rates for the deer mouse are between 0.18 and 0.45 g/g-day (wet-weight). The food ingestion rates in kg/day were calculated by multiplying the maximum ingestion rate by the conservative body weight (conservative scenario) and the average ingestion rate by the average body weight (average exposure scenario). The food ingestion rates were then multiplied by 0.15, which is the percent solids of plant foliage (USEPA, 2005) to convert the ingestion rate from a wet-weight value to a dry-weight value. The incidental soil ingestion rate was calculated by multiplying the ingestion rate by the percentage of soil that is incidentally ingested for a white-footed mouse (assumed 2% for conservative and average food chain model) from USEPA (1993) because incidental soil ingestion rates for the cotton mouse are not available.

The listed home range sizes for the deer mouse are 0.014 hectares to 0.128 hectares (0.035 to 0.3 acres) with an average home range of 0.062 hectares (0.15) acres (USEPA, 1993).

Marsh Wren (Cistothorus palustris)

Marsh wrens are common bird inhabitants of freshwater cattail marshes and salt marshes. Standing water from several centimeters to a meter are typical of the preferred habitat of the marsh wren. They breed as far south as Florida and spend their winters in the southern United States, particularly in coastal areas. Marsh wrens typically nest in association with bulrushes, cattails, and sedges. Marsh wrens consume aquatic insects and invertebrates by gleaning from the water surface, on stems and leaves of aquatic plants, and the marsh bottom.

The adult body weight for the marsh wren ranges from 0.0094 to 0.0119 kg with an average of 0.0104 kg. The

listed food ingestion rates for the marsh wren are between 0.67 and 0.99 g/g-day (wet-weight). The food ingestion rates in kg/day were calculated by multiplying the maximum ingestion rate by the conservative body weight (conservative scenario) and the average ingestion rate by the average body weight (average exposure scenario). The food ingestion rates were then multiplied by 0.33, which is the percent solids of insects (USEPA, 1993) to convert the ingestion rate from a wet-weight value to a dry-weight value. The incidental soil ingestion rate was calculated by multiplying the ingestion rate by the percentage of soil that is incidentally ingested for a woodcock (assumed 16.4% for conservative food chain model and 6.4% for the average food chain model) from USEPA (2005) because incidental soil ingestion rates for a marsh wren are not available. 16.4% is the 90th percentile value and 6.4% is the 50th percentile value from USEPA (2005).

The listed territory sizes for the marsh wren are 0.006 hectares to 0.17 hectares (0.015 to 0.42 acres) with an average territory of 0.0542 hectares (0.133) acres (USEPA, 1993). Home ranges for the marsh wren were not available. The term "territory" refers to the area occupied by an animal or group of animals that is forcibly defended against by intruders of the same species. The home range is the area within which an animal normally spends all, or most, of its time in the course of a season (Dasmann, 1981), and home ranges of birds are usually larger than their territories. The difference between territory and home range is important when determining the extent to which a receptor uses a particular site such as SWMU 16.

Mourning Dove

The mourning dove is the most abundant dove in the United States and is common in many habitats. The mourning dove can be found in rural areas, cities, and in suburban areas. Mourning doves travel and forage in flocks, except during breeding seasons when the birds will form pairs. Mourning doves feed primarily from the ground, eating wheat, buckwheat, and weed seeds.

Exposure parameters for the mourning dove were taken from USEPA (2005). Only one adult body weight for the mourning dove is listed (120 g) and so this body weight was used in the conservative and average exposure scenarios. Two studies were listed in USEPA (2005) and so the average of the maximum food ingestion rates (0.19 g/g-day, dry-weight) was used for the conservative foodchain model. The average of the mean food ingestion rates (0.137 g/g-day, dry weight) was used for the conservative foodchain model. The final ingestion rates used in the foodchain models were calculated by multiplying the average of the maximum ingestion rates by the conservative body weight (conservative scenario) and the average of the average ingestion rates by the average body weight (average exposure scenario). Because the values were listed as dry-weight in USEPA (2005), further conversions were not necessary. The incidental soil ingestion rate was calculated by multiplying the ingestion rate by the percentage of soil that is incidentally ingested for a dove (assumed 13.9% for conservative food chain model and 6.1% for the average food chain model) from USEPA (2005). 13.9% is the 90th percentile value and 6.1% is the 50th percentile value from USEPA (2005).

Home range data for the mourning dove was not available.

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APPENDIX G.3
TOXICITY REFERENCE VALUES

TABLE G.3-1

TOXICITY REFERENCE VALUES
NSW CHARLESTON
CHARLESTON, SOUTH CAROLINA

PARAMETER	Mammal		Bird	
	NOAEL	LOAEL	NOAEL	LOAEL
PESTICIDES/PCBs (mg/kg/d)				
4,4'-DDD	0.8	4	0.009	0.052
4,4'-DDE	0.8	4	0.009	0.052
4,4'-DDT	0.8	4	0.009	0.052
Aldrin	0.2	1	NV	NV
Alpha-BHC	0.014	0.14	0.56	2.25
Alpha-Chlordane	4.58	9.16	2.14	10.7
Aroclor-1242	0.069	0.69	0.41	4.1
Aroclor-1248	0.01	0.1	NV	NV
Aroclor-1254	0.068	0.68	0.18	1.8
Aroclor-1260	0.068	0.68	0.18	1.8
delta-BHC	0.014	0.14	0.56	2.25
Endrin Aldehyde	0.092	0.92	0.01	0.1
Endrin Ketone	0.092	0.92	0.01	0.1
Gamma-BHC (Lindane)	8	80	2	20
Gamma-Chlordane	4.58	9.16	2.14	10.7
Heptachlor	0.1	1	NV	NV
INORGANICS (mg/kg/d)				
Arsenic	0.126	1.26	2.46	7.38
Cadmium	1	10	1.45	20
Chromium	3.28	13.14	1	5
Copper	11.71	15.14	46.97	61.72
Lead	8	80	1.13	11.3
Mercury	0.032	0.16	0.0064	0.064
Nickel	40	80	77.4	107
Selenium	0.2	0.33	0.4	0.8
Zinc	160	320	14.49	130.9

-The sources of these NOAELS and LOAELS are presented in Table G.3-2.
-If only a NOAEL was available, the value was multiplied by 10 to estimate the LOAEL and if only a LOAEL was available, the value was divided by 10 to estimate the NOAEL.

NV = No Value

TABLE G.3-2

SOURCES AND ENDPOINTS FOR NOAELS AND LOAELS FOR TERRESTRIAL WILDLIFE
NWS CHARLESTON
CHARLESTON, SOUTH CAROLINA

Parameters	Concentration (mg/kg-day)	Endpoint	Effect	Chronic/ Subchronic	Species	Primary Reference	Source of Reference
Pesticides							
Aldrin	0.2	NOAEL	reproductive	chronic	rat	Treon and Cleveland, 1955	Sample et.al., 1996
Aldrin	1	LOAEL	reproductive	chronic	rat	Treon and Cleveland, 1955	Sample et.al., 1996
BHC (mixed isomers)	0.137	LOAEL	reproductive	chronic	mink	Bleavins et al., 1984	Sample et.al., 1996
BHC (mixed isomers)	0.563	NOAEL	reproductive	chronic	Japanese quail	Vos et al., 1971	Sample et.al., 1996
BHC (mixed isomers)	2.25	LOAEL	reproductive	chronic	Japanese quail	Vos et al., 1971	Sample et.al., 1996
gamma-BHC (lindane)	8	NOAEL	reproductive	chronic	rat	Palmer et al., 1978	Sample et.al., 1996
gamma-BHC (lindane)	20	LOAEL	reproductive	chronic	mallard duck	Chakravarty and Lahiri, 1986	Sample et.al., 1996
Chlordane	2.14	NOAEL	mortality	chronic	red-winged blackbird	Stickel et al., 1983	Sample et.al., 1996
Chlordane	10.7	LOAEL	mortality	chronic	red-winged blackbird	Stickel et al., 1983	Sample et.al., 1996
Chlordane	4.58	NOAEL	reproduction	chronic	mouse	WHO, 1984	Sample et.al., 1996
Chlordane	9.16	LOAEL	reproduction	chronic	mouse	WHO, 1984	Sample et.al., 1996
4,4'-DDT	0.8	NOAEL	reproductive	chronic	rat	Fitzhugh, 1948	Sample et.al., 1996
4,4'-DDT	4	LOAEL	reproductive	chronic	rat	Fitzhugh, 1948	Sample et.al., 1996
4,4'-DDT	0.052(1)	LOAEL	reproduction	chronic	brown pelican	Anderson et al., 1975	USEPA, 1995
4,4'-DDT	0.009(2)	NOAEL	reproduction	chronic	brown pelican	Anderson et al., 1975	USEPA, 1995
Endrin	0.92	LOAEL	reproduction	chronic	mouse	Good and Ware, 1969	Sample et.al., 1996
Endrin	0.1035	LOAEL	reproduction	chronic	screech owl	Fleming et al., 1982	Sample et.al., 1996
Heptachlor	1	LOAEL	reproduction	chronic	mink	Crum et al., 1993	Sample et.al., 1996
Aroclor-1242	0.685	LOAEL	reproduction	chronic	mink	Bleavins et al., 1980	Sample et.al., 1996
Aroclor-1242	0.41	NOAEL	reproduction	chronic	screech owl	McLane and Hughes, 1980	Sample et.al., 1996
Aroclor-1248	0.1	LOAEL	reproductive	chronic	rhesus monkey	Barsotti et al., 1976	Sample et.al., 1996
Aroclor-1254	1.8	LOAEL	reproductive	chronic	pheasant	Dahlgren et al., 1972	Sample et.al., 1996
Aroclor-1254	0.68	LOAEL	reproduction	chronic	mouse	McCoy et al., 1995	Sample et.al., 1996
Inorganics							
Arsenic	1.261	LOAEL	reproductive	chronic	mouse	Schroeder and Mitchner, 1971	Sample et.al., 1996
Arsenic	2.46	NOAEL	mortality	chronic	brown-headed cowbird	USFWS, 1969	Sample et.al., 1996
Arsenic	7.38	LOAEL	mortality	chronic	brown-headed cowbird	USFWS, 1969	Sample et.al., 1996
Cadmium	1	NOAEL	reproductive	chronic	rat	Sutou et al., 1980	Sample et.al., 1996
Cadmium	10	LOAEL	reproductive	chronic	rat	Sutou et al., 1980	Sample et.al., 1996
Cadmium	1.45	NOAEL	reproductive	chronic	mallard duck	White and Finely, 1978	Sample et.al., 1996
Cadmium	20	LOAEL	reproductive	chronic	mallard duck	White and Finely, 1978	Sample et.al., 1996
Chromium(III)	1	NOAEL	reproductive	chronic	black duck	Haseltine et al., 1985	Sample et.al., 1996
Chromium(III)	5	LOAEL	reproductive	chronic	black duck	Haseltine et al., 1985	Sample et.al., 1996
Chromium(VI)	3.28	NOAEL	BW/food cons.	chronic	rat	Mackenzie et al., 1958	Sample et.al., 1996
Chromium(VI)	131.4	LOAEL	mortality	subchronic	rat	Steven et al., 1976	Sample et.al., 1996
Copper	11.71	NOAEL	reproductive	chronic	mink	Aulerich et al., 1982	ATSDR, 1989
Copper	15.14	LOAEL	reproductive	chronic	mink	Aulerich et al., 1982	ATSDR, 1989
Copper	46.97	NOAEL	mortality	chronic	chicks	Mehring et al., 1960	Sample et.al., 1996
Copper	61.72	LOAEL	mortality	chronic	chicks	Mehring et al., 1960	Sample et.al., 1996
Lead	8	NOAEL	reproductive	chronic	rat	Azar et al., 1973	Sample et.al., 1996
Lead	80	LOAEL	reproductive	chronic	rat	Azar et al., 1973	Sample et.al., 1996
Lead	1.13	NOAEL	reproductive	chronic	Japanese quail	Edens et al., 1976	Sample et.al., 1996
Lead	11.3	LOAEL	reproductive	chronic	Japanese quail	Edens et al., 1976	Sample et.al., 1996
Mercury	0.064	LOAEL	reproductive	chronic	mallard duck	Heinz, 1979	Sample et.al., 1996
Mercury	0.032	NOAEL	reproductive	chronic	rat	Verschuuren et al., 1976	Sample et.al., 1996
Mercury	0.16	LOAEL	reproductive	chronic	rat	Verschuuren et al., 1976	Sample et.al., 1996
Nickel	40	NOAEL	reproductive	chronic	rat	Ambrose et al., 1976	Sample et.al., 1996
Nickel	80	LOAEL	reproductive	chronic	rat	Ambrose et al., 1976	Sample et.al., 1996
Nickel	77.4	NOAEL	mortality	chronic	mallard duck	Cain and Pafford, 1981	Sample et.al., 1996
Nickel	107	LOAEL	mortality	chronic	mallard duck	Cain and Pafford, 1981	Sample et.al., 1996
Selenium	0.4	NOAEL	reproductive	chronic	mallard duck	Heinz et al., 1989	Sample et.al., 1996
Selenium	0.8	LOAEL	reproductive	chronic	mallard duck	Heinz et al., 1989	Sample et.al., 1996
Selenium	0.2	NOAEL	reproductive	chronic	rat	Rosenfeld and Beath, 1954	Sample et.al., 1996
Selenium	0.33	LOAEL	reproductive	chronic	rat	Rosenfeld and Beath, 1954	Sample et.al., 1996
Zinc	160	NOAEL	reproductive	chronic	rat	Schlicker and Cox, 1968	Sample et.al., 1996
Zinc	320	LOAEL	reproductive	chronic	rat	Schlicker and Cox, 1968	Sample et.al., 1996
Zinc	14.49	NOAEL	reproductive	chronic	white leghorn hen	Stahl et al., 1990	Sample et.al., 1996
Zinc	130.9	LOAEL	reproductive	chronic	white leghorn hen	Stahl et al., 1990	Sample et.al., 1996

1 - The LOAEL of 0.052 mg/kg-day was the recalculated LOAEL for the referenced study by assumming a lag time for the reduction of DDT (see USEPA, 1995)

2 - The NOAEL of 0.009 was calculated by dividing the original LOAEL of the referenced study (0.027 mg/kg-day) by an uncertainty factor of 3 (see USEPA, 1995).

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APPENDIX G.4
FOOD-CHAIN MODEL CALCULATIONS

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT SWMU 16, NWS Charleston	JOB NUMBER
SUBJECT percent lipid calculation	
BASED ON USEPA, 1997. (EPA 823-R-97-006).	DRAWING NUMBER
BY R. Young / CHECKED BY A. Bernhardt	APPROVED BY / DATE 9/23/05

Percent lipid content in fish:

Species	Whole fish % lipid content *
Redbreast sunfish	3.6
Green sunfish	3.2
Pumpkinseed	3.9
Longear sunfish	2.8
Bluegill sunfish	3.5
Bluegill sunfish	4.4
	3.566 ≈ 3.6%

wet-weight lipid for fish

To adjust lipid for fish to dry-weight, divide by 25%, which is the percent solids of fish from Sample et al., 1997.

$$\frac{3.6}{25} \times 100 = 14.4\%$$ dry-weight lipid for fish

* Values taken from Appendix C, Table C-3b, USEPA, 1997. The Incidence and Severity of Sediment Contamination in Surface Waters of the United States.

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SHORT-TAILED SHREW - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 16, CHARLESTON, SOUTH CAROLINA

Chemical	Max Soil Conc. (mg/kg)	Biotransfer Factor (soil to inv)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	NOAEL HQ	LOAEL HQ
Pesticides/PCBs										
4,4'-DDE	4.60E-03	1.30E+01	5.98E-02	2.35E-05	1.02E-02	1.02E-02	8.00E-01	4.00E+00	1.27E-02	2.55E-03
4,4'-DDT	4.80E-03	1.30E+01	6.24E-02	2.45E-05	1.06E-02	1.06E-02	8.00E-01	4.00E+00	1.33E-02	2.66E-03
Aroclor-1254	5.90E+01	1.59E+01	9.39E+02	3.01E-01	1.60E+02	1.60E+02	6.80E-02	6.80E-01	2.35E+03	2.35E+02
Inorganics										
Cadmium	6.07E+01	4.07E+01	2.47E+03	3.10E-01	4.20E+02	4.20E+02	1.00E+00	1.00E+01	4.20E+02	4.20E+01
Chromium	6.67E+02	3.16E+00	2.11E+03	3.40E+00	3.58E+02	3.62E+02	3.28E+00	1.31E+01	1.10E+02	2.75E+01
Copper	5.81E+01	1.53E+00	8.90E+01	2.96E-01	1.51E+01	1.54E+01	1.17E+01	1.51E+01	1.32E+00	1.02E+00
Lead	1.24E+04	1.52E+00	1.89E+04	6.32E+01	3.21E+03	3.27E+03	8.00E+00	8.00E+01	4.09E+02	4.09E+01
Mercury	1.10E-01	2.06E+01	2.27E+00	5.61E-04	3.86E-01	3.86E-01	3.20E-02	1.60E-01	1.21E+01	2.41E+00
Zinc	1.57E+02	1.29E+01	2.02E+03	8.01E-01	3.44E+02	3.45E+02	1.60E+02	3.20E+02	2.15E+00	1.08E+00

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.53E-02	kg
Food Ingestion Rate = (If)	2.59E-03	kg/day
Soil Ingestion Rate = (Is)	7.78E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Ci = Contaminant concentration in invertebrate = (soil conc. * Biotransfer Factor)
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (invertebrate)
H=HR/CA (Assume = to 1)

SHORT-TAILED SHREW - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 16, CHARLESTON, SOUTH CAROLINA

Chemical	Avg Soil Conc. (mg/kg)	Biotransfer Factor (soil to inv)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	NOAEL HQ	LOAEL HQ
Pesticides/PCBs										
4,4'-DDE	4.60E-03	1.30E+01	5.98E-02	4.04E-06	5.84E-03	5.85E-03	8.00E-01	4.00E+00	7.31E-03	1.46E-03
4,4'-DDT	4.80E-03	1.30E+01	6.24E-02	4.22E-06	6.10E-03	6.10E-03	8.00E-01	4.00E+00	7.62E-03	1.52E-03
Aroclor-1254	1.24E+01	6.67E+00	8.26E+01	1.09E-02	8.06E+00	8.08E+00	6.80E-02	6.80E-01	1.19E+02	1.19E+01
Inorganics										
Cadmium	1.32E+01	7.71E+00	1.02E+02	1.16E-02	9.96E+00	9.98E+00	1.00E+00	1.00E+01	9.98E+00	9.98E-01
Chromium	1.54E+02	3.06E-01	4.71E+01	1.35E-01	4.60E+00	4.74E+00	3.28E+00	1.31E+01	1.44E+00	3.61E-01
Copper	1.60E+01	5.15E-01	8.21E+00	1.40E-02	8.02E-01	8.16E-01	1.17E+01	1.51E+01	6.97E-02	5.39E-02
Lead	2.76E+03	2.66E-01	7.34E+02	2.43E+00	7.17E+01	7.41E+01	8.00E+00	8.00E+01	9.26E+00	9.26E-01
Mercury	4.25E-02	1.69E+00	7.20E-02	3.74E-05	7.03E-03	7.07E-03	3.20E-02	1.60E-01	2.21E-01	4.42E-02
Zinc	4.10E+01	3.20E+00	1.31E+02	3.60E-02	1.28E+01	1.29E+01	1.60E+02	3.20E+02	8.04E-02	4.02E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.69E-02	kg
Food Ingestion Rate = (If)	1.65E-03	kg/day
Soil Ingestion Rate = (Is)	1.48E-05	kg/day
Home Range = (HR)	9.70E-01	Acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Ci = Contaminant concentration in invertebrate = (soil conc. * Biotransfer Factor)
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (invertebrate)
H=HR/CA (Assume = to 1)

COTTON MOUSE - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 16, CHARLESTON, SOUTH CAROLINA

Chemical	Max Soil Conc. (mg/kg)	Biotransfer Factor (soil to veg.)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Vegetation	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	NOAEL HQ	LOAEL HQ
Pesticides/PCBs										
4,4'-DDE	4.60E-03	1.90E-02	8.74E-05	1.32E-05	1.26E-05	2.58E-05	8.00E-01	4.00E+00	3.22E-05	6.44E-06
4,4'-DDT	4.80E-03	7.80E-03	3.74E-05	1.38E-05	5.38E-06	1.92E-05	8.00E-01	4.00E+00	2.40E-05	4.79E-06
Aroclor-1254	5.90E+01	1.30E-02	7.67E-01	1.70E-01	1.10E-01	2.80E-01	6.80E-02	6.80E-01	4.11E+00	4.11E-01
Inorganics										
Cadmium	6.07E+01	3.25E+00	1.97E+02	1.74E-01	2.83E+01	2.85E+01	1.00E+00	1.00E+01	2.85E+01	2.85E+00
Chromium	6.67E+02	8.39E-02	5.60E+01	1.92E+00	8.04E+00	9.96E+00	3.28E+00	1.31E+01	3.04E+00	7.58E-01
Copper	5.81E+01	6.25E-01	3.63E+01	1.67E-01	5.22E+00	5.38E+00	1.17E+01	1.51E+01	4.60E-01	3.56E-01
Lead	1.24E+04	4.68E-01	5.80E+03	3.56E+01	8.34E+02	8.69E+02	8.00E+00	8.00E+01	1.09E+02	1.09E+01
Mercury	1.10E-01	5.00E+00	5.50E-01	3.16E-04	7.90E-02	7.93E-02	3.20E-02	1.60E-01	2.48E+00	4.96E-01
Zinc	1.57E+02	1.82E+00	2.86E+02	4.51E-01	4.11E+01	4.15E+01	1.60E+02	3.20E+02	2.59E-01	1.30E-01

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.48E-02	kg
Food Ingestion Rate = (If)	2.13E-03	kg/day
Soil Ingestion Rate = (Is)	4.25E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Cp = Contaminant concentration in vegetation = (soil conc. * Biotransfer Factor)
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (vegetation)
H=HR/CA (Assume = to 1)

COTTON MOUSE - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 16, CHARLESTON, SOUTH CAROLINA

Chemical	Avg Soil Conc. (mg/kg)	Biotransfer Factor (soil to veg.)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Vegetation	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	NOAEL HQ	LOAEL HQ
Pesticides/PCBs										
4,4'-DDE	4.60E-03	1.90E-02	8.74E-05	3.70E-06	3.52E-06	7.22E-06	8.00E-01	4.00E+00	9.03E-06	1.81E-06
4,4'-DDT	4.80E-03	7.80E-03	3.74E-05	3.86E-06	1.51E-06	5.37E-06	8.00E-01	4.00E+00	6.71E-06	1.34E-06
Aroclor-1254	1.24E+01	1.30E-02	1.61E-01	9.97E-03	6.48E-03	1.64E-02	6.80E-02	6.80E-01	2.42E-01	2.42E-02
Inorganics										
Cadmium	1.32E+01	5.86E-01	7.75E+00	1.07E-02	3.12E-01	3.23E-01	1.00E+00	1.00E+01	3.23E-01	3.23E-02
Chromium	1.54E+02	4.10E-02	6.31E+00	1.24E-01	2.54E-01	3.78E-01	3.28E+00	1.31E+01	1.15E-01	2.88E-02
Copper	1.60E+01	1.24E-01	1.98E+00	1.28E-02	7.96E-02	9.24E-02	1.17E+01	1.51E+01	7.89E-03	6.11E-03
Lead	2.76E+03	3.89E-02	1.07E+02	2.22E+00	4.32E+00	6.54E+00	8.00E+00	8.00E+01	8.18E-01	8.18E-02
Mercury	4.25E-02	6.52E-01	2.77E-02	3.42E-05	1.12E-03	1.15E-03	3.20E-02	1.60E-01	3.59E-02	7.18E-03
Zinc	4.10E+01	3.66E-01	1.50E+01	3.30E-02	6.04E-01	6.37E-01	1.60E+02	3.20E+02	3.98E-03	1.99E-03

Body Weight = (BW)	2.10E-02	kg
Food Ingestion Rate = (If)	8.45E-04	kg/day
Soil Ingestion Rate = (Is)	1.69E-05	kg/day
Home Range = (HR)	1.52E-01	Acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Cp = Contaminant concentration in vegetation = (soil conc. * Biotransfer Factor)
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (vegetation)
H=HR/CA (Assume = to 1)

MOURNING DOVE - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 16, CHARLESTON, SOUTH CAROLINA

Chemical	Max Soil Conc. (mg/kg)	Biotransfer Factor (soil to veg.)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Vegetation	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	NOAEL HQ	LOAEL HQ
Pesticides/PCBs										
4,4'-DDE	4.60E-03	1.90E-02	8.74E-05	1.21E-04	1.66E-05	1.38E-04	9.00E-03	5.20E-02	1.53E-02	2.66E-03
4,4'-DDT	4.80E-03	7.80E-03	3.74E-05	1.27E-04	7.11E-06	1.34E-04	9.00E-03	5.20E-02	1.49E-02	2.57E-03
Aroclor-1254	5.90E+01	1.30E-02	7.67E-01	1.56E+00	1.46E-01	1.70E+00	1.80E-01	1.80E+00	9.47E+00	9.47E-01
Inorganics										
Cadmium	6.07E+01	3.25E+00	1.97E+02	1.60E+00	3.75E+01	3.91E+01	1.45E+00	2.00E+01	2.70E+01	1.95E+00
Chromium	6.67E+02	8.39E-02	5.60E+01	1.76E+01	1.06E+01	2.82E+01	1.00E+00	5.00E+00	2.82E+01	5.65E+00
Copper	5.81E+01	6.25E-01	3.63E+01	1.53E+00	6.90E+00	8.43E+00	4.70E+01	6.17E+01	1.80E-01	1.37E-01
Lead	1.24E+04	4.68E-01	5.80E+03	3.27E+02	1.10E+03	1.43E+03	1.13E+00	1.13E+01	1.27E+03	1.27E+02
Mercury	1.10E-01	5.00E+00	5.50E-01	2.91E-03	1.05E-01	1.07E-01	6.40E-03	6.40E-02	1.68E+01	1.68E+00
Zinc	1.57E+02	1.82E+00	2.86E+02	4.15E+00	5.43E+01	5.84E+01	1.45E+01	1.31E+02	4.03E+00	4.46E-01

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.20E-01	kg
Food Ingestion Rate = (If)	2.28E-02	kg/day
Soil Ingestion Rate = (Is)	3.17E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Cp = Contaminant concentration in vegetation = (soil conc. * Biotransfer Factor)
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (vegetation)
H=HR/CA (Assume = to 1)

MOURNING DOVE - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 16, CHARLESTON, SOUTH CAROLINA

Chemical	Avg Soil Conc. (mg/kg)	Biotransfer Factor (soil to veg.)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Vegetation	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	NOAEL HQ	LOAEL HQ
Pesticides/PCBs										
4,4'-DDE	4.60E-03	1.90E-02	8.74E-05	3.83E-05	1.19E-05	5.03E-05	9.00E-03	5.20E-02	5.59E-03	9.67E-04
4,4'-DDT	4.80E-03	7.80E-03	3.74E-05	4.00E-05	5.12E-06	4.51E-05	9.00E-03	5.20E-02	5.01E-03	8.68E-04
Aroclor-1254	1.24E+01	1.30E-02	1.61E-01	1.03E-01	2.20E-02	1.25E-01	1.80E-01	1.80E+00	6.96E-01	6.96E-02
Inorganics										
Cadmium	1.32E+01	5.86E-01	7.75E+00	1.10E-01	1.06E+00	1.17E+00	1.45E+00	2.00E+01	8.07E-01	5.85E-02
Chromium	1.54E+02	4.10E-02	6.31E+00	1.28E+00	8.63E-01	2.15E+00	1.00E+00	5.00E+00	2.15E+00	4.29E-01
Copper	1.60E+01	1.24E-01	1.98E+00	1.33E-01	2.70E-01	4.03E-01	4.70E+01	6.17E+01	8.59E-03	6.53E-03
Lead	2.76E+03	3.89E-02	1.07E+02	2.30E+01	1.47E+01	3.77E+01	1.13E+00	1.13E+01	3.33E+01	3.33E+00
Mercury	4.25E-02	6.52E-01	2.77E-02	3.54E-04	3.79E-03	4.14E-03	6.40E-03	6.40E-02	6.47E-01	6.47E-02
Zinc	4.10E+01	3.66E-01	1.50E+01	3.42E-01	2.05E+00	2.39E+00	1.45E+01	1.31E+02	1.65E-01	1.83E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.20E-01	kg
Food Ingestion Rate = (If)	1.64E-02	kg/day
Soil Ingestion Rate = (Is)	1.00E-03	kg/day
Home Range = (HR)	Assume 100%	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Cp = Contaminant concentration in vegetation = (soil conc. * Biotransfer Factor)
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (vegetation)
H=HR/CA (Assume = to 1)

AMERICAN WOODCOCK - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 16, CHARLESTON, SOUTH CAROLINA

Chemical	Max Soil Conc. (mg/kg)	Biotransfer Factor (soil to inv)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	NOAEL HQ	LOAEL HQ
Pesticides/PCBs										
4,4'-DDE	4.60E-03	1.30E+01	5.98E-02	1.38E-04	1.09E-02	1.11E-02	9.00E-03	5.20E-02	1.23E+00	2.13E-01
4,4'-DDT	4.80E-03	1.30E+01	6.24E-02	1.44E-04	1.14E-02	1.15E-02	9.00E-03	5.20E-02	1.28E+00	2.22E-01
Aroclor-1254	5.90E+01	1.59E+01	9.39E+02	1.77E+00	1.71E+02	1.73E+02	1.80E-01	1.80E+00	9.62E+02	9.62E+01
Inorganics										
Cadmium	6.07E+01	4.07E+01	2.47E+03	1.82E+00	4.51E+02	4.53E+02	1.45E+00	2.00E+01	3.12E+02	2.26E+01
Chromium	6.67E+02	3.16E+00	2.11E+03	2.00E+01	3.85E+02	4.05E+02	1.00E+00	5.00E+00	4.05E+02	8.10E+01
Copper	5.81E+01	1.53E+00	8.90E+01	1.74E+00	1.62E+01	1.80E+01	4.70E+01	6.17E+01	3.83E-01	2.91E-01
Lead	1.24E+04	1.52E+00	1.89E+04	3.71E+02	3.45E+03	3.82E+03	1.13E+00	1.13E+01	3.38E+03	3.38E+02
Mercury	1.10E-01	2.06E+01	2.27E+00	3.30E-03	4.14E-01	4.18E-01	6.40E-03	6.40E-02	6.53E+01	6.53E+00
Zinc	1.57E+02	1.29E+01	2.02E+03	4.70E+00	3.69E+02	3.74E+02	1.45E+01	1.31E+02	2.58E+01	2.86E+00

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.66E-01	kg
Food Ingestion Rate = (If)	3.03E-02	kg/day
Soil Ingestion Rate = (Is)	4.97E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Ci = Contaminant concentration in invertebrate = (soil conc. * Biotransfer Factor)
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (invertebrate)
H=HR/CA (Assume = to 1)

AMERICAN WOODCOCK - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 16, CHARLESTON, SOUTH CAROLINA

Chemical	Avg Soil Conc. (mg/kg)	Biotransfer Factor (soil to inv)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	NOAEL HQ	LOAEL HQ
Pesticides/PCBs										
4,4'-DDE	4.60E-03	1.30E+01	5.98E-02	3.92E-05	7.97E-03	8.01E-03	9.00E-03	5.20E-02	8.90E-01	1.54E-01
4,4'-DDT	4.80E-03	1.30E+01	6.24E-02	4.10E-05	8.32E-03	8.36E-03	9.00E-03	5.20E-02	9.29E-01	1.61E-01
Aroclor-1254	1.24E+01	6.67E+00	8.26E+01	1.06E-01	1.10E+01	1.11E+01	1.80E-01	1.80E+00	6.17E+01	6.17E+00
Inorganics										
Cadmium	1.32E+01	7.71E+00	1.02E+02	1.13E-01	1.36E+01	1.37E+01	1.45E+00	2.00E+01	9.46E+00	6.86E-01
Chromium	1.54E+02	3.06E-01	4.71E+01	1.31E+00	6.28E+00	7.60E+00	1.00E+00	5.00E+00	7.60E+00	1.52E+00
Copper	1.60E+01	5.15E-01	8.21E+00	1.36E-01	1.10E+00	1.23E+00	4.70E+01	6.17E+01	2.62E-02	1.99E-02
Lead	2.76E+03	2.66E-01	7.34E+02	2.35E+01	9.78E+01	1.21E+02	1.13E+00	1.13E+01	1.07E+02	1.07E+01
Mercury	4.25E-02	1.69E+00	7.20E-02	3.63E-04	9.59E-03	9.96E-03	6.40E-03	6.40E-02	1.56E+00	1.56E-01
Zinc	4.10E+01	3.20E+00	1.31E+02	3.50E-01	1.75E+01	1.78E+01	1.45E+01	1.31E+02	1.23E+00	1.36E-01

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.90E-01	kg
Food Ingestion Rate = (If)	2.53E-02	kg/day
Soil Ingestion Rate = (Is)	1.62E-03	kg/day
Home Range = (HR)	6.13E+01	Acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Ci = Contaminant concentration in invertebrate = (soil conc. * Biotransfer Factor)
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (invertebrate)
H=HR/CA (Assume = to 1)

MARSH WREN - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 16, CHARLESTON, SOUTH CAROLINA

Chemical	Max Sediment Conc. (mg/kg)	Biotransfer Factor (sed to benthic inv)(1)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Sediment	Dose (mg/kg/d) from: Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	NOAEL HQ	LOAEL HQ
Pesticides/PCBs										
4,4'-DDD	5.30E-03	2.80E-01	2.14E-02	3.60E-04	8.84E-03	9.20E-03	9.00E-03	5.20E-02	1.02E+00	1.77E-01
4,4'-DDE	4.20E-03	7.70E+00	4.66E-01	2.85E-04	1.93E-01	1.93E-01	9.00E-03	5.20E-02	2.14E+01	3.71E+00
4,4'-DDT	4.40E-03	1.67E+00	1.06E-01	2.99E-04	4.38E-02	4.41E-02	9.00E-03	5.20E-02	4.90E+00	8.48E-01
Alpha-Chlordane	3.70E-03	4.77E+00	2.54E-01	2.51E-04	1.05E-01	1.05E-01	2.14E+00	1.07E+01	4.93E-02	9.85E-03
Aroclor-1242	1.60E-01	6.41E+01	1.48E+02	1.09E-02	6.11E+01	6.11E+01	4.10E-01	4.10E+00	1.49E+02	1.49E+01
Aroclor-1254	NA	6.41E+01	NA	NA	NA	NA	1.80E-01	1.80E+00	NA	NA
Gamma-Chlordane	3.30E-03	2.22E+00	1.05E-01	2.24E-04	4.37E-02	4.39E-02	2.14E+00	1.07E+01	2.05E-02	4.10E-03
alpha-BHC	1.40E-02	1.80E+00	3.63E-01	9.50E-04	1.50E-01	1.51E-01	5.60E-01	2.25E+00	2.70E-01	6.72E-02
gamma-BHC (Lindane)	6.40E-03	1.80E+00	1.66E-01	4.34E-04	6.86E-02	6.91E-02	2.00E+00	2.00E+01	3.45E-02	3.45E-03
Inorganics										
Arsenic	2.06E+01	6.90E-01	1.42E+01	1.40E+00	5.88E+00	7.28E+00	2.46E+00	7.38E+00	2.96E+00	9.86E-01
Cadmium	NA	7.99E+00	NA	NA	NA	NA	1.45E+00	2.00E+01	NA	NA
Chromium	7.16E+01	4.68E-01	3.35E+01	4.86E+00	1.39E+01	1.87E+01	1.00E+00	5.00E+00	1.87E+01	3.75E+00
Copper	1.00E+02	5.25E+00	5.25E+02	6.79E+00	2.17E+02	2.24E+02	4.70E+01	6.17E+01	4.77E+00	3.63E+00
Lead	4.65E+01	6.07E-01	2.82E+01	3.16E+00	1.17E+01	1.48E+01	1.13E+00	1.13E+01	1.31E+01	1.31E+00
Mercury	2.90E-01	2.87E+00	8.32E-01	1.97E-02	3.44E-01	3.64E-01	6.40E-03	6.40E-02	5.69E+01	5.69E+00
Nickel	2.91E+01	2.32E+00	6.75E+01	1.97E+00	2.79E+01	2.99E+01	7.74E+01	1.07E+02	3.86E-01	2.80E-01
Selenium	2.60E+00	1.00E+00	2.60E+00	1.76E-01	1.08E+00	1.25E+00	4.00E-01	8.00E-01	3.13E+00	1.57E+00
Zinc	1.58E+02	7.53E+00	1.19E+03	1.07E+01	4.92E+02	5.03E+02	1.45E+01	1.31E+02	3.47E+01	3.84E+00

Cells are shaded if the value is greater than 1.0

(1) Sediment to fish BSAFs were used for the pesticides because sediment to benthic invertebrate BSAFs are not available.

Body Weight = (BW)	9.40E-03	kg
Food Ingestion Rate = (If)	3.89E-03	kg/day
Soil Ingestion Rate = (Is)	6.38E-04	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Ci = Contaminant concentration in invertebrate
Metals = sediment concentration * BAF
Organics = (sediment concentration * BSAF * %lipids)/(% total organic carbon)
Where:
% Lipids = 14.4 % (see Appendix G.4)
% TOC = 1 %
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (invertebrate)
H=HR/CA (Assume = to 1)

MARSH WREN - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 16, CHARLESTON, SOUTH CAROLINA

Chemical	Avg Sed. Conc. (mg/kg)	Biotransfer Factor (sed to benthic inv)(1)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Sediment	Dose (mg/kg/d) from: Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	NOAEL HQ	LOAEL HQ
Pesticides/PCBs										
4,4'-DDD	5.16E-03	2.80E-01	2.08E-02	9.51E-05	5.99E-03	6.08E-03	9.00E-03	5.20E-02	6.76E-01	1.17E-01
4,4'-DDE	3.83E-03	7.70E+00	4.25E-01	7.06E-05	1.22E-01	1.22E-01	9.00E-03	5.20E-02	1.36E+01	2.35E+00
4,4'-DDT	4.40E-03	1.67E+00	1.06E-01	8.11E-05	3.05E-02	3.06E-02	9.00E-03	5.20E-02	3.40E+00	5.88E-01
Alpha-Chlordane	3.11E-03	4.77E+00	2.13E-01	5.73E-05	6.15E-02	6.15E-02	2.14E+00	1.07E+01	2.88E-02	5.75E-03
Aroclor-1242	4.86E-02	3.62E+01	2.54E+01	8.97E-04	7.31E+00	7.31E+00	4.10E-01	4.10E+00	1.78E+01	1.78E+00
Aroclor-1254	NA	3.62E+01	NA	NA	NA	NA	1.80E-01	1.80E+00	NA	NA
Gamma-Chlordane	3.05E-03	2.22E+00	9.75E-02	5.62E-05	2.81E-02	2.81E-02	2.14E+00	1.07E+01	1.32E-02	2.63E-03
alpha-BHC	6.19E-03	1.80E+00	1.61E-01	1.14E-04	4.62E-02	4.64E-02	5.60E-01	2.25E+00	8.28E-02	2.06E-02
gamma-BHC (Lindane)	3.84E-03	1.80E+00	9.94E-02	7.07E-05	2.86E-02	2.87E-02	2.00E+00	2.00E+01	1.44E-02	1.44E-03
Inorganics										
Arsenic	1.51E+01	1.43E-01	2.16E+00	2.79E-01	6.23E-01	9.02E-01	2.46E+00	7.38E+00	3.67E-01	1.22E-01
Cadmium	NA	6.00E-01	NA	NA	NA	NA	1.45E+00	2.00E+01	NA	NA
Chromium	5.32E+01	1.00E-01	5.32E+00	9.81E-01	1.53E+00	2.51E+00	1.00E+00	5.00E+00	2.51E+00	5.03E-01
Copper	4.06E+01	1.56E+00	6.31E+01	7.48E-01	1.82E+01	1.89E+01	4.70E+01	6.17E+01	4.03E-01	3.07E-01
Lead	3.08E+01	7.10E-02	2.19E+00	5.68E-01	6.30E-01	1.20E+00	1.13E+00	1.13E+01	1.06E+00	1.06E-01
Mercury	8.75E-02	1.14E+00	9.94E-02	1.61E-03	2.86E-02	3.02E-02	6.40E-03	6.40E-02	4.73E+00	4.73E-01
Nickel	1.56E+01	4.86E-01	7.58E+00	2.88E-01	2.18E+00	2.47E+00	7.74E+01	1.07E+02	3.19E-02	2.31E-02
Selenium	1.14E+00	1.00E+00	1.14E+00	2.10E-02	3.28E-01	3.49E-01	4.00E-01	8.00E-01	8.72E-01	4.36E-01
Zinc	9.51E+01	1.94E+00	1.84E+02	1.75E+00	5.30E+01	5.48E+01	1.45E+01	1.31E+02	3.78E+00	4.18E-01

Cells are shaded if the value is greater than 1.0

(1) Sediment to fish BSAFs were used for the pesticides because sediment to benthic invertebrate BSAFs are not available.

Body Weight = (BW)	1.04E-02	kg
Food Ingestion Rate = (If)	2.99E-03	kg/day
Soil Ingestion Rate = (Is)	1.91E-04	kg/day
Home Range = (HR)	1.33E-01	Acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Ci = Contaminant concentration in invertebrate
Metals = sediment concentration * BAF
Organics = (sediment concentration * BSAF * %lipids)/(% total organic carbon)
Where:
% Lipids = 14.4 % (see Appendix G.4)
% TOC = 1 %
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (invertebrate)
H=HR/CA (Assume = to 1)

RACCOON - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 16, CHARLESTON, SOUTH CAROLINA

Chemical	Max Sediment Conc. (mg/kg)	Biotransfer Factor (sed to fish)(1)	Fish Conc. (mg/kg)	Dose (mg/kg/d) from: Sediment	Dose (mg/kg/d) from: Fish	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	NOAEL HQ	LOAEL HQ
Pesticides/PCBs										
4,4'-DDD	5.30E-03	2.80E-01	2.14E-02	6.79E-06	2.91E-04	2.98E-04	8.00E-01	4.00E+00	3.72E-04	7.45E-05
4,4'-DDE	4.20E-03	7.70E+00	4.66E-01	5.38E-06	6.34E-03	6.35E-03	8.00E-01	4.00E+00	7.94E-03	1.59E-03
4,4'-DDT	4.40E-03	1.67E+00	1.06E-01	5.63E-06	1.44E-03	1.45E-03	8.00E-01	4.00E+00	1.81E-03	3.62E-04
Alpha-Chlordane	3.70E-03	4.77E+00	2.54E-01	4.74E-06	3.46E-03	3.47E-03	4.58E+00	9.16E+00	7.57E-04	3.79E-04
Aroclor-1242	1.60E-01	1.85E+00	4.26E+00	2.05E-04	5.81E-02	5.83E-02	6.90E-02	6.90E-01	8.45E-01	8.45E-02
Aroclor-1254	NA	1.85E+00	NA	NA	NA	NA	6.80E-02	6.80E-01	NA	NA
Gamma-Chlordane	3.30E-03	2.22E+00	1.05E-01	4.23E-06	1.44E-03	1.44E-03	4.58E+00	9.16E+00	3.15E-04	1.57E-04
alpha-BHC	1.40E-02	1.80E+00	3.63E-01	1.79E-05	4.94E-03	4.96E-03	1.40E-02	1.40E-01	3.54E-01	3.54E-02
gamma-BHC (Lindane)	6.40E-03	1.80E+00	1.66E-01	8.20E-06	2.26E-03	2.27E-03	8.00E+00	8.00E+01	2.84E-04	2.84E-05
Inorganics										
Arsenic	2.06E+01	6.90E-01	1.42E+01	2.64E-02	1.94E-01	2.20E-01	1.26E-01	1.26E+00	1.75E+00	1.75E-01
Cadmium	NA	7.99E+00	NA	NA	NA	NA	1.00E+00	1.00E+01	NA	NA
Chromium	7.16E+01	4.68E-01	3.35E+01	9.17E-02	4.57E-01	5.48E-01	3.28E+00	1.31E+01	1.67E-01	4.17E-02
Copper	1.00E+02	5.25E+00	5.25E+02	1.28E-01	7.15E+00	7.28E+00	1.17E+01	1.51E+01	6.22E-01	4.81E-01
Lead	4.65E+01	6.07E-01	2.82E+01	5.96E-02	3.85E-01	4.44E-01	8.00E+00	8.00E+01	5.55E-02	5.55E-03
Mercury	2.90E-01	2.87E+00	8.32E-01	3.71E-04	1.13E-02	1.17E-02	3.20E-02	1.60E-01	3.66E-01	7.31E-02
Nickel	2.91E+01	2.32E+00	6.75E+01	3.73E-02	9.20E-01	9.57E-01	4.00E+01	8.00E+01	2.39E-02	1.20E-02
Selenium	2.60E+00	1.00E+00	2.60E+00	3.33E-03	3.54E-02	3.88E-02	2.00E-01	3.30E-01	1.94E-01	1.17E-01
Zinc	1.58E+02	7.53E+00	1.19E+03	2.02E-01	1.62E+01	1.64E+01	1.60E+02	3.20E+02	1.03E-01	5.13E-02

Cells are shaded if the value is greater than 1.0

(1) Sediment to benthic invertebrate BSAFs were used for the inorganics becuased sediment to fish BSAFs are not available.

Body Weight = (BW)	3.67E+00	kg
Food Ingestion Rate = (If)	5.00E-02	kg/day
Soil Ingestion Rate = (Is)	4.70E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (fish) = (Cf * If)(H)/BW
Cf = Contaminant concentration in fish
Metals = sediment concentration * BAF
Organics = (sediment concentration * BSAF * %lipids)/(% total organic carbon)
Where:
% Lipids = 14.4 % (see Appendix G.4)
% TOC = 1 %
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (fish)
H=HR/CA (Assume = to 1)

RACCOON - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 16, CHARLESTON, SOUTH CAROLINA

Chemical	Avg Sed. Conc. (mg/kg)	Biotransfer Factor (sed to fish)(1)	Fish Conc. (mg/kg)	Dose (mg/kg/d) from: Sediment	Dose (mg/kg/d) from: Fish	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	NOAEL HQ	LOAEL HQ
Pesticides/PCBs										
4,4'-DDD	5.16E-03	2.80E-01	2.08E-02	6.15E-06	2.64E-04	2.70E-04	8.00E-01	4.00E+00	3.37E-04	6.75E-05
4,4'-DDE	3.83E-03	7.70E+00	4.25E-01	4.56E-06	5.38E-03	5.39E-03	8.00E-01	4.00E+00	6.74E-03	1.35E-03
4,4'-DDT	4.40E-03	1.67E+00	1.06E-01	5.25E-06	1.34E-03	1.35E-03	8.00E-01	4.00E+00	1.68E-03	3.37E-04
Alpha-Chlordane	3.11E-03	4.77E+00	2.13E-01	3.70E-06	2.71E-03	2.71E-03	4.58E+00	9.16E+00	5.92E-04	2.96E-04
Aroclor-1242	4.86E-02	1.85E+00	1.30E+00	5.80E-05	1.64E-02	1.65E-02	6.90E-02	6.90E-01	2.39E-01	2.39E-02
Aroclor-1254	NA	1.85E+00	NA	NA	NA	NA	6.80E-02	6.80E-01	NA	NA
Gamma-Chlordane	3.05E-03	2.22E+00	9.75E-02	3.64E-06	1.24E-03	1.24E-03	4.58E+00	9.16E+00	2.71E-04	1.35E-04
alpha-BHC	6.19E-03	1.80E+00	1.61E-01	7.38E-06	2.04E-03	2.04E-03	1.40E-02	1.40E-01	1.46E-01	1.46E-02
gamma-BHC (Lindane)	3.84E-03	1.80E+00	9.94E-02	4.57E-06	1.26E-03	1.27E-03	8.00E+00	8.00E+01	1.58E-04	1.58E-05
Inorganics										
Arsenic	1.51E+01	1.43E-01	2.16E+00	1.80E-02	2.74E-02	4.55E-02	1.26E-01	1.26E+00	3.61E-01	3.61E-02
Cadmium	NA	6.00E-01	NA	NA	NA	NA	1.00E+00	1.00E+01	NA	NA
Chromium	5.32E+01	1.00E-01	5.32E+00	6.34E-02	6.75E-02	1.31E-01	3.28E+00	1.31E+01	3.99E-02	9.96E-03
Copper	4.06E+01	1.56E+00	6.31E+01	4.83E-02	8.00E-01	8.49E-01	1.17E+01	1.51E+01	7.25E-02	5.60E-02
Lead	3.08E+01	7.10E-02	2.19E+00	3.67E-02	2.77E-02	6.44E-02	8.00E+00	8.00E+01	8.06E-03	8.06E-04
Mercury	8.75E-02	1.14E+00	9.94E-02	1.04E-04	1.26E-03	1.37E-03	3.20E-02	1.60E-01	4.27E-02	8.53E-03
Nickel	1.56E+01	4.86E-01	7.58E+00	1.86E-02	9.62E-02	1.15E-01	4.00E+01	8.00E+01	2.87E-03	1.43E-03
Selenium	1.14E+00	1.00E+00	1.14E+00	1.36E-03	1.44E-02	1.58E-02	2.00E-01	3.30E-01	7.89E-02	4.78E-02
Zinc	9.51E+01	1.94E+00	1.84E+02	1.13E-01	2.33E+00	2.45E+00	1.60E+02	3.20E+02	1.53E-02	7.65E-03

Cells are shaded if the value is greater than 1.0

(1) Sediment to benthic invertebrate BSAFs were used for the inorganics becuased sediment to fish BSAFs are not available.

Body Weight = (BW)	5.60E+00	kg
Food Ingestion Rate = (If)	7.10E-02	kg/day
Soil Ingestion Rate = (Is)	6.67E-03	kg/day
Home Range = (HR)	1.56E+03	Acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (fish) = (Cf * If)(H)/BW
Cf = Contaminant concentration in fish
Metals = sediment concentration * BAF
Organics = (sediment concentration * BSAF * %lipids)/(% total organic carbon)
Where:
% Lipids = 14.4 % (see Appendix G.4)
% TOC = 1 %
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (fish)
H=HR/CA (Assume = to 1)

SHORT-TAILED SHREW - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 17, CHARLESTON, SOUTH CAROLINA

Chemical	Max Soil Conc. (mg/kg)	Biotransfer Factor (soil to inv)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	NOAEL HQ	LOAEL HQ
Pesticides/PCBs										
4,4'-DDD	3.70E-02	1.30E+01	4.81E-01	1.89E-04	8.18E-02	8.19E-02	8.00E-01	4.00E+00	1.02E-01	2.05E-02
4,4'-DDE	9.20E-03	1.30E+01	1.20E-01	4.69E-05	2.03E-02	2.04E-02	8.00E-01	4.00E+00	2.55E-02	5.09E-03
4,4'-DDT	2.00E-02	1.30E+01	2.60E-01	1.02E-04	4.42E-02	4.43E-02	8.00E-01	4.00E+00	5.54E-02	1.11E-02
Aldrin	2.20E-03	3.30E+00	7.26E-03	1.12E-05	1.23E-03	1.25E-03	2.00E-01	1.00E+00	6.23E-03	1.25E-03
Alpha-Chlordane	5.50E-04	5.00E+00	2.75E-03	2.80E-06	4.67E-04	4.70E-04	4.58E+00	9.16E+00	1.03E-04	5.13E-05
Aroclor-1248	5.70E-01	1.59E+01	9.07E+00	2.91E-03	1.54E+00	1.54E+00	1.00E-02	1.00E-01	1.54E+02	1.54E+01
Aroclor-1254	8.70E-01	1.59E+01	1.38E+01	4.44E-03	2.35E+00	2.36E+00	6.80E-02	6.80E-01	3.47E+01	3.47E+00
Aroclor-1260	3.50E-01	1.59E+01	5.57E+00	1.78E-03	9.46E-01	9.48E-01	6.80E-02	6.80E-01	1.39E+01	1.39E+00
Endrin Aldehyde	1.30E-03	3.60E+00	4.68E-03	6.63E-06	7.95E-04	8.02E-04	9.20E-02	9.20E-01	8.72E-03	8.72E-04
Endrin Ketone	5.40E-03	3.60E+00	1.94E-02	2.75E-05	3.30E-03	3.33E-03	9.20E-02	9.20E-01	3.62E-02	3.62E-03
Heptachlor	2.80E-03	1.00E+01	2.80E-02	1.43E-05	4.76E-03	4.77E-03	1.00E-01	1.00E+00	4.77E-02	4.77E-03
delta-BHC	1.80E-03	5.00E+00	9.00E-03	9.18E-06	1.53E-03	1.54E-03	1.40E-02	1.40E-01	1.10E-01	1.10E-02
gamma-BHC (Lindane)	8.70E-04	5.00E+00	4.35E-03	4.44E-06	7.39E-04	7.44E-04	8.00E+00	8.00E+01	9.30E-05	9.30E-06
Inorganics										
Cadmium	1.25E+01	4.07E+01	5.09E+02	6.37E-02	8.64E+01	8.65E+01	1.00E+00	1.00E+01	8.65E+01	8.65E+00
Chromium	3.92E+02	3.16E+00	1.24E+03	2.00E+00	2.11E+02	2.13E+02	3.28E+00	1.31E+01	6.48E+01	1.62E+01
Copper	1.93E+03	1.53E+00	2.95E+03	9.84E+00	5.02E+02	5.12E+02	1.17E+01	1.51E+01	4.37E+01	3.38E+01
Lead	6.70E+02	1.52E+00	1.02E+03	3.42E+00	1.73E+02	1.77E+02	8.00E+00	8.00E+01	2.21E+01	2.21E+00
Mercury	1.80E+00	2.06E+01	3.71E+01	9.18E-03	6.31E+00	6.32E+00	3.20E-02	1.60E-01	1.97E+02	3.95E+01
Nickel	3.48E+02	4.73E+00	1.65E+03	1.77E+00	2.80E+02	2.82E+02	4.00E+01	8.00E+01	7.04E+00	3.52E+00
Zinc	1.51E+03	1.29E+01	1.95E+04	7.70E+00	3.31E+03	3.31E+03	1.60E+02	3.20E+02	2.07E+01	1.04E+01

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.53E-02	kg
Food Ingestion Rate = (If)	2.59E-03	kg/day
Soil Ingestion Rate = (Is)	7.78E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Ci = Contaminant concentration in invertebrate = (soil conc. * Biotransfer Factor)
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (invertebrate)
H=HR/CA (Assume = to 1)

SHORT-TAILED SHREW - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 17, CHARLESTON, SOUTH CAROLINA

Chemical	Avg Soil Conc. (mg/kg)	Biotransfer Factor (soil to inv)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	NOAEL HQ	LOAEL HQ
Pesticides/PCBs										
4,4'-DDD	3.98E-03	1.30E+01	5.17E-02	3.50E-06	5.05E-03	5.05E-03	8.00E-01	4.00E+00	6.32E-03	1.26E-03
4,4'-DDE	2.26E-03	1.30E+01	2.94E-02	1.99E-06	2.88E-03	2.88E-03	8.00E-01	4.00E+00	3.60E-03	7.20E-04
4,4'-DDT	3.07E-03	1.30E+01	3.99E-02	2.70E-06	3.90E-03	3.90E-03	8.00E-01	4.00E+00	4.87E-03	9.75E-04
Aldrin	1.09E-03	3.30E+00	3.58E-03	9.54E-07	3.50E-04	3.51E-04	2.00E-01	1.00E+00	1.75E-03	3.51E-04
Alpha-Chlordane	5.50E-04	5.00E+00	2.75E-03	4.84E-07	2.69E-04	2.69E-04	4.58E+00	9.16E+00	5.88E-05	2.94E-05
Aroclor-1248	3.98E-02	6.67E+00	2.65E-01	3.50E-05	2.59E-02	2.59E-02	1.00E-02	1.00E-01	2.59E+00	2.59E-01
Aroclor-1254	7.86E-02	6.67E+00	5.24E-01	6.91E-05	5.12E-02	5.13E-02	6.80E-02	6.80E-01	7.54E-01	7.54E-02
Aroclor-1260	3.67E-02	6.67E+00	2.44E-01	3.22E-05	2.39E-02	2.39E-02	6.80E-02	6.80E-01	3.52E-01	3.52E-02
Endrin Aldehyde	1.30E-03	3.60E+00	4.68E-03	1.14E-06	4.57E-04	4.58E-04	9.20E-02	9.20E-01	4.98E-03	4.98E-04
Endrin Ketone	2.06E-03	3.60E+00	7.41E-03	1.81E-06	7.24E-04	7.26E-04	9.20E-02	9.20E-01	7.89E-03	7.89E-04
Heptachlor	1.08E-03	1.00E+01	1.08E-02	9.47E-07	1.05E-03	1.05E-03	1.00E-01	1.00E+00	1.05E-02	1.05E-03
delta-BHC	1.06E-03	5.00E+00	5.30E-03	9.31E-07	5.17E-04	5.18E-04	1.40E-02	1.40E-01	3.70E-02	3.70E-03
gamma-BHC (Lindane)	8.70E-04	5.00E+00	4.35E-03	7.65E-07	4.25E-04	4.26E-04	8.00E+00	8.00E+01	5.32E-05	5.32E-06
Inorganics										
Cadmium	1.26E+00	7.71E+00	9.72E+00	1.11E-03	9.49E-01	9.50E-01	1.00E+00	1.00E+01	9.50E-01	9.50E-02
Chromium	3.76E+01	3.06E-01	1.15E+01	3.30E-02	1.12E+00	1.16E+00	3.28E+00	1.31E+01	3.52E-01	8.80E-02
Copper	1.76E+02	5.15E-01	9.06E+01	1.55E-01	8.85E+00	9.00E+00	1.17E+01	1.51E+01	7.69E-01	5.94E-01
Lead	9.40E+01	2.66E-01	2.50E+01	8.26E-02	2.44E+00	2.52E+00	8.00E+00	8.00E+01	3.16E-01	3.16E-02
Mercury	2.17E-01	1.69E+00	3.68E-01	1.91E-04	3.59E-02	3.61E-02	3.20E-02	1.60E-01	1.13E+00	2.26E-01
Nickel	3.42E+01	1.06E+00	3.62E+01	3.00E-02	3.54E+00	3.57E+00	4.00E+01	8.00E+01	8.91E-02	4.46E-02
Zinc	1.91E+02	3.20E+00	6.11E+02	1.68E-01	5.97E+01	5.99E+01	1.60E+02	3.20E+02	3.74E-01	1.87E-01

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.69E-02	kg
Food Ingestion Rate = (If)	1.65E-03	kg/day
Soil Ingestion Rate = (Is)	1.48E-05	kg/day
Home Range = (HR)	9.70E-01	Acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Ci = Contaminant concentration in invertebrate = (soil conc. * Biotransfer Factor)
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (invertebrate)
H=HR/CA (Assume = to 1)

COTTON MOUSE - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 17, CHARLESTON, SOUTH CAROLINA

Chemical	Max Soil Conc. (mg/kg)	Biotransfer Factor (soil to veg.)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Vegetation	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	NOAEL HQ	LOAEL HQ
Pesticides/PCBs										
4,4'-DDD	3.70E-02	1.60E-02	5.92E-04	1.06E-04	8.51E-05	1.91E-04	8.00E-01	4.00E+00	2.39E-04	4.78E-05
4,4'-DDE	9.20E-03	1.90E-02	1.75E-04	2.64E-05	2.51E-05	5.15E-05	8.00E-01	4.00E+00	6.44E-05	1.29E-05
4,4'-DDT	2.00E-02	7.80E-03	1.56E-04	5.75E-05	2.24E-05	7.99E-05	8.00E-01	4.00E+00	9.98E-05	2.00E-05
Aldrin	2.20E-03	6.90E-01	1.52E-03	6.32E-06	2.18E-04	2.24E-04	2.00E-01	1.00E+00	1.12E-03	2.24E-04
Alpha-Chlordane	5.50E-04	2.50E-02	1.38E-05	1.58E-06	1.98E-06	3.56E-06	4.58E+00	9.16E+00	7.76E-07	3.88E-07
Aroclor-1248	5.70E-01	1.60E-02	9.12E-03	1.64E-03	1.31E-03	2.95E-03	1.00E-02	1.00E-01	2.95E-01	2.95E-02
Aroclor-1254	8.70E-01	1.30E-02	1.13E-02	2.50E-03	1.62E-03	4.12E-03	6.80E-02	6.80E-01	6.07E-02	6.07E-03
Aroclor-1260	3.50E-01	2.90E-03	1.02E-03	1.01E-03	1.46E-04	1.15E-03	6.80E-02	6.80E-01	1.69E-02	1.69E-03
Endrin Aldehyde	1.30E-03	8.20E-02	1.07E-04	3.74E-06	1.53E-05	1.91E-05	9.20E-02	9.20E-01	2.07E-04	2.07E-05
Endrin Ketone	5.40E-03	8.20E-02	4.43E-04	1.55E-05	6.36E-05	7.91E-05	9.20E-02	9.20E-01	8.60E-04	8.60E-05
Heptachlor	2.80E-03	1.20E-01	3.36E-04	8.05E-06	4.83E-05	5.63E-05	1.00E-01	1.00E+00	5.63E-04	5.63E-05
delta-BHC	1.80E-03	9.00E-01	1.62E-03	5.17E-06	2.33E-04	2.38E-04	1.40E-02	1.40E-01	1.70E-02	1.70E-03
gamma-BHC (Lindane)	8.70E-04	2.70E-01	2.35E-04	2.50E-06	3.37E-05	3.62E-05	8.00E+00	8.00E+01	4.53E-06	4.53E-07
Inorganics										
Cadmium	1.25E+01	3.25E+00	4.06E+01	3.59E-02	5.84E+00	5.87E+00	1.00E+00	1.00E+01	5.87E+00	5.87E-01
Chromium	3.92E+02	8.39E-02	3.29E+01	1.13E+00	4.72E+00	5.85E+00	3.28E+00	1.31E+01	1.78E+00	4.45E-01
Copper	1.93E+03	6.25E-01	1.21E+03	5.55E+00	1.73E+02	1.79E+02	1.17E+01	1.51E+01	1.53E+01	1.18E+01
Lead	6.70E+02	4.68E-01	3.14E+02	1.93E+00	4.50E+01	4.70E+01	8.00E+00	8.00E+01	5.87E+00	5.87E-01
Mercury	1.80E+00	5.00E+00	9.00E+00	5.17E-03	1.29E+00	1.30E+00	3.20E-02	1.60E-01	4.06E+01	8.11E+00
Nickel	3.48E+02	1.41E+00	4.91E+02	1.00E+00	7.05E+01	7.15E+01	4.00E+01	8.00E+01	1.79E+00	8.94E-01
Zinc	1.51E+03	1.82E+00	2.75E+03	4.34E+00	3.95E+02	3.99E+02	1.60E+02	3.20E+02	2.49E+00	1.25E+00

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.48E-02	kg
Food Ingestion Rate = (If)	2.13E-03	kg/day
Soil Ingestion Rate = (Is)	4.25E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Cp = Contaminant concentration in vegetation = (soil conc. * Biotransfer Factor)
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (vegetation)
H=HR/CA (Assume = to 1)

COTTON MOUSE - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 17, CHARLESTON, SOUTH CAROLINA

Chemical	Avg Soil Conc. (mg/kg)	Biotransfer Factor (soil to veg.)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Vegetation	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	NOAEL HQ	LOAEL HQ
Pesticides/PCBs										
4,4'-DDD	3.98E-03	1.60E-02	6.36E-05	3.20E-06	2.56E-06	5.76E-06	8.00E-01	4.00E+00	7.20E-06	1.44E-06
4,4'-DDE	2.26E-03	1.90E-02	4.30E-05	1.82E-06	1.73E-06	3.56E-06	8.00E-01	4.00E+00	4.44E-06	8.89E-07
4,4'-DDT	3.07E-03	7.80E-03	2.39E-05	2.47E-06	9.63E-07	3.43E-06	8.00E-01	4.00E+00	4.29E-06	8.58E-07
Aldrin	1.09E-03	6.90E-01	7.49E-04	8.74E-07	3.01E-05	3.10E-05	2.00E-01	1.00E+00	1.55E-04	3.10E-05
Alpha-Chlordane	5.50E-04	2.50E-02	1.38E-05	4.43E-07	5.53E-07	9.96E-07	4.58E+00	9.16E+00	2.18E-07	1.09E-07
Aroclor-1248	3.98E-02	1.60E-02	6.36E-04	3.20E-05	2.56E-05	5.76E-05	1.00E-02	1.00E-01	5.76E-03	5.76E-04
Aroclor-1254	7.86E-02	1.30E-02	1.02E-03	6.33E-05	4.11E-05	1.04E-04	6.80E-02	6.80E-01	1.54E-03	1.54E-04
Aroclor-1260	3.67E-02	2.90E-03	1.06E-04	2.95E-05	4.28E-06	3.38E-05	6.80E-02	6.80E-01	4.97E-04	4.97E-05
Endrin Aldehyde	1.30E-03	8.20E-02	1.07E-04	1.05E-06	4.29E-06	5.34E-06	9.20E-02	9.20E-01	5.80E-05	5.80E-06
Endrin Ketone	2.06E-03	8.20E-02	1.69E-04	1.66E-06	6.80E-06	8.45E-06	9.20E-02	9.20E-01	9.19E-05	9.19E-06
Heptachlor	1.08E-03	1.20E-01	1.29E-04	8.67E-07	5.20E-06	6.07E-06	1.00E-01	1.00E+00	6.07E-05	6.07E-06
delta-BHC	1.06E-03	9.00E-01	9.53E-04	8.53E-07	3.84E-05	3.92E-05	1.40E-02	1.40E-01	2.80E-03	2.80E-04
gamma-BHC (Lindane)	8.70E-04	2.70E-01	2.35E-04	7.00E-07	9.45E-06	1.02E-05	8.00E+00	8.00E+01	1.27E-06	1.27E-07
Inorganics										
Cadmium	1.26E+00	5.86E-01	7.39E-01	1.01E-03	2.97E-02	3.08E-02	1.00E+00	1.00E+01	3.08E-02	3.08E-03
Chromium	3.76E+01	4.10E-02	1.54E+00	3.02E-02	6.20E-02	9.22E-02	3.28E+00	1.31E+01	2.81E-02	7.02E-03
Copper	1.76E+02	1.24E-01	2.18E+01	1.42E-01	8.78E-01	1.02E+00	1.17E+01	1.51E+01	8.70E-02	6.73E-02
Lead	9.40E+01	3.89E-02	3.66E+00	7.56E-02	1.47E-01	2.23E-01	8.00E+00	8.00E+01	2.78E-02	2.78E-03
Mercury	2.17E-01	6.52E-01	1.42E-01	1.75E-04	5.70E-03	5.88E-03	3.20E-02	1.60E-01	1.84E-01	3.67E-02
Nickel	3.42E+01	1.80E-02	6.15E-01	2.75E-02	2.48E-02	5.23E-02	4.00E+01	8.00E+01	1.31E-03	6.53E-04
Zinc	1.91E+02	3.66E-01	6.99E+01	1.54E-01	2.81E+00	2.97E+00	1.60E+02	3.20E+02	1.85E-02	9.27E-03

Body Weight = (BW)	2.10E-02	kg
Food Ingestion Rate = (If)	8.45E-04	kg/day
Soil Ingestion Rate = (Is)	1.69E-05	kg/day
Home Range = (HR)	1.52E-01	Acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Cp = Contaminant concentration in vegetation = (soil conc. * Biotransfer Factor)
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (vegetation)
H=HR/CA (Assume = to 1)

MOURNING DOVE - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 17, CHARLESTON, SOUTH CAROLINA

Chemical	Max Soil Conc. (mg/kg)	Biotransfer Factor (soil to veg.)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Vegetation	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	NOAEL HQ	LOAEL HQ
Pesticides/PCBs										
4,4'-DDD	3.70E-02	1.60E-02	5.92E-04	9.77E-04	1.12E-04	1.09E-03	9.00E-03	5.20E-02	1.21E-01	2.10E-02
4,4'-DDE	9.20E-03	1.90E-02	1.75E-04	2.43E-04	3.32E-05	2.76E-04	9.00E-03	5.20E-02	3.07E-02	5.31E-03
4,4'-DDT	2.00E-02	7.80E-03	1.56E-04	5.28E-04	2.96E-05	5.58E-04	9.00E-03	5.20E-02	6.20E-02	1.07E-02
Aldrin	2.20E-03	6.90E-01	1.52E-03	5.81E-05	2.88E-04	3.47E-04	NV	NV	#VALUE!	#VALUE!
Alpha-Chlordane	5.50E-04	2.50E-02	1.38E-05	1.45E-05	2.61E-06	1.71E-05	2.14E+00	1.07E+01	8.01E-06	1.60E-06
Aroclor-1248	5.70E-01	1.60E-02	9.12E-03	1.51E-02	1.73E-03	1.68E-02	NV	NV	#VALUE!	#VALUE!
Aroclor-1254	8.70E-01	1.30E-02	1.13E-02	2.30E-02	2.15E-03	2.51E-02	1.80E-01	1.80E+00	1.40E-01	1.40E-02
Aroclor-1260	3.50E-01	2.90E-03	1.02E-03	9.24E-03	1.93E-04	9.44E-03	1.80E-01	1.80E+00	5.24E-02	5.24E-03
Endrin Aldehyde	1.30E-03	8.20E-02	1.07E-04	3.43E-05	2.03E-05	5.46E-05	1.00E-02	1.00E-01	5.46E-03	5.46E-04
Endrin Ketone	5.40E-03	8.20E-02	4.43E-04	1.43E-04	8.41E-05	2.27E-04	1.00E-02	1.00E-01	2.27E-02	2.27E-03
Heptachlor	2.80E-03	1.20E-01	3.36E-04	7.39E-05	6.38E-05	1.38E-04	NV	NV	#VALUE!	#VALUE!
delta-BHC	1.80E-03	9.00E-01	1.62E-03	4.75E-05	3.08E-04	3.55E-04	5.60E-01	2.25E+00	6.35E-04	1.58E-04
gamma-BHC (Lindane)	8.70E-04	2.70E-01	2.35E-04	2.30E-05	4.46E-05	6.76E-05	2.00E+00	2.00E+01	3.38E-05	3.38E-06
Inorganics										
Cadmium	1.25E+01	3.25E+00	4.06E+01	3.30E-01	7.72E+00	8.05E+00	1.45E+00	2.00E+01	5.55E+00	4.02E-01
Chromium	3.92E+02	8.39E-02	3.29E+01	1.04E+01	6.25E+00	1.66E+01	1.00E+00	5.00E+00	1.66E+01	3.32E+00
Copper	1.93E+03	6.25E-01	1.21E+03	5.10E+01	2.29E+02	2.80E+02	4.70E+01	6.17E+01	5.96E+00	4.54E+00
Lead	6.70E+02	4.68E-01	3.14E+02	1.77E+01	5.96E+01	7.73E+01	1.13E+00	1.13E+01	6.84E+01	6.84E+00
Mercury	1.80E+00	5.00E+00	9.00E+00	4.75E-02	1.71E+00	1.76E+00	6.40E-03	6.40E-02	2.75E+02	2.75E+01
Nickel	3.48E+02	1.41E+00	4.91E+02	9.19E+00	9.33E+01	1.02E+02	7.74E+01	1.07E+02	1.32E+00	9.58E-01
Zinc	1.51E+03	1.82E+00	2.75E+03	3.99E+01	5.22E+02	5.62E+02	1.45E+01	1.31E+02	3.88E+01	4.29E+00

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.20E-01	kg
Food Ingestion Rate = (If)	2.28E-02	kg/day
Soil Ingestion Rate = (Is)	3.17E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Cp = Contaminant concentration in vegetation = (soil conc. * Biotransfer Factor)
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (vegetation)
H=HR/CA (Assume = to 1)

MOURNING DOVE - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 17, CHARLESTON, SOUTH CAROLINA

Chemical	Avg Soil Conc. (mg/kg)	Biotransfer Factor (soil to veg.)	Vegetation Conc. (mg/kg)	Dose (mg/kg/d) from: Soil	Dose (mg/kg/d) from: Vegetation	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	NOAEL HQ	LOAEL HQ
Pesticides/PCBs										
4,4'-DDD	3.98E-03	1.60E-02	6.36E-05	3.31E-05	8.70E-06	4.18E-05	9.00E-03	5.20E-02	4.65E-03	8.05E-04
4,4'-DDE	2.26E-03	1.90E-02	4.30E-05	1.89E-05	5.88E-06	2.48E-05	9.00E-03	5.20E-02	2.75E-03	4.76E-04
4,4'-DDT	3.07E-03	7.80E-03	2.39E-05	2.56E-05	3.27E-06	2.89E-05	9.00E-03	5.20E-02	3.21E-03	5.55E-04
Aldrin	1.09E-03	6.90E-01	7.49E-04	9.05E-06	1.02E-04	1.11E-04	NV	NV	#VALUE!	#VALUE!
Alpha-Chlordane	5.50E-04	2.50E-02	1.38E-05	4.59E-06	1.88E-06	6.46E-06	2.14E+00	1.07E+01	3.02E-06	6.04E-07
Aroclor-1248	3.98E-02	1.60E-02	6.36E-04	3.32E-04	8.70E-05	4.19E-04	NV	NV	#VALUE!	#VALUE!
Aroclor-1254	7.86E-02	1.30E-02	1.02E-03	6.55E-04	1.40E-04	7.95E-04	1.80E-01	1.80E+00	4.42E-03	4.42E-04
Aroclor-1260	3.67E-02	2.90E-03	1.06E-04	3.06E-04	1.45E-05	3.20E-04	1.80E-01	1.80E+00	1.78E-03	1.78E-04
Endrin Aldehyde	1.30E-03	8.20E-02	1.07E-04	1.08E-05	1.46E-05	2.54E-05	1.00E-02	1.00E-01	2.54E-03	2.54E-04
Endrin Ketone	2.06E-03	8.20E-02	1.69E-04	1.72E-05	2.31E-05	4.02E-05	1.00E-02	1.00E-01	4.02E-03	4.02E-04
Heptachlor	1.08E-03	1.20E-01	1.29E-04	8.98E-06	1.77E-05	2.66E-05	NV	NV	#VALUE!	#VALUE!
delta-BHC	1.06E-03	9.00E-01	9.53E-04	8.83E-06	1.30E-04	1.39E-04	5.60E-01	2.25E+00	2.48E-04	6.18E-05
gamma-BHC (Lindane)	8.70E-04	2.70E-01	2.35E-04	7.25E-06	3.21E-05	3.94E-05	2.00E+00	2.00E+01	1.97E-05	1.97E-06
Inorganics										
Cadmium	1.26E+00	5.86E-01	7.39E-01	1.05E-02	1.01E-01	1.11E-01	1.45E+00	2.00E+01	7.69E-02	5.57E-03
Chromium	3.76E+01	4.10E-02	1.54E+00	3.13E-01	2.11E-01	5.24E-01	1.00E+00	5.00E+00	5.24E-01	1.05E-01
Copper	1.76E+02	1.24E-01	2.18E+01	1.47E+00	2.98E+00	4.45E+00	4.70E+01	6.17E+01	9.46E-02	7.20E-02
Lead	9.40E+01	3.89E-02	3.66E+00	7.83E-01	5.00E-01	1.28E+00	1.13E+00	1.13E+01	1.14E+00	1.14E-01
Mercury	2.17E-01	6.52E-01	1.42E-01	1.81E-03	1.94E-02	2.12E-02	6.40E-03	6.40E-02	3.31E+00	3.31E-01
Nickel	3.42E+01	1.80E-02	6.15E-01	2.85E-01	8.41E-02	3.69E-01	7.74E+01	1.07E+02	4.77E-03	3.45E-03
Zinc	1.91E+02	3.66E-01	6.99E+01	1.59E+00	9.55E+00	1.11E+01	1.45E+01	1.31E+02	7.69E-01	8.51E-02

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.20E-01	kg
Food Ingestion Rate = (If)	1.64E-02	kg/day
Soil Ingestion Rate = (Is)	1.00E-03	kg/day
Home Range = (HR)	Assume 100%	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Cp = Contaminant concentration in vegetation = (soil conc. * Biotransfer Factor)
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (vegetation)
H=HR/CA (Assume = to 1)

AMERICAN WOODCOCK - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 17, CHARLESTON, SOUTH CAROLINA

Chemical	Max Soil Conc. (mg/kg)	Biotransfer Factor (soil to inv.)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Sediment	Dose (mg/kg/d) from: Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	NOAEL HQ	LOAEL HQ
Pesticides/PCBs										
4,4'-DDD	3.70E-02	1.30E+01	4.81E-01	1.11E-03	8.79E-02	8.90E-02	9.00E-03	5.20E-02	9.88E+00	1.71E+00
4,4'-DDE	9.20E-03	1.30E+01	1.20E-01	2.76E-04	2.18E-02	2.21E-02	9.00E-03	5.20E-02	2.46E+00	4.25E-01
4,4'-DDT	2.00E-02	1.30E+01	2.60E-01	5.99E-04	4.75E-02	4.81E-02	9.00E-03	5.20E-02	5.34E+00	9.25E-01
Aldrin	2.20E-03	3.30E+00	7.26E-03	6.59E-05	1.33E-03	1.39E-03	NV	NV	#VALUE!	#VALUE!
Alpha-Chlordane	5.50E-04	5.00E+00	2.75E-03	1.65E-05	5.02E-04	5.19E-04	2.14E+00	1.07E+01	2.42E-04	4.85E-05
Aroclor-1248	5.70E-01	1.59E+01	9.07E+00	1.71E-02	1.66E+00	1.67E+00	NV	NV	#VALUE!	#VALUE!
Aroclor-1254	8.70E-01	1.59E+01	1.38E+01	2.61E-02	2.53E+00	2.55E+00	1.80E-01	1.80E+00	1.42E+01	1.42E+00
Aroclor-1260	3.50E-01	1.59E+01	5.57E+00	1.05E-02	1.02E+00	1.03E+00	1.80E-01	1.80E+00	5.71E+00	5.71E-01
Endrin Aldehyde	1.30E-03	3.60E+00	4.68E-03	3.89E-05	8.55E-04	8.94E-04	1.00E-02	1.00E-01	8.94E-02	8.94E-03
Endrin Ketone	5.40E-03	3.60E+00	1.94E-02	1.62E-04	3.55E-03	3.71E-03	1.00E-02	1.00E-01	3.71E-01	3.71E-02
Heptachlor	2.80E-03	1.00E+01	2.80E-02	8.39E-05	5.11E-03	5.20E-03	NV	NV	#VALUE!	#VALUE!
delta-BHC	1.80E-03	5.00E+00	9.00E-03	5.39E-05	1.64E-03	1.70E-03	5.60E-01	2.25E+00	3.03E-03	7.55E-04
gamma-BHC (Lindane)	8.70E-04	5.00E+00	4.35E-03	2.61E-05	7.95E-04	8.21E-04	2.00E+00	2.00E+01	4.10E-04	4.10E-05
Inorganics										
Cadmium	1.25E+01	4.07E+01	5.09E+02	3.74E-01	9.29E+01	9.33E+01	1.45E+00	2.00E+01	6.43E+01	4.66E+00
Chromium	3.92E+02	3.16E+00	1.24E+03	1.17E+01	2.26E+02	2.38E+02	1.00E+00	5.00E+00	2.38E+02	4.76E+01
Copper	1.93E+03	1.53E+00	2.95E+03	5.78E+01	5.40E+02	5.98E+02	4.70E+01	6.17E+01	1.27E+01	9.68E+00
Lead	6.70E+02	1.52E+00	1.02E+03	2.01E+01	1.86E+02	2.06E+02	1.13E+00	1.13E+01	1.83E+02	1.83E+01
Mercury	1.80E+00	2.06E+01	3.71E+01	5.39E-02	6.78E+00	6.83E+00	6.40E-03	6.40E-02	1.07E+03	1.07E+02
Nickel	3.48E+02	4.73E+00	1.65E+03	1.04E+01	3.01E+02	3.11E+02	7.74E+01	1.07E+02	4.02E+00	2.91E+00
Zinc	1.51E+03	1.29E+01	1.95E+04	4.52E+01	3.55E+03	3.60E+03	1.45E+01	1.31E+02	2.48E+02	2.75E+01

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.66E-01	kg
Food Ingestion Rate = (If)	3.03E-02	kg/day
Soil Ingestion Rate = (Is)	4.97E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Ci = Contaminant concentration in invertebrate = (soil conc. * Biotransfer Factor)
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (invertebrate)
H=HR/CA (Assume = to 1)

AMERICAN WOODCOCK - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 17, CHARLESTON, SOUTH CAROLINA

Chemical	Avg Soil Conc. (mg/kg)	Biotransfer Factor (soil to inv)	Invertebrate Conc. (mg/kg)	Dose (mg/kg/d) from: Sediment	Dose (mg/kg/d) from: Invert.	Total Dose (mg/kg/d)	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	NOAEL HQ	LOAEL HQ
Pesticides/PCBs										
4,4'-DDD	3.98E-03	1.30E+01	5.17E-02	3.39E-05	6.89E-03	6.93E-03	9.00E-03	5.20E-02	7.70E-01	1.33E-01
4,4'-DDE	2.26E-03	1.30E+01	2.94E-02	1.93E-05	3.93E-03	3.94E-03	9.00E-03	5.20E-02	4.38E-01	7.59E-02
4,4'-DDT	3.07E-03	1.30E+01	3.99E-02	2.62E-05	5.32E-03	5.34E-03	9.00E-03	5.20E-02	5.94E-01	1.03E-01
Aldrin	1.09E-03	3.30E+00	3.58E-03	9.26E-06	4.78E-04	4.87E-04	NV	NV	#VALUE!	#VALUE!
Alpha-Chlordane	5.50E-04	5.00E+00	2.75E-03	4.69E-06	3.67E-04	3.71E-04	2.14E+00	1.07E+01	1.74E-04	3.47E-05
Aroclor-1248	3.98E-02	6.67E+00	2.65E-01	3.39E-04	3.54E-02	3.57E-02	NV	NV	#VALUE!	#VALUE!
Aroclor-1254	7.86E-02	6.67E+00	5.24E-01	6.71E-04	6.99E-02	7.05E-02	1.80E-01	1.80E+00	3.92E-01	3.92E-02
Aroclor-1260	3.67E-02	6.67E+00	2.44E-01	3.13E-04	3.26E-02	3.29E-02	1.80E-01	1.80E+00	1.83E-01	1.83E-02
Endrin Aldehyde	1.30E-03	3.60E+00	4.68E-03	1.11E-05	6.24E-04	6.35E-04	1.00E-02	1.00E-01	6.35E-02	6.35E-03
Endrin Ketone	2.06E-03	3.60E+00	7.41E-03	1.76E-05	9.88E-04	1.01E-03	1.00E-02	1.00E-01	1.01E-01	1.01E-02
Heptachlor	1.08E-03	1.00E+01	1.08E-02	9.19E-06	1.44E-03	1.44E-03	NV	NV	#VALUE!	#VALUE!
delta-BHC	1.06E-03	5.00E+00	5.30E-03	9.04E-06	7.06E-04	7.15E-04	5.60E-01	2.25E+00	1.28E-03	3.18E-04
gamma-BHC (Lindane)	8.70E-04	5.00E+00	4.35E-03	7.42E-06	5.80E-04	5.87E-04	2.00E+00	2.00E+01	2.94E-04	2.94E-05
Inorganics										
Cadmium	1.26E+00	7.71E+00	9.72E+00	1.08E-02	1.30E+00	1.31E+00	1.45E+00	2.00E+01	9.01E-01	6.53E-02
Chromium	3.76E+01	3.06E-01	1.15E+01	3.21E-01	1.53E+00	1.85E+00	1.00E+00	5.00E+00	1.85E+00	3.71E-01
Copper	1.76E+02	5.15E-01	9.06E+01	1.50E+00	1.21E+01	1.36E+01	4.70E+01	6.17E+01	2.89E-01	2.20E-01
Lead	9.40E+01	2.66E-01	2.50E+01	8.02E-01	3.33E+00	4.13E+00	1.13E+00	1.13E+01	3.66E+00	3.66E-01
Mercury	2.17E-01	1.69E+00	3.68E-01	1.85E-03	4.91E-02	5.09E-02	6.40E-03	6.40E-02	7.96E+00	7.96E-01
Nickel	3.42E+01	1.06E+00	3.62E+01	2.92E-01	4.83E+00	5.12E+00	7.74E+01	1.07E+02	6.61E-02	4.78E-02
Zinc	1.91E+02	3.20E+00	6.11E+02	1.63E+00	8.15E+01	8.31E+01	1.45E+01	1.31E+02	5.74E+00	6.35E-01

Cells are shaded if the value is greater than 1.0

Body Weight = (BW)	1.90E-01	kg
Food Ingestion Rate = (If)	2.53E-02	kg/day
Soil Ingestion Rate = (Is)	1.62E-03	kg/day
Home Range = (HR)	6.13E+01	Acres
Contaminated Area = (CA)	Assume equal to home range	

Dose (soil) = (Cs * Is)(H)/BW
Dose (invertebrate) = (Ci * If)(H)/BW
Ci = Contaminant concentration in invertebrate = (soil conc. * Biotransfer Factor)
Cs = Contaminant concentration in soil
Total Dose = Dose (soil) + Dose (invertebrate)
H=HR/CA (Assume = to 1)

APPENDIX G.5

SUPPLEMENTARY EVALUATION OF SWMU 16 SURFACE SOIL DATA AS SEDIMENT DATA

SUPPLEMENTARY EVALUATION OF SWMU 16 SURFACE SOIL DATA AS SEDIMENT DATA

INTRODUCTION

SWMU 16 is located along the edge of an extensive tidal marsh associated with Goose Creek. Four surface soil samples were collected at SWMU 16 and laboratory analytical data from these samples were evaluated in the ecological risk assessment. Although surface water was not present at the locations of the four surface soil samples (16-S-01-00, 16-S-02-00, 16-S-03-00, and 16-S-04-00 at locations 16SS01, 16SS02, 16SS03, and 16SS04, respectively) during sample collection, the sample locations are well within the area encompassed by higher tides like that mapped in 2006 as the highest tide of that year. With this in mind, the Natural Resources Trustees (NRTs) have requested that the analytical data from the four surface soil samples be evaluated relative to sediment ecological screening values. The following text comprises this evaluation.

RESULTS

Table 1 summarizes the chemicals detected in the aforementioned surface soil samples and compares the maximum detected concentrations to USEPA Region IV sediment ecological screening values (USEPA, 2001). The data in Table 1 are repeated from Table 7-1 of the ecological risk assessment (see Section 7 of the RFI Report).

Surface soil concentrations of 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, aluminum, arsenic, calcium, cobalt, copper, iron, magnesium, manganese, mercury, nickel, potassium, selenium, sodium, vanadium, and zinc (Table 1) were similar to or less than concentrations in sediment (Table 7-2 of the RFI) and therefore, any potential sediment-related risks posed by these chemicals are similar to or less than those discussed in the ecological risk assessment.

Concentrations of acetone, benzaldehyde, phthalates, Aroclor-1254, antimony, barium, cadmium, chromium, and lead in one or more surface soil samples (Table 1) were greater than their concentrations in sediment (Table 7-2 of the RFI); these chemicals are discussed below:

<u>Acetone</u>

Acetone was not detected in sediment but was detected in two of four surface soil samples. Acetone is sometimes present in environmental samples due to laboratory contamination. Acetone is also used in numerous products, so its presence in soil samples might be site-related, but acetone is volatile and biodegrades fairly rapidly in most soils, so its presence might be due to

laboratory contamination. Moreover, acetone was frequently detected in field QA/QC samples throughout all phases of the investigation (Appendix E-7 of RFI Report) with maximum concentrations of 28 ug/L in rinsate blanks, 19 ug/L in trip blanks, and 35 ug/L in field blanks. Regardless of the source of acetone, a sediment ecological screening value for this compound is absent, so potential risks to sediment-related receptors cannot be fully evaluated.

Benzaldehyde

Benzaldehyde was detected in the same two surface soil samples as acetone (16-S-03-00 and 16-S-04-00). Benzaldehyde was not detected in sediment but its sediment detection limits (430 µg/kg to 1700 µg/kg; Appendix E-6) in five of six sediment samples exceeded the two detected soil concentrations of 450 µg/kg and 460 µg/kg. Thus, a comparison of surface soil concentrations to sediment concentrations is unclear. In addition, a sediment ecological screening value for benzaldehyde was not located, so potential sediment-related risks cannot be fully evaluated. Moreover, benzaldehyde was detected in field QA/QC samples during the latest phase of the RFI (Appendix E-7.of RFI Report) with maximum concentrations of 13 ug/L in both rinsate and field blanks.

Phthalates

Phthalates are common environmental contaminants due to their use in plastics, and are relatively persistent in the environment. Phthalates can also be an artifact of the sampling and/or analytical methods.

Phthalates were not detected in sediment, at sediment detection limits of 460 µg/kg to 4300 µg/kg for bis(2-ethylhexyl) phthalate and 430 µg/kg to 1700 µg/kg for other phthalates (Appendix E-6). The maximum surface soil concentration of bis (2-ethylhexyl) phthalate was 6,100,000 µg/kg in the duplicate of 16-S-02-00 and was 3,800,000 µg/kg in the original sample 16-S-02-00, compared to a sediment ecological screening value of 182 µg/kg. Thus, these concentrations indicate risk to benthic receptors in the vicinity of sample 16-S-02-00. Other detected bis (2-ethylhexyl) phthalate concentrations (240 µg/kg in 16-S-04-00 and 250 µg/kg in 16-S-03-00) only slightly exceeded the sediment ecological screening value.

Four other phthalates were detected in surface soil sample 16-S-02-00 and its duplicate, but were not detected in the three other surface soil samples. Sediment ecological screening values for these phthalates were not located, so potential risks to sediment invertebrates cannot be evaluated.

Aroclor 1254

Aroclor-1254 was not detected in sediment, at sediment detection limits of 22 µg/kg to 86 µg/kg (Appendix E-6). It was detected in surface soil sample 16-S-02-00 at 59,000 µg/kg and in the duplicate of that sample at 40,000 µg/kg, compared to a sediment ecological screening value of 33 µg/kg. It was not detected in other surface soil samples; detection limits in surface soil ranged from 20 to 22 µg/kg. Thus, potential risks to benthic receptors in the vicinity of sample 16-S-02-00 are likely, while risks to benthic receptors at the other three locations are negligible.

Metals

Antimony was detected in surface soil sample 16-S-02-00 at 98.3 mg/kg and in the duplicate of that sample at 122 mg/kg, compared to a sediment ecological screening value of 12 mg/kg. It was not detected in other surface soil samples; detection limits in surface soil ranged from 0.18 mg/kg to 0.41 mg/kg. Antimony was not detected in sediment.

There is no USEPA Region IV sediment ecological screening value for barium, but the Apparent Effects Threshold (AET) for sediment is 48 mg/kg (Buchman, 1999). This value was exceeded in surface soil sample 16-S-02-00 at 150 mg/kg and in the duplicate of that sample at 207 mg/kg. Barium concentrations in the other soil samples ranged from 13.5 to 19.8 mg/kg, which were less than the AET and less than the concentration in the upgradient sediment sample (23SD08 at 36.1 mg/kg).

Surface soil concentrations of cadmium exceeded the 1.0 mg/kg sediment ecological screening value in 16-S-02-00 at 60.7 mg/kg and in the duplicate of that sample at 44 mg/kg. Cadmium concentrations in the other soil samples ranged from non-detect (0.32 mg/kg detection limit) to 0.26 mg/kg. Cadmium was not detected in sediment.

Surface soil concentrations of chromium exceeded the 52.3 mg/kg sediment ecological screening value in 16-S-02-00 at 478 mg/kg and in the duplicate of that sample at 667 mg/kg. Chromium concentrations in the other soil samples ranged from 11 to 18.3 mg/kg.

Surface soil concentrations of lead exceeded the 30.2 mg/kg sediment ecological screening value in 16-S-02-00 at 9,610 mg/kg and in the duplicate of that sample at 12,400 mg/kg. Lead concentrations in the other soil samples ranged from 7.8 to 11.8 mg/kg.

SUMMARY

When interpreted as soil, only location 16SS02 (sample 16-S-02) presents a significant risk, with potential ecological risks primarily from Aroclor 1254, lead, and other metals and human health risks primarily from lead, Aroclor 1254, bis(2-ethylhexyl) phthalate, and chromium. When SWMU 16 surface soil data is instead interpreted as sediment data, as discussed above, again only location 16SS02 presents a significant ecological risk. Five phthalates, one PCB (Aroclor-1254), and five metals (antimony, barium, cadmium, chromium, and lead) at location 16-S-02-00 were elevated relative to ecological screening values and/or to concentrations in nearby sediment samples. Maximum hazard quotients were highest for bis(2-ethylhexyl)phthalate, Aroclor-1254, and lead (Table 1). Potential risks to sediment-related receptors are not expected at the other three surface soil sample locations. Acetone and benzaldehyde were detected in surface soil samples 16-S-03-00 and 16-S-04-00. Sediment toxicity thresholds for these two compounds were not available and QA/QC results indicate the detections are not site related.

There are no changes to the RFI Report conclusions if the SWMU 16 surface soil data are interpreted as sediment data. The RFI Report evaluation resulted in a recommendation to address the 16SS02 (sample 16-S-02) "hot spot" location in a Corrective Measures Study (CMS). Also, the RFI Report noted that regardless of risk assessment results, SWMU 16 is a landfill and so a cover system and monitoring also need to be addressed in a CMS.

REFERENCES

Buchman, M.F. 1999. NOAA Screening Quick Reference Tables, NOAA HAZMAT Report 99-1, Seattle, Washington, Coastal Protection and Restoration Division, National Oceanic and Atmospheric Administration, 12 pp.

USEPA (U.S. Environmental Protection Agency). 2001. Supplemental Guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment. Waste Management Division, Atlanta, Georgia. Originally published November 1995. Website version last updated November 30, 2001: http://www.epa.gov/region4/waste/ots/ecolbul.htm

TABLE 1
COMPARISON OF SURFACE SOIL DATA TO SEDIMENT ECOLOGICAL SCREENING VALUES
SWMU 16
NAVAL WEAPONS STATION CHARLESTON
CHARLESTON, SOUTH CAROLINA

Parameter	Frequency of Detection	Detected Concentrations		Sample of Maximum Detection	Average of Positive Detections	Average of All Samples	Sediment ESV[1]	Hazard Quotient[2]
		Min.	Max.					
Volatile Organics (µg/kg)								
Acetone	2/4	1300 J	1700 J	16-S-04-00	1500	764	NA	NA
Semivolatile Organics (µg/kg)								
Benzaldehyde	2/4	450	460	16-S-03-00	455	1184	NA	NA
Bis(2-ethylhexyl)phthalate	3/4	240 J	6100000	16-S-02-00-D	1650163	1237673	182	33516.5
Butyl benzyl phthalate	1/4	9400	16000	16-S-02-00-D	12700	3330	NA	NA
Di-n-butyl phthalate	1/4	14000	26000	16-S-02-00-D	20000	5155	NA	NA
Di-n-octyl phthalate	1/4	34000 J	70000 J	16-S-02-00-D	52000	13155	NA	NA
Diethyl phthalate	1/4	870 J	1900 J	16-S-02-00-D	1385	501	NA	NA
Pesticides/PCBs (µg/kg)								
4,4'-DDD	1/4	1.4 J	1.4 J	16-S-03-00	1.4	93	3.3	0.4
4,4'-DDE	2/4	3.1 J	4.6	16-S-04-00	3.9	94	3.3	1.4
4,4'-DDT	1/4	4.8	4.8	16-S-04-00	4.8	93	3.3	1.5
Total DDT[3]	2/4	4.5	9.4	16-S-04-00	-	-	3.3	2.8
Aroclor-1254	1/4	40000	59000	16-S-02-00	49500	12383	33	1787.9
Inorganics (mg/kg)								
Aluminum	4/4	3030	14200	16-S-01-00	8734	8734	NA	NA
Antimony	1/4	98.3	122	16-S-02-00-D	110	28	12	10.2
Arsenic	4/4	1.1	3.9	16-S-01-00 16-S-03-00 16-S-04-00	3.2	3.2	7.24	0.5
Barium	4/4	13.5	207	16-S-02-00-D	56.9	56.9	NA	NA
Cadmium	3/4	0.16	60.7	16-S-02-00	17.6	13.2	1	60.7
Calcium	4/4	274	1440	16-S-02-00	561	561	NA	NA
Chromium	4/4	11	667	16-S-02-00-D	154	154	52.3	12.8
Cobalt	3/4	0.52	1.1	16-S-01-00	0.84	0.73	NA	NA
Copper	4/4	2.4	58.1	16-S-02-00-D	16	16	18.7	3.1
Iron	4/4	1520 J	15800 J	16-S-01-00	10936	10936	NA	NA
Lead	4/4	7.8	12400	16-S-02-00-D	2759	2759	30.2	410.6
Magnesium	4/4	626	1230	16-S-01-00	881	881	NA	NA
Manganese	4/4	9.4	41.4 J	16-S-04-00	24	24	NA	NA
Mercury	4/4	0.02	0.11	16-S-02-00-D	0.04	0.04	0.13	0.8
Nickel	4/4	1.6	4.7	16-S-04-00	3.1	3.1	15.9	0.3
Potassium	4/4	236	641	16-S-01-00	476	476	NA	NA
Selenium	2/4	0.67	0.69	16-S-04-00	0.7	1.3	NA	NA
Sodium	4/4	1590	4160	16-S-01-00	2675	2675	NA	NA
Vanadium	4/4	3.8	34.1	16-S-01-00	22	22	NA	NA
Zinc	4/4	5.4	157	16-S-02-00	41	41	124	1.3

Notes:
Associated Samples: 16-S-01-00, 16-S-02-00, 16-S-02-00 DUP, 16-S-03-00, and 16-S-04-00.
(1) USEPA Region 4 ecological screening value (ESV) for sediment (USEPA, 2001).
(2) Hazard quotient (HQ) = maximum detected concentration ÷ sediment ecological screening value.
(3) Total DDT = the sum of detected DDD, DDE, and DDT isomers.
NA = Ecological screening value not available.